Acute Kidney Injury

PO-001

Urinary trace elements as early biomarkers for acute kidney injury after cardiac surgery

J. Allen [1,*], D. Gardner [2], H. Skinner [3], D. Richens [3], A. Szafranek [3], I. Mitchell [3], K. Edmonds [3], S. Naik [3], M. Devonald [1]

[1]Renal and Transplant Unit, NOTTINGHAM UNIVERISTY HOSPITALS NHS TRUST, [2]School of Veterinary Medicine and Science, University of Nottingham, [3]Trent Cardiac Centre, NOTTINGHAM UNIVERISTY HOSPITALS NHS TRUST, Nottingham, United Kingdom

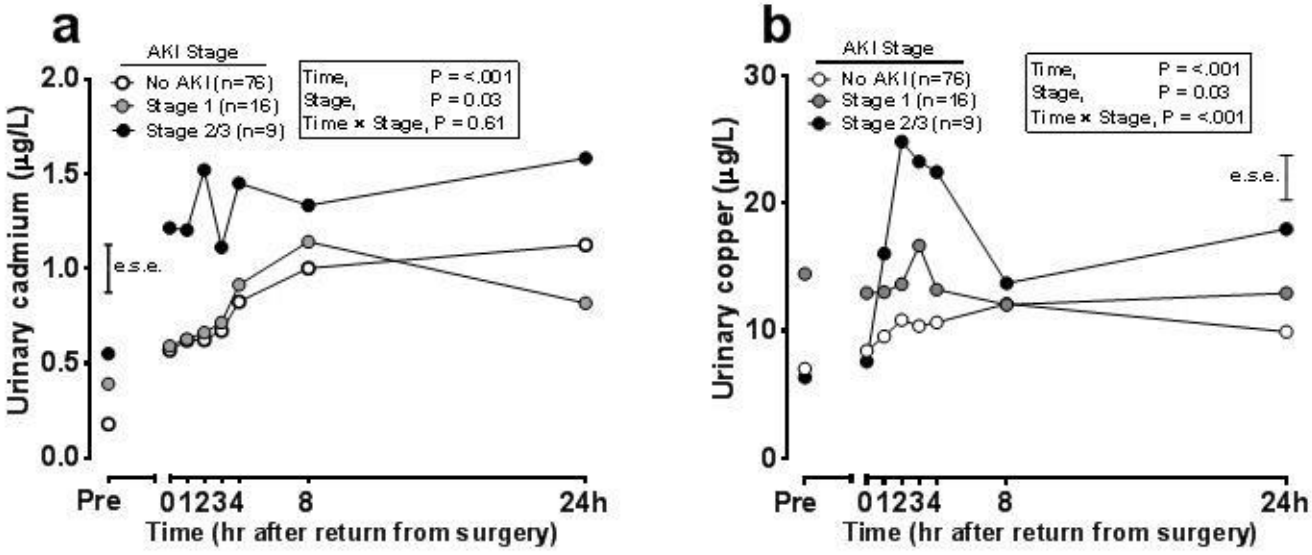
Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is a worldwide problem, associated with poor patient outcomes and huge cost (>£1 billion per year in the NHS). It is common, occurring in 20-30% patients undergoing cardiac surgery. Serum creatinine (SCr) is the current gold standard for detection, but is a poor and late marker of renal injury. Earlier detection has the potential to improve patient outcomes and experience. As yet no biomarker has been able to fulfil this role. From a porcine model of AKI (Gardner et al AJP-Renal 2014) we have demonstrated that urinary cadmium (Cd) and copper (Cu) are potential putative biomarkers of acute tubular injury which may allow early detection of AKI after cardiac surgery.

Objectives: As part of a programme of research investigating urinary Cd and Cu as early biomarkers of acute tubular injury in different clinical settings, we conducted a single centre prospective observational study of patients undergoing cardiac surgery to determine whether urinary Cd and Cu predict development and stage of AKI.

Methods: Patients undergoing cardiac surgery with one or more risk factors for AKI were recruited at the Trent Cardiac Centre. Urine was sampled preoperatively and at 0, 1, 2, 3, 4, 8 and 24 h postoperatively. Urinary elements were measured using ICP-MS and were analysed with correction for urinary Cr by Restricted Maximum Likelihood estimating equations (Genstat v18, VSNi, UK). SCr was measured as part of standard care. AKI was detected and staged using KDIGO SCr criteria or need for renal replacement therapy (RRT). Data are presented as means (SD or SEM as appropriate). Outcome measures were development of AKI (yes or no) stratified according to KDIGO stage.

Image:



Results: We enrolled 114 adult patients; 101 were included in the analysis; median age was 69y, 71% Male. Procedures were 61% elective and 39% emergency (CABG 31%, off pump CABG 7%, valve surgery 48%, CABG + valve surgery 11%,

other 4%). Mean procedure time was 213min (mean bypass time 98min; mean cross clamp time 69min). AKI occurred in 25% participants (16% stage 1, 2% stage 2, 7% stage 3 – the majority of stage 3 AKI received RRT). From preoperative baseline, urinary Cd and Cu increased considerably in patients developing stage 2/3 AKI, relative to no-AKI or Stage 1 AKI (Fig1a,b), each peaking at 2h. Using No-AKI as the reference category, the average increment in Cd and Cu for AKI stage 2/3 patients at 2h was 0.97 μg/L and 11.6 μg/L respectively.
Conclusion: Urinary Cd and Cu rise within 2 hours of injury in patients with stage 2-3 AKI, making these trace elements promising novel early biomarkers of AKI.

Disclosure of Interest: None Declared

Keywords: AKI, Creatinine

Acute Kidney Injury

PO-002

Outcomes in patients with acute kidney injury reviewed by Critical Care Outreach: what is the role of the National Early Warning Score?

N. Wroe [1,*], D. Potter [1], A. Lewington [2], H. Redhead [3]

[1]Medicine, UNIVERSITY OF LEEDS, [2]Renal Medicine, [3]Intensive Care, St James University Hospital, Leeds, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) is frequently diagnosed in patients seen by critical care outreach (CCO). However, the outcomes these patients experience and the role of the National Early Warning Score (NEWS) is poorly understood. Current literature focuses on ward/ICU patients, uses outdated definitions for AKI and limits follow up to the inpatient period.

Objectives: This pilot study aimed to describe outcomes in critically unwell AKI patients and to evaluate the role of the NEWS and other factors in identifying patients who will experience negative outcomes.

Methods: Retrospective cohort study using the electronic healthcare records of 65 patients seen by CCO between November 2014 and February 2015. Mortality up to one year was analysed using univariate and multivariate regression; all other statistical tests were non-parametric. Biomarker changes leading up to referral were assessed graphically.

Results: 43% (28/65) of patients required escalation to higher level care, 55% (36/65) failed to survive beyond one year and 30% (8/27) of those who did survive developed chronic kidney disease. Previous AKI significantly predicted mortality (Adjusted Hazard Ratio 2.7, $p = 0.04$). The NEWS was associated with increased hazard of death but did not reach significance. A subgroup of patients developed Stage 3 AKI before a rise in NEWS, with poor outcome. Potassium and bicarbonate derangement occurred prior to changes in serum creatinine, and greater changes were seen in patients who died.

Conclusion: AKI in the CCO patient population is associated with high morbidity and mortality. Previous AKI has a lasting impact on mortality. NEWS is a poor predictor of mortality in AKI, supporting AKI stage 3 as an earlier trigger for CCO review. Potassium and Bicarbonate may be useful as early indicators of deteriorating tubular function. Further research using larger samples should be conducted to corroborate this pilot study.

Disclosure of Interest: None Declared

Keywords: Bicarbonate, Management of AKI, Patient outcome measures

Acute Kidney Injury

PO-003

RENAL REPLACEMENT THERAPY FOR ACUTE KIDNEY INJURY IN A TERTIARY NEPHROLOGY CENTRE

C. Chukwu [1,*], S. Ahmed [1], A. Sharma [1]

[1]Department of Nephrology, Royal Liverpool and Broadgreen University Hospital NHS foundation Trust, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Timely referral to specialist renal care, optimal timing of renal replacement therapy (RRT), duration and intensity of RRT and regular assessment for recovery of renal function are aspects of care that can impact on the survival of patients with AKI

Objectives: The aim of the study was to assess current practice in the management of patients with severe AKI requiring RRT with reference to Renal Association guidelines

Methods: A retrospective analysis of all patients who were admitted with severe AKI and received RRT in the Renal Unit from July 2015 to August 2016 was conducted. Case notes and clinic letters were reviewed and information relating to timing of nephrology referral, indications, initiation, monitoring and withdrawal of RRT as well as subsequent follow up was gathered. Patients who received RRT in a level 3 environment were excluded

Results: 35 patients received RRT for AKI during this period; there was inadequate information for 10 patients. 68% were males, mean age was 61.9+/- 14.7years with a range of 36-88 years. 76%(19/25) patients were transferred to a renal bed within 24hrs of referral. 76%(19/25) had pre-morbid estimated glomerular filtration rate (eGFR) ≥60ml/min. The commonest indication for RRT was Oliguria (11/25) and the least common indication for RRT was uremic complication (2/25). 0% (0/25) of the patients had a review of the delivered dialysis dose during the period of RRT. 60%(15/25) achieved dialysis independence prior to discharge. The commonest reason for suspending dialysis was improvement in urine output 9/15(60%). 60%(15/25) of the patients were alive at discharge giving an in-patient mortality rate of 40%. The 30-day post-discharge mortality was 56%(14/25). Of the 15 patients that were discharged, 4 patients (27%) were followed up within 1month of discharge while 7 patients (47%) were followed up within 2 months of discharge. 4 patients died before their follow up appointment. A clear diagnosis and follow up plan was recorded in the discharge summary in 87% and 67% of the patients respectively

Conclusion: This study confirms the high mortality amongst patients with severe AKI irrespective of their baseline renal function. The commonest reason for starting RRT is oliguria while improved urine output was the commonest reason for suspending RRT. These preliminary audit data identify areas for improvement efforts including dialysis prescription optimisation for patients with AKI, and optimisation of follow up arrangements for these sick patients

Disclosure of Interest: None Declared

Keywords: AKI, Dialysis, RRT in AKI

Acute Kidney Injury

PO-004

Outcomes of acute interstitial nephritis treatment from a dedicated acute kidney injury clinic at the Royal Liverpool University Hospital

M. Khandaker [1,*], R. Brown [1] and Department of Nephrology, Royal Liverpool University Hospital
[1]Nephrology, ROYAL LIVERPOOL UNIVERSITY HOSPITAL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute interstitial nephritis (AIN) is a condition that is detected in up to 27% of biopsies[1] in patients who present with acute kidney injury (AKI). Often the cause for AIN is an offending drug and the treatment is withdrawal of the suspected drug and corticosteroids, grade 1C recommendation from observational studies[2]. Previous literature suggests that early recognition and treatment results in better outcomes. AIN is an important cause for acute kidney injury and likely to be underdiagnosed particularly in the elderly population as some observational studies have suggested[3, 4].

Objectives: In our dedicated AKI clinic we have diagnosed and managed patients with AIN in an outpatient setting. We have undertaken a retrospective review of outcomes of these cases.

Methods: Over a 12 month period 15 patients were identified as having had a kidney biopsy confirming a diagnosis of AIN. Information collected included the source of referral, whether kidney biopsy occurred within an inpatient or outpatient setting. Treatment was with prednisolone and removal of the offending drug. For patients who had an inpatient biopsy treatment was started immediately. For patients who had an outpatient biopsy, there was a significant delay (in some cases months) in starting treatment. We recorded the response to treatment using serum creatinine measured at 4 and 12 weeks after commencing treatment.

Table:

Table 1. Showing source of kidney biopsy, mean creatinine at diagnosis, 4 weeks and 12 weeks (after starting treatment)

	Number of patients	Mean creatinine at diagnosis (µmol/L)	Mean creatinine at 4 weeks (µmol/L)	Mean creatinine at 12 weeks (µmol/L)
Inpatient kidney biopsy	7	546	230.43	168.86
Outpatient kidney biopsy	8	203.38	161.13	140.13

Results: Table 1 summarises our findings. The majority of our patients were female with a mean age of 63. Patient referrals were mainly from secondary care and slightly more patients had a kidney biopsy in an outpatient setting. The mean serum creatinine at diagnosis was much higher for inpatients than for outpatients. Both groups of patients responded to treatment however the level of response to treatment for inpatients was greater. The mean creatinine reduction at 12 weeks for inpatients was 377.14µmol/L compared to 63.25µmol/L for outpatients. Our data suggests that at 12 weeks serum creatinine responds well to treatment despite delays in diagnosis.

The most common culprit drug for AIN were proton pump inhibitors (8 patients), followed by antibiotics (5 patients) and this was usually a combination. NSAIDs were found to be the cause for 4 patients and the cause for one patient was apixaban.

Conclusion: Patients with AIN can be managed safely in an outpatient setting in an AKI clinic, even with significant delays in initiating steroid treatment good recovery of renal function can be achieved within 12 weeks.

References: 1. Increased prevalence of acute tubulointerstitial nephritis. Goicoechea M et al. Nephrol Dial Transplant. 2013 Jan;28(1):112-5

2. Drug-induced acute interstitial nephritis. Rossert J. Kidney Int. 2001;60(2):804

3. Biopsy-proven acute interstitial nephritis, 1993-2011: a case series. Muriithi AK et al. Am J Kidney Dis. 2014;64(4):558

4. Clinical characteristics, causes and outcomes of acute interstitial nephritis in the elderly. Muriithi AK et al. Kidney Int. 2015 Feb;87(2):458-64

Disclosure of Interest: None Declared

Keywords: Acute tubulointerstitial nephritis, Corticosteroids, Patient outcome measures

Acute Kidney Injury

PO-005

Magnetic Resonance Imaging to Assess the Pathophysiology of Acute Kidney Injury

H. Mahmoud [1,*], C. Buchanan [2], E. Cox [2], B. Prestwich [2], S. Francis [2], M. Taal [1], N. Selby [1]

[1]Centre for Kidney Research and Innovation , university of nottingham, Derby, [2]Sir Peter Mansfield Imaging Centre, university of nottingham , Nottingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The pathophysiology of Acute Kidney Injury (AKI) in humans is not well delineated, in part due to limitations in current methods of renal imaging. Recent advances in Magnetic Resonance Imaging (MRI) show promise in assessing a range of structural and functional changes that are relevant to kidney disease. We performed a pilot study in which we combined several MRI techniques into a single scan session (multiparametric MRI) and applied this to longitudinally assess patients with AKI.

Objectives: Identify differences in renal structure and function between AKI patients and healthy volunteers. Also identify differences in renal structure and function in AKI patients between peak AKI scan and 90 day follow up scan.

Methods: 11 people were studied, four patients with AKI and seven healthy volunteers (HV) who acted as a comparator group. The patients all had AKI stage 3 and none had pre-existing CKD. Patients underwent multiparametric renal MRI scans at the time of AKI and then again 90 days later. Biochemical and clinical parameters were collected at each time point.

MRI scans were performed on a 3T Philips Ingenia scanner. Structural assessments included kidney volume, longitudinal-relaxation time (T1) mapping and Diffusion-Weighted Imaging (DWI) as markers of fibrosis and/or inflammation. Functional assessments included Arterial Spin Labelling (ASL) to measure renal perfusion and Blood Oxygenation Level Dependant Imaging (BOLD) as an indicator of renal oxygenation.

Results: The AKI patients had a mean age of 42±11yrs, two male and mean baseline creatinine of 66±18μmol/L. Peak serum creatinine was 611±235μmol/L; three patients had pre-renal AKI and one had tubulointerstitial nephritis. The first MRI scan was performed within 5 days of peak serum creatinine. By the second MRI scan at 90 days, all patients had complete biochemical recovery (serum creatinine 72±7μmol/L).

Total renal volumes were significantly increased at time of AKI as compared to HVs (635±190mls and 358±36mls respectively, p=0.017). Renal cortical T_2*(BOLD) and T_1 values increased in AKI patients, whilst renal cortex perfusion was reduced. Cortical and medullary T_1 values for AKI patients were 1805±64ms and 1905±20ms respectively. By comparison, HVs had cortical T_1 values of 1342±176ms (p=0.02 vs AKI) and medullary T_1 values of 1713±74ms (p=0.003 vs AKI).

There were also significant differences in MRI measures at 90 days as compared to time of AKI. Renal volumes had reduced (446±199mls p=0.004), as did cortical T_1 (1517±62ms, p= 0.04) and medullary T_1 values (1723±30ms, p=0.017), but cortical T_1 values at 90 days remained significantly higher than the HV group (p=0.003).

Conclusion: This is the first study to use multiparametric MRI in patients with AKI. We successfully demonstrate that multiparametric MRI can be used to assess kidney function and structure during an episode of AKI. The increase in renal volume may be associated with increase in interstitial oedema and inflammation which is also reflected in the raised T_1 values at point of injury. The persistent increase in T_1 at 90 days may potentially be related to the development of renal fibrosis after an episode of AKI. These changes were present despite normalisation of serum creatinine. Further studies are required to build on this initial pilot work, and determine how best multiparametric MRI can be used to characterise the nature of renal injury in AKI and its recovery.

Disclosure of Interest: None Declared

Keywords: Imaging

Acute Kidney Injury

PO-006

Incidence and risk factors for paediatric acute kidney injury in the UK

A. Henderson [1,*], M. Iwagami [2], C. Bottomley [1], K. Mansfield [2], L. Tomlinson [2], D. Nitsch [2]

[1]Infectious Disease Epidemiology, [2]Non-communicable Disease Epidemiology, LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, London, United Kingdom

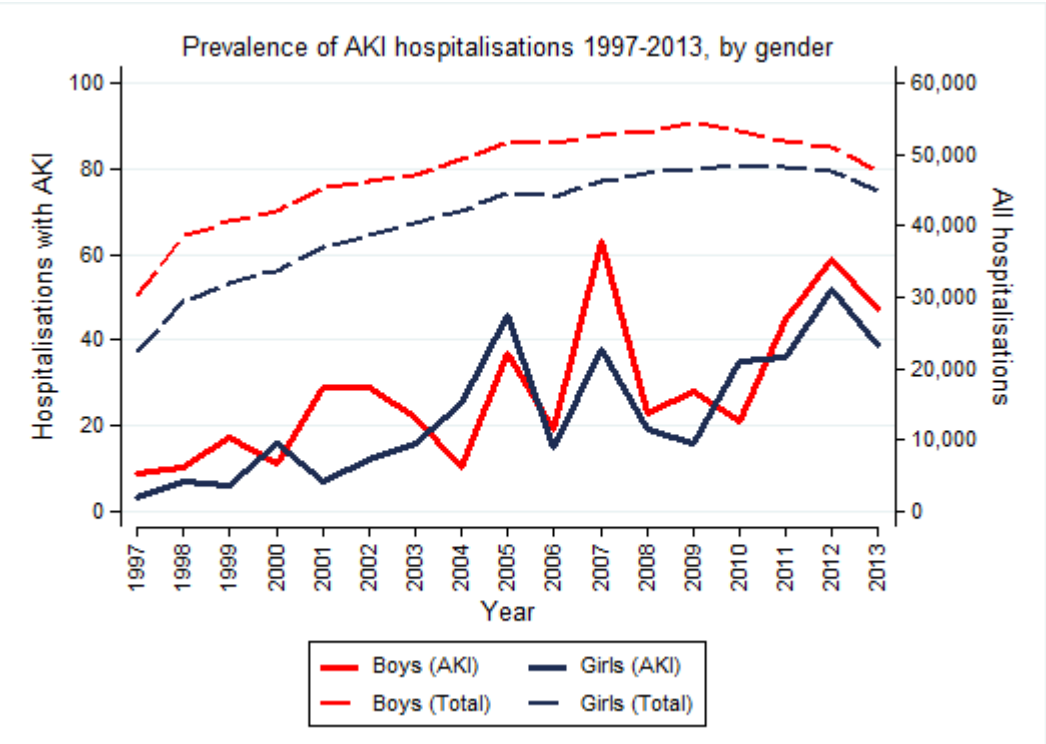
Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) is a condition that affects a large number of adults in the UK, carrying a large disease burden. Research into AKI in children is limited.

Objectives: This study aimed to explore changes in the proportion of paediatric hospitalisations with AKI since 1997, investigate common characteristics of AKI hospitalisations compared to all hospitalisations, and identify potential risk factors of AKI.

Methods: We used data from the Clinical Practice Research Datalink (CPRD) which was linked to the Hospital Episode Statistics database (HES). HES data were only available for practices participating in CRPD who had agreed for HES linkage. We defined a diagnosis of AKI/acute renal failure using ICD 10 N17 code in HES. Additional information on previous diagnoses and medication was derived from CPRD.We explored trends in AKI diagnosis through the proportion of all paediatric hospitalisations that include an AKI diagnosis. We also explored common characteristics in AKI diagnoses relative to other hospitalisations. Finally, we designed a matched case-control study and analysed using conditional logistic regression to assess the effect of key risk factors on the odds of AKI diagnosis, using risk factor information from linked CPRD records.

Image:



Results: The number of AKI diagnoses has increased since 1997 but this is in line with the increased number of hospitalisations recorded over the same period (see image). In 2013 there were only 86 hospitalisations recorded to

have AKI, representing 0.09% of all paediatric hospitalisations. There was no difference in the proportion of AKI diagnosis out of all hospitalisations by sex. However, there is evidence that age at admission was greater for those with an AKI diagnosis (10.6 years) than non-AKI hospitalisations (8.6) (p
Conclusion: The number of children with AKI diagnosed in the UK remains low in comparison to research in children in other countries and in adults, suggesting that AKI is underreported in the UK. Specific existing diagnoses (e.g. sepsis, leukaemia) during hospital admissions, congenital disorders and surgery put children at higher risk of AKI.

Disclosure of Interest: None Declared

Keywords: AKI, Children

Acute Kidney Injury

PO-007

Two Centre Experience of Anti-Glomerular Basement Membrane Disease

B. Oliveira [1,*], M. Antonelou [1], S. Chatterjee [1], A. Baumann [2], M. Blunden [2]

[1]Renal Medicine, Royal Free NHS Foundation Trust, [2]Renal Medicine, Royal London Hospital, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Anti-Glomerular Basement (Anti-GBM) disease is a rare cause of Acute Kidney Injury (AKI) characterised by rapid progression to complete anuria and End-Stage Renal Disease (ESRD) unless prompt immunosupressive treatment is initiated. There are several points along the patient's journey where delays in the recognition and treatment of this disease occur. These include delays in sending the apropriate tests and access to treatment if the patient presents in a non-specialist centre.

Objectives: We sought to analyse all cases of Anti-GBM disease in two centres in London. we had the following aims;
-Identify where delays in establishing diagnosis of the condition occur
-Identify where delays in starting treatment occur once diagnosis established
-Identify long term outcomes of patients included

Methods: Histopathology and renal databases used to identify all cases of anti-GBM from 1978 to 2016. Demographic and clincal data collected using case records and pathology systems. Data collected included the following; dates tests sent and when result available, requirement and date established on long-term RRT, and mortality data.

Results: There were a total of 50 patients across both sites (29 at the Royal Free and 21 at the Royal London) with anti-GBM disease.

Test and treatment timings;

-Time between presentation and requesting anti-GBM antibody;
Mean = 6.3 days
Median = 3 days

-Time between GBM tests request and result;
Mean = 3.54
Median = 3

-Time between presentation and starting immunosuppression;
Mean = 8.5
Median = 4
Range = 0 - 38

Patient Outcomes;
-The time between presentation and RRT status known for 33 patients
-30 became RRT dependent at some point
-70% patients became RRT dependent within 1 month
-Median time between presentation and RRT = 4.5 days

Conclusion: Results are consistent with previous reports showing poor renal outcome for anti-GBM disease. Treatment was delayed in a number of cases. Reviewing case records revealed that these were mainly due to delays in establishing the diagnosis in non-specialist centres and with subsequent delays in transfer. Significant delays in sending the

appropriate test occurred in many cases and these results emphasize the importance of sending this at the first available opportunity so that renal saving treatment can be instigated.

References: Alchi, B., Griffiths, M., Sivalingam, M., Jayne, D. & Farrington, K. Predictors of renal and patient outcomes in anti-GBM disease: clinicopathologic analysis of a two-centre cohort. *Nephrol. Dial. Transplant. Off. Publ. Eur. Dial. Transpl. Assoc. - Eur. Ren. Assoc.* **30,** 814–821 (2015).
Lahmer, T. & Heemann, U. Anti-glomerular basement membrane antibody disease: A rare autoimmune disorder affecting the kidney and the lung. *Autoimmun. Rev.* **12,** 169–173 (2012).
Savage, C. O., Pusey, C. D., Bowman, C., Rees, A. J. & Lockwood, C. M. Antiglomerular basement membrane antibody mediated disease in the British Isles 1980-4. *Br Med J Clin Res Ed* **292,** 301–304 (1986).

Disclosure of Interest: None Declared

Keywords: Anti-GBM disease, Glomerulonephritis, Immunosuppression

Acute Kidney Injury

PO-008

A Collaborative Quality Improvement Project to Improve Management of Community Acquired Primary Care AKI (CAP AKI) using E-alerts and an Educational Outreach Programme (PEEP Study)

J. Tollitt [1,*], E. Flanagan [1], S. McCorkindale [2], S. Glynn-Atkins [2], L. Emmett [1], D. Darby [3], B. Bennett [4], S. Sinha [1], D. Poulikakos [1]

[1]Renal Department, SALFORD ROYAL NHS TRUST, [2]Salford Clinical Commissioning Group, [3]Pathology Department, SALFORD ROYAL NHS TRUST, Salford, United Kingdom, [4]Improvement Science Consulting, Washington, United States

Preferred Presentation Method: Oral or Poster

Introduction:

60% of all patients have established Acute Kidney Injury (AKI) when admitted to hospital(1). Community Acquired AKI (CA_HAKI) is acquired within the community but diagnosed in hospital whereas primary care AKI (CA_PAKI) is acquired and diagnosed in the community. CA_PAKI is less common but still impacts on long term patient mortality(3).

Objectives:

1) Reduce the response time for severe community acquired acute kidney injury (stages 2 and 3) detected in primary care (CA_PAKI).

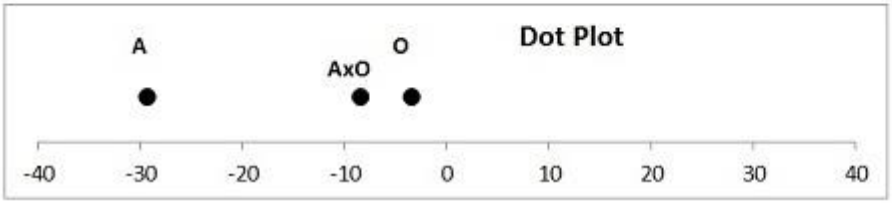
Methods:

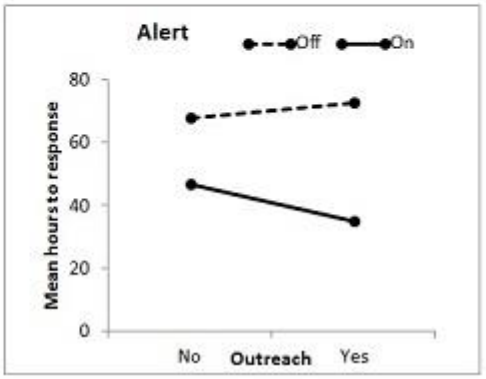
Baseline incidence of CA_PAKI detected by primary care was collected between January 2015 and April 2016. All GP practices in Salford were assigned into 4 groups using a restricted randomisation technique. A 2x2 factorial design was constructed using 2 interventions; an educational AKI outreach programme into GP practices and an AKI e-alert to accompany blood tests taken in the community. All patients in Salford CCG were included. Dialysis patients and patients <18 years old were excluded. Observation period of the effect of interventions was April to August 2016. Response time was defined as number of hours between AKI alert and repeat blood test or admission to hospital. Comparison between pre and during intervention response time was performed with Mann-Whitney U test. The relative effects of the interventions are calculated and visualised based on the Yates algorithm.

Image:

AKI response time		2^2 Design				
		E-Alert	Education			
		Off	No			
		On	Yes			
Test	Groups	A	O	AxO	Mean hours to response	n=
1	4	-	-	+	68	11
2	3	+	-	-	47.14	14
3	2	-	+	-	72.92	14
4	1	+	+	+	35.25	8
	Effect	-29.265	-3.485	-8.41		

	Outreach	
Alert	No	Yes
Off	68	72.92
On	47.14	35.25





Results:

0.8% of all 182,142 primary care creatinine blood tests demonstrated CA_PAKI, AKI1(0.6%), AKI2 (0.1%) and AKI3 (0.06%). There were 47 alerts AKI 2 and 3 alerts during the intervention period. During the intervention response time decreased compared to the response time of 47 consecutive alerts prior to the intervention phase (median 16 hours, IQR 107 from median 49 IQR 123 respectively, p=0.031). The relative effects of the interventions to the mean response time calculated by the Yates algorithm are shown in the design matrix and dot plot graph in figure 1 (left). The response plot in Figure 1 (right) demonstrates the combination of e-alert and educational outreach has most impact on a reduction in mean time to repeat blood test or hospital admission.

Educational outreach visits were well received by GP and community nursing colleagues. Average learner score was 9.1/10 and 100% of learners would welcome a repeat visit. The project did not result in an increased number of community blood tests performed.

Conclusion:

This study is the first to demonstrate that the introduction of an e-alert reduces the response time to AKI 2 and 3. The outreach programme was welcomed and provided additional benefit when combined with e-alerts.

References:

1. Selby NM, Crowley L, Fluck RJ, McIntyre CW, Monaghan J, Lawson N, et al. Use of Electronic Results Reporting to Diagnose and Monitor AKI in Hospitalized Patients. Clin J Am Soc Nephrol. 2012 Apr 1;7(4):533–40.

2. Sawhney S, Fluck N, Fraser SD, Marks A, Prescott GJ, Roderick PJ, et al. KDIGO-based acute kidney injury criteria operate differently in hospitals and the community—findings from a large population cohort. Nephrol Dial Transplant. England; 2016 Jun;31(6):922–9.

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI, Medicines management

Acute Kidney Injury

PO-009

Creation and Outcomes of a Nurse-Led Acute Kidney Injury Specialist Service

S. Hawes [1,*]

[1]Wessex Kidney Centre, PORTSMOUTH HOSPITAL TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: AKI is a common and serious health care concern, yet potentially avoidable in some cases. In light of the creation of the NICE guidelines on AKI (2013) and the AKI Patient Safety Alert Directive (2014) many acute trusts have instated AKI nurse specialists. This presentation will discuss how the role has been implemented and the impact it has had on patient outcomes 1 year on.

Objectives: The main aims of the AKI service is to reduce the number of hospital acquired AKI throughout the hospital and improve outcomes for patients with AKI in terms of mortality and length of stay.

To achieve this aim, the objectives over the first year have been:

Nurse Specialist clinically reviewing patients' who are triggering stage 2 and 3 AKI alerts in all areas of the hospital.

Working alongside and advising on AKI management for junior medical and nursing staff.

Increasing the profile, visibility and understanding of AKI of staff and patients.

Hospital wide AKI education for ward based HCSW, Staff Nurses and Junior Doctors.

Methods: Clinical Assessment:

Development of an AKI care pathway

Formation of an AKI essential check list in sticker form to use for clinical patients triggering AKI Alerts

Creation of an AKI Alert Sticker for patient's drug charts who trigger AKI Alerts

Education

AKI education for all junior doctors on trust Induction

AKI education for all new staff nurses on preceptorship programme

AKI session added to already established patient safety study day

Increasing AKI Visibility:

Displaying the AKI Care Pathway in all ward areas.

Producing pocket sized AKI essential intervention check list cards for ward based doctors and nurses.

Production of AKI patient information leaflets.

Adding AKI alert triggers and icons on the electronic "VitalPAC" patient monitoring system.

Table:

	Pre AKI Nurse Specalist	Post AKI Nurse Specialist
Total Stage 3 HA-AKI	104	88
Mortality Rate	38%	33%
Total Deaths	40	29
Average L.o.S (interquartile)	27 days	24 days

Results: Numbers of hospital acquired AKI (HA-AKI), mortality rates and length of stay for the 6 months pre initiation of Specialist Services have been compared to hospital acquired AKI results 6 months post initiation.

The results show a fair improvement in hospital acquired AKI numbers with a reduction of 15%, mortality (5.5%) and length of stay (9%) also improved. Overall the results indicate that the AKI nurse specialist role has had a measurable impact on patient outcomes, even over this small time period.

Conclusion: AKI is a vast patient safety concern that is still widely missed, overlooked or mismanaged by clinical staff. Instating an AKI nurse specialist into an acute hospital can help improve AKI manage and patient outcomes.

References: NICE (2013) Acute kidney injury: Prevention, detection and management of acute kidney injury up to the point of renal replacement therapy.
NHS England (2014) Patient Safety Alert Directive: Standardising the early identification of Acute Kidney Injury.

Disclosure of Interest: None Declared

Keywords: Management of AKI, Staff training

Acute Kidney Injury

PO-010

How Significant is Proteinuria Result on Patients with AKI Stage 3?

S. Hawes [1,*]

[1]Wessex Kidney Centre, PORTSMOUTH HOSPITAL TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Poster

Introduction: Urine dipping for proteinuria is a quick and simple yet informative clinical test. An AKI nurse specialist undertaking urine dips on a regular basis as part of their patient assessment began to work on a hypothesis that patient with none/low levels of proteinuria had measurably better outcomes than those with high levels.

Objectives: The objective of this study was to detect any correlation between the amount of protein detected on urine dips and the overall outcome of patients, in terms of duration of AKI, renal recovery and mortality.

Methods: All patients reviewed by the AKI Nurse triggering new AKI Stage 3 Alerts assessed between the 1st of September to the 30th of November 2016 that had a urine dip preformed in the first 24 hours after admission where included. The primary cause of the patients AKI along with patient's progress during hospital admission was tracked and overall outcomes recorded. Renal recovery was defined as days until creatinine level returned to patients own baseline for patients who survived to discharge from hospital.

Table:

Protein	Duration of AKI (days)	Renal Recovery (days)	Renal Recovery %	Mortality %
Protein Negative	3.9	11	84.6%	23.1%
Protein +1	7.7	11	57.9%	15.8%
Protein +2	6.0	4	40.0%	70.0%
Protein +3	34.0	1	20.0%	80.0%

Results: The results do show a significant correlation between proteinuria and the chance of renal recovery and mortality. This is however, a very small study with irregular patient sample groups; principally with only 5 patients will protein 3+. Duration of AKI is similar for both Protein +1 and protein +2 but patients with only +1 protein have much higher renal recovery rates and much lower mortality rates.

Conclusion: Overall, outcomes do back up the assumption. The results will be useful in planning care when reviewing AKI patients in the future.

References: Grams ME, Astor BC, Bash LD, et al. Albuminuria and estimated glomerular filtration rate independently associate with acute kidney injury. J Am Soc Nephrol. 2010;21:1757–1764.

Hsu, R.K. and Hsu, C.Y., 2011. Proteinuria and reduced glomerular filtration rate as risk factors for acute kidney injury. *Current opinion in nephrology and hypertension*, *20*(3), p.211.

Disclosure of Interest: None Declared

Keywords: AKI, Proteinuria, Urinalysis

Acute Kidney Injury

PO-011

Acute Kidney Injury days or time to recovery a novel sensitive metric for AKI improvement

P. Hanumapura [1,*], D. Waring [1], L. Ebah [1]

[1]Renal, CENTRAL MANCHESTER UNIVERSITY HOSPITALS, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) occurs in 1 in 5 hospital admissions in the UK, associated with worse outcomes. There has been a national drive to improve AKI management, and every trust is measuring the improvements in AKI care. The commonly used outcome measures include AKI incidence, hospital length of stay and mortality. However these measures are influenced by several other factors and as such may not necessarily be true reflection of the AKI improvement activities.

Objectives: To test the hypothesis that the time to recovery from AKI (AKI days) will constitute a new sensitive marker for the impact of the intervention to AKI care.

Methods: As a part of the multifaceted quality improvement programme we recorded attainments in process (4 process) and outcome measures (5 measures).The key improvement quality improvement were AKI alerts, check list, tailored AKI education, AKI nurses to help with implementation and to support team in managing AKI. Data for all process and outcome measure was continuously monitored on statistically process charts on month to month basis and relevant improvement was calculated quarterly and achieved improvements were compared. In addition a 3 month factorial design experiment the impact of the various interventions such as nurse intervention, check list, education and pharmacist intervention and was conducted using AKI days as the hypothetical marker of AKI improvement. We also analysed the co-relations between AKI days and other conventional outcome measure such as LoS. The AKI days was defined as the difference between the first date of a blood test which triggered an AKI alert, to the date that the patient recovered or creatinine was less than 50% from the baseline or no more AKI alert is triggered.Patients without baseline were excluded.

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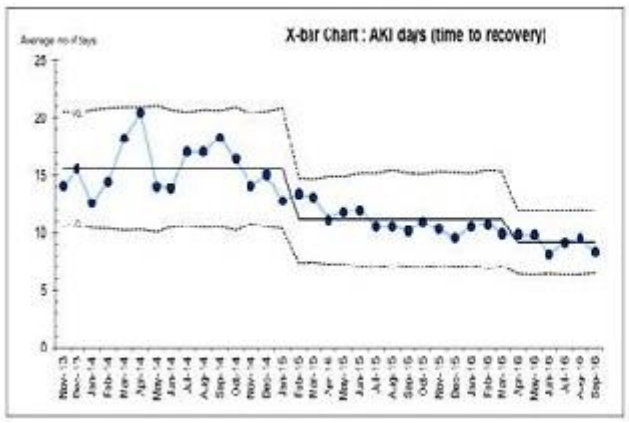

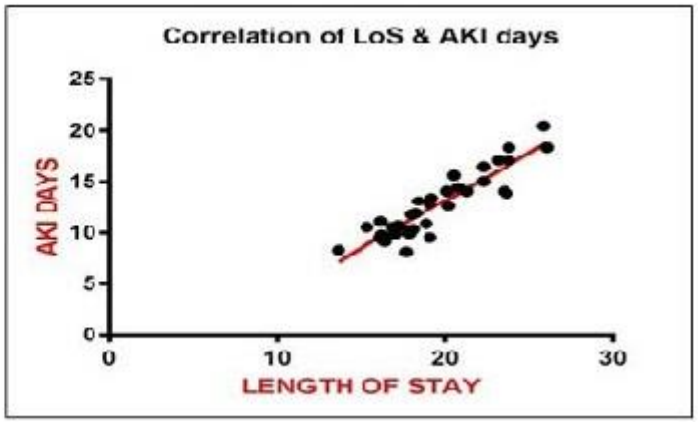

Results: We had 9622 cases of AKI recorded since November 2013 to September 2016 of which 7172 patients had baseline and had AKI days measured. From the date of full implementation of the improvement programme (March 2015) the AKI days have consistently shortened from baseline of 15.6 days prior to intervention to 9.2 days in the current two quarter i.e. April to September 2016 (41% reduction). This compares to a 22% reduction in average LoS (22.2 to 17.6 days), 27% reduction in AKI incidence and 11% reduction in AKI mortality. During this period the key process measures such as detection of AKI within 24 hours had improved from 52% to 100% and appropriate drug review has been carried out in 95% of cases from baseline of 48%. AKI days correlated quite strongly with LoS (r=0.91) and p-value

<0.0001. Interestingly the absolute reduction in LoS (6 days) is very similar to reduction in AKI days (6 days) suggesting early discharge is attributable to early recovery from AKI. In the factorial design experiment AKI days came out as the clear most sensitive marker for measuring the impact of the improvement programme. The AKI days was significantly shorter on wards where the intervention consisted of combination of nurse intervention +checklist +education (5.9 days) compared to 14.4 days where different interventions implemented.
Conclusion: Our study clearly shows AKI days have a very sensitive measure of improvement in AKI outcome care. Whilst traditional marker such as LoS and mortality may still see an improvement but may be significantly influenced by other factors such as social needs and other competing improvement programmes. We propose AKI days to a new outcome marker to measure AKI improvement programmes.

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI

Acute Kidney Injury

PO-012

Effect of Acute Kidney Injury on Chronic Kidney Disease Progression and Proteinuria: Baseline Results from the ARID study

K. Horne [1], R. Packington [1], J. Monaghan [2], T. Reilly [3], N. Kolhe [1], R. Fluck [1], M. Taal [4], N. Selby [4,*]

[1]Renal Medicine, [2]Clinical Biochemistry, [3]Informatics, Royal Derby Hospital, [4]Centre for Kidney Research and Innovation, UNIVERSITY OF NOTTINGHAM, Derby, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The long-term sequelae of acute kidney injury (AKI) on renal function and mortality are increasingly appreciated, but there remains the need for prospective studies in generalisable patient groups.

Objectives: We present baseline data from a large parallel group cohort study of AKI in an undifferentiated hospitalised population.

Methods: In a single UK centre, participants were identified with a hospital-wide electronic AKI detection system. Cases (hospitalised patients who sustained AKI) were matched 1:1 with controls (hospitalised patients without AKI) for age, baseline eGFR stage and diabetes. Biochemical parameters including renal function and proteinuria were measured at 3 months post-AKI and will be measured at 1,3 and 5 years (year 1 follow up visits will be completed January 2017). Survival data will be tracked to 10 years. CKD progression is defined as ≥25% decline in eGFR with decline in eGFR stage.

Results: 1125 patients were recruited of whom 866 were successfully matched. There was no difference between cases and controls in age (71 yrs (IQR 14) vs. 71 yrs (IQR 13), p=0.7) or baseline CKD-EPI eGFR (70.3±20ml/min vs 69.6±20ml/min, p=0.58). AKI episodes were predominantly stage 1 with median duration 3 days (IQR 3).

At 3 months, mean eGFR was lower in the AKI group than controls: 63.1±22ml/min vs. 73.6±21ml/min/1.73m^2 p<0.001. 73 AKI cases (17%) demonstrated CKD development or progression as compared with only 12 controls (3%), p<0.001. Albuminuria (ACR≥3mg/mmol) was more common in the AKI group; 180 (42%) cases had albuminuria compared with 99 (23%) controls, p<0.001. Median ACR in the AKI group was 1.8 (IQR 8.8)mg/mmol compared with 0.8 (IQR 2.8)mg/mmol in controls, p<0.001.

Conclusion: Non-recovery of renal function is common at 3 months following AKI, even in a general hospital population with predominantly AKI stage 1. Albuminuria is also common after AKI; it is currently unclear whether this reflects renal parenchymal injury at time of AKI or a pre-existing risk factor. Long-term follow-up is ongoing with the aim of developing strategies to better stratify individual patient risk.

Disclosure of Interest: None Declared

Keywords: AKI, CKD Progression, Proteinuria

Acute Kidney Injury

PO-013

METABOLOME OF THE ISCHEMIA-REPERFUSED KIDNEY: MASS SPECTROMETRIC DATA FROM A PORCINE MODEL

D. Gardner [1,*], R. Polisetty [2], C. Ortori [3], H. Kim [3], D. Barrett [3]

[1]SCHOOL OF VETERINARY MEDICINE, UNIVERSITY OF NOTTINGHAM, NOTTINGHAM, United Kingdom, [2]Department of Biochemistry, University of Delhi, New Delhi, India, [3]School of Pharmacy, UNIVERSITY OF NOTTINGHAM, NOTTINGHAM, United Kingdom

Preferred Presentation Method: Oral

Introduction: Acute kidney injury (AKI) is serious, with high mortality and costly, with high on-going costs of morbidity. AKI has greatest impact on the proximal tubule (PT) epithelia, a cell-type that is abundant in mitochondria which facilitates the high level of oxidative work of the PT.

Objectives: Using a porcine model of AKI which recapitulates many features of human AKI, we aimed to characterise for the first-time significant changes in the kidney cortex metabolome as a result of ischemia and subsequently reperfusion. A further group of non-ischaemia reperfused kidneys were used as control.

Methods: Female pigs (n=6; 50-70 kg) were randomized to an ischemic AKI protocol in which both renal arteries are clamped for 40 mins. At this time, the left kidney was nephrectomised and the right kidney reperfused for 2 hours. Kidney cortex tissue samples from both kidneys and a sham-control group (n=6) were snap-frozen then processed for unsupervised metabolite identification by LC-MS/MS. After extensive filtering, multivariate statistical approaches combined with bioinformatics were used to identify significantly altered metabolites and metabolic pathways.

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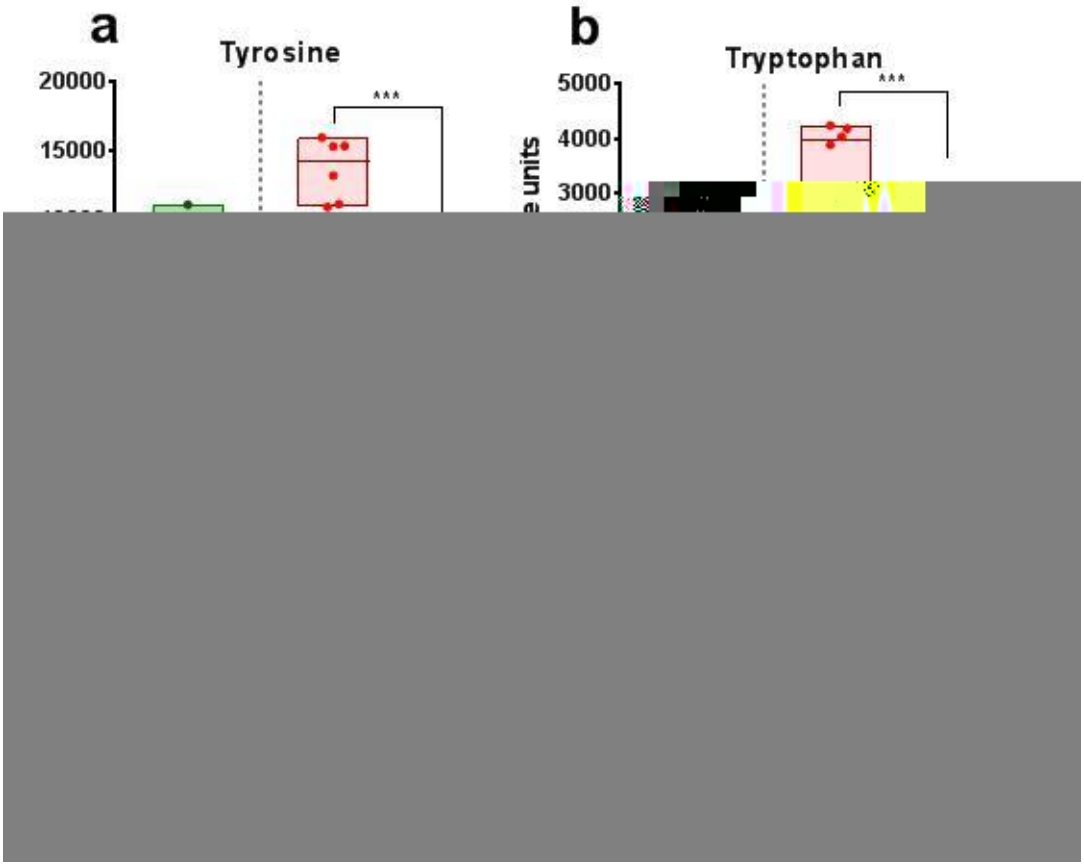


Results: Pathways most affected by ischaemia and reperfusion were amino acid, lipid and carbohydrate metabolism. In particular, accumulation followed by increased degradation/catabolism of tyrosine (Fig 1a), tryptophan (Fig 1b), proline, arginine and serine were notable in all pigs during reperfusion. Variability of lipid species was minimal within groups but principal components analysis of all lipid-soluble metabolites efficiently discriminated each treatment group (Fig 1c).
Conclusion: Using a large animal model of AKI designed to allow direct comparison of the left kidney (ischaemic) vs right kidney (reperfused) metabolome, we note marked metabolic changes in the kidney cortex as early as 2h reperfusion. Amino acid degradation/catabolism was increased likely because of mitochondrial dysfunction in the proximal tubule. The significantly altered pathways identified may offer a window into the development of novel preventative therapeutics that target mitochondrial metabolism.

Disclosure of Interest: None Declared

Keywords: AKI, Animal model, Ischaemia

Acute Kidney Injury

PO-014

A survey on clinicians' views on automated electronic alert system for acute kidney injury and its influence on clinical practice patterns

K. P. Ng [1,*], K. Patel [1], P. Rajendran [1], K. Shivakumar [1]

[1]Renal Medicine, Russells Hall Hospital, Dudley, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is a common condition, which is associated with significant morbidity and mortality. In June 2014, NHS England recommended a national algorithm to be implemented across the NHS in order to identify potential cases of AKI from laboratory data in real time. However, impact of the automated electronic alert system (e-alert) for AKI on health resource use and patients' outcomes remains unclear.

Objectives: The survey aimed to examine clinicians' perceptions on AKI e-alert, explore its influence on clinicians' practice and renal referral patterns as well as identify potential areas for improvement.

Methods: A cross-sectional survey was conducted at a NHS general hospital in 2016 during four settings: medical grand-round, foundation year doctors' teaching session, core medical trainees teaching session and an convenience sampling of doctors from all adults medical and surgical wards. All participants were doctors working at the named hospital. Data was collected using paper questionnaire, of which all participants were required to complete and return within the same setting.

Table:

	Never	Sometimes	Usually	Always
Investigations	10%	21%	47%	21%
Treatments	10%	17%	40%	31%
Ceiling of treatment	25%	35%	29%	9%
Discharge planning	8%	20%	38%	26%

Results: In total, 87 doctors completed the questionnaire; 22% consultants, 12% registrars, 51% core trainees or foundation doctors and 15% others. All participants reported to be familiar with the AKI staging criteria. Most (95%) stated to be aware of the AKI e-alert system. AKI e-alert staging system was perceived to 'never', 'sometimes' or 'usually' reflect the degree of renal impairment by 1%, 34% and 55% respectively. AKI e-alert was reported to influence most aspects of participants' clinical practice (Table 1:Self-reported frequency of AKI e-alert affecting various aspects of clinical practice). However, 25% stated that the AKI e-alert system 'never' affected their decision on patient's ceiling of treatment. Participants reported increased tendency of renal referral with advancing AKI stages. Overall, 49% stated that the AKI e-alert system increased their frequency of renal referral. Even in early stage, 38% of the participants 'sometimes' whilst 14% 'usually or always' referred patients with AKI stage 1 to renal service. In general, 85% believed that the AKI e-alert system improved patients' care. Suggestions from participants included improving reliability, incorporating colour-coded system, ensuring medical team in-charged of patients' care were aware of the alerts, allowing electronic on-line renal referral, redirecting all AKI stage 3 e-alert to the renal team, introducing tick-box system on electronic discharge letter to ease documentation of information on AKI events and improving education on AKI.

Conclusion: Overall, clinicians' attitude towards AKI e-alert was positive but highlighted potential areas for improvement and expressed the need for continuing education. AKI e-alert appeared to influence most aspects of participants' clinical practice and renal referral patterns. Further research is required to clarify if such change of practice affects patients' outcomes.

Disclosure of Interest: None Declared

Keywords: AKI, Qualitative study

Acute Kidney Injury

PO-015

Prescribing patterns at the time of AKI: opportunities to improve care

S. Shaw [1,*], D. Moore [2], A. Akani [2], K. Horne [1], R. Packington [1], M. Taal [1], N. Selby [1]

[1]Renal Unit, [2]Pharmacy, ROYAL DERBY NHS FOUNDATION TRUST, Derby, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Currently, there is limited information about medication prescribing at the time of AKI and how this impacts on patient outcomes. We present a description of prescribing patterns at the time of AKI in the context of a prospective case-control study.

Objectives: Undertake a matched case controlled prospective study comparing prescribing patterns for patients with or without AKI.

Methods: Participants were prospectively identified from a hospital-wide electronic AKI reporting system. Cases (hospitalised patients who sustained AKI) were matched 1:1 with controls (hospitalised patients without AKI) for age, baseline eGFR stage and diabetes. Electronic medical record was interrogated for complete prescribing details at sequential time points.

Results: 866 patients were successfully matched. Pharmacy confirmation of medication history occurred in 757 (87%) during admission.

At baseline, more cases than controls were prescribed ACE inhibitors/ARBs (215 (50%) vs 170 (39%), p=0.002) and NSAIDs (56 (13%) vs 28 (7%), p=0.001). There was no difference in prescription of statins, metformin or diuretics. At the time of AKI, 144 (33%) patients were administered ACEi/ARB and 37 (9%) cases received NSAIDs, suggesting suspension of medications in some cases. Within 24hrs of AKI onset, ACEi were stopped in 101 (70%) and NSAIDs in 18 (50%) of these. 190 cases were prescribed an antibiotic at the time of AKI; dosing was inappropriate in 61 (32%).

AKI diagnosis was communicated to primary care in 209 (49%) of cases at hospital discharge, and information regarding medication changes in only 123 cases (29%). At hospital discharge there was reduction in prescribing ACEi/ARB in both groups, but to a greater extent in AKI; 110 (26%) cases were prescribed ACEi/ARB at discharge, compared with 164 (37%) controls, p<0.001.

Conclusion: Whilst prescriber awareness of the importance of suspending nephrotoxic medications at time of AKI is evident, there are additional opportunities to reduce risk of AKI onset and to improve dose adjustment of common medications during AKI. Improving post-AKI care with consideration of restarting cardiovascular medications is another area in which benefits seem likely.

Disclosure of Interest: None Declared

Keywords: AKI, Medicines management, Prescribing

Acute Kidney Injury

PO-016

Reducing incidence of hospital acquired AKI and reducing AKI progression in a large teaching hospital; Phase 2 of the AKI collaborative

L. Sykes [1,*], R. Nipah [2] and AKI collaborative and quality improvement team at Salford Royal Foundation Trust

[1]AKI & Quality Improvement Fellow, [2]Acute medicine, SRFT, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is a common condition that is associated with significant mortality and cost according to the NCEPOD report of 2009. The Quality Improvement Collaborative was established to review and improve both the recognition and management of AKI. Phase 1 included 10 wards has been incredibly effective; it reduced the incidence of hospital acquired AKI and reduced the number of AKI's progressing from stage 1 to stage 2 or 3.

Objectives: We aim to reduce all cause AKIs by 10%, reduce hospital acquired AKIs by 25% and reduce progression of AKI 1 to either AKI 2 or 3 by 50% on the new wards incorporated into the collaborative during phase 2.

Methods: To buddy up the existing 10 collaborative wards with 10 new "buddy" wards. To use a change package to use as a basis for intervention with the new 10 buddy wards. This change package includes an AKI bundle, based on the acronym 'SALFORD', nurse champion roles, inclusion of AKI at the safety huddle and ward round, pharmacist review of medication and a significant new education package.

Image:

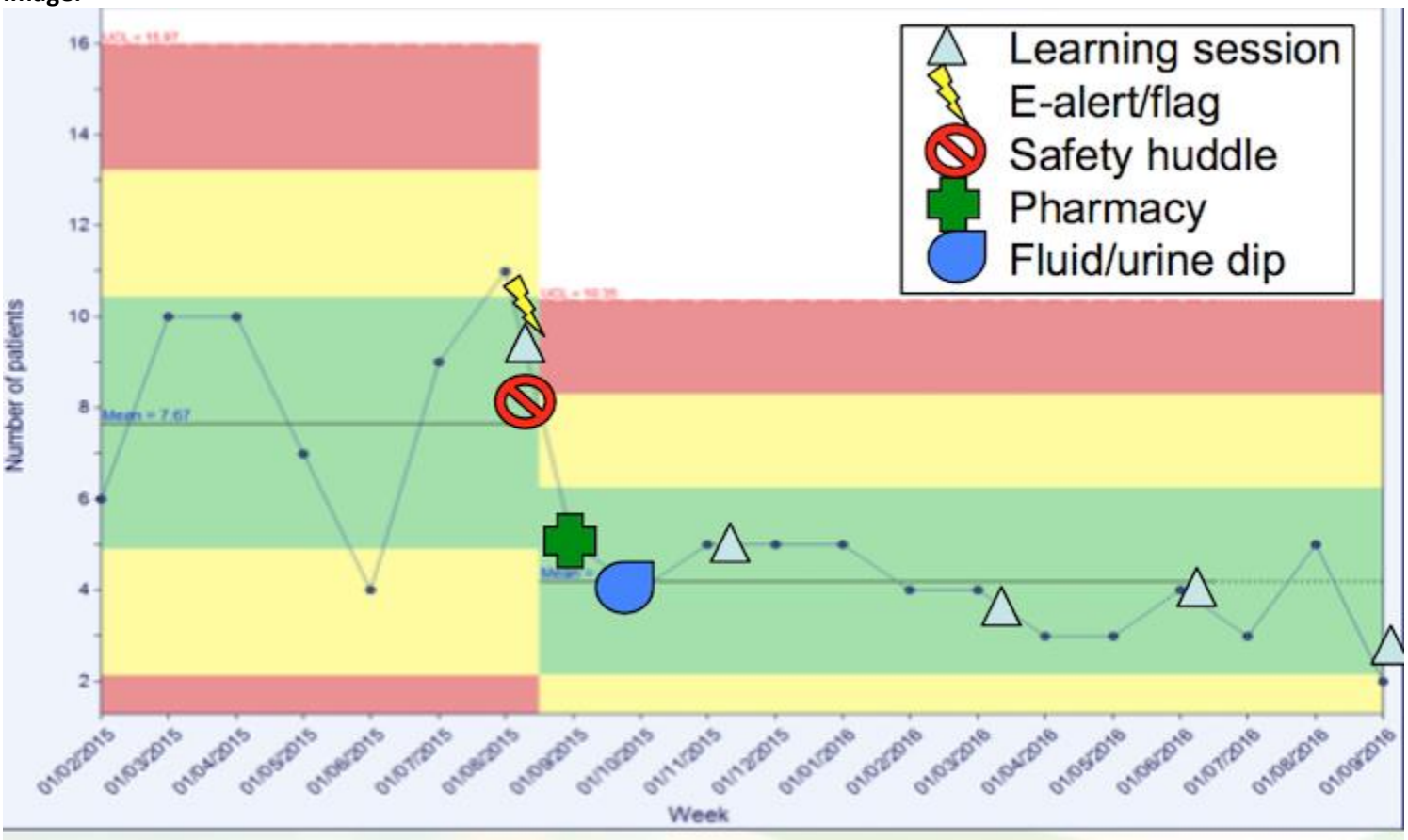


Table: SPC chart showing the reduction in patients AKI progression on the collaborative wards over time

Results: Phase 1 saw several statistically significant results; a 15.56% reduction in overall hospital acquired AKI, with a 22.32% reduction on the collaborative wards. Whilst there was normal variation shown for the overall hospital rates of progression of AKI 1 to AKI 2/3 there was a 48.47% reduction on the collaborative wards. As Phase 2 is rolled out we expect to achieve similar results, but likely in a shorter time period.
Conclusion: Phase 1 has created a statistically significant sustained reduction in hospital acquired AKI incidence and AKI progression. Through our change package and support for the new wards during the spread phase we expect similar reproducable results throughout the new wards. If replicated this is a simple change package that can be moved to other test sites and be a significant step towards tackling AKI.

Disclosure of Interest: None Declared

Keywords: AKI

Acute Kidney Injury

PO-017

ACUTE KIDNEY INJURY MANAGEMENT BY RENAL ADVANCED NURSE PRACTITIONER HELPS REDUCE PATIENT LENGTH OF STAY IN A LARGE TEACHING HOSPITAL

C. Allinson [1,*], J. Murray [1], I. Moore [1]

[1]Renal Unit, SOUTH TEES HOSPITALS NHS TRUST, Middlesbrough, United Kingdom

Preferred Presentation Method: Poster

Introduction: In 2014 we identified challenges in maintaining continuity of renal patient care outside of the renal unit, due to junior doctor shortages. Care of patients with acute kidney injury (AKI) managed outside the renal ward was particularly affected. We introduced a role for a renal advanced nurse practitioner (ANP) and reported the impact of this role at UKKW 2016[1].

Our ANP completed formal training to undertake fluid balance assessments, prescribe haemodialysis and medication. Her role has aided continuity of renal care, improved recognition and management of AKI and helped reduce Length of Stay (LOS) across our Trust. She has co-authored trust guidelines on stepdown of AKI patients from critical care settings, facilitating patient flow within our Trust. Follow-up of AKI cases by the ANP has promoted appropriate post-discharge follow-up.

Objectives: We wished to assess the impact of our renal ANP role on the detection, management and LOS of AKI patients in our Trust over a 12 month period.

Methods: We collected data to assess the impact of the ANP role from January to December 2016, with particular regard to AKI detection and management and LOS due to AKI alone.

Results: 83 AKI cases were identified and managed by our renal ANP in conjunction with each patient's index clinical team; 51 patients (61.4%) were male, 32 were female. Mean patient age was 67.6 years (range 15-94). Sixteen patients (19.5%) died whilst inpatient. Sixty-seven patients were discharged alive, with a mean Creatinine of 184.6µmol/L at the point of discharge (range 49-690µmol/L). Twelve of these patients (17.9%) subsequently died.

Forty-five (67.2%) of the 67 patients discharged were deemed suitable for an 'AKI clinic' review, though no such facility is currently available within our Trust. Our renal service incorporates a wide and diverse geographical area, meaning patients requiring post-AKI review often receive this at general nephrology satellite clinics or their local GP surgery. Of the surviving patients, 30 are reviewed by their GP, 17 (those with or at high risk of progressive CKD) at renal clinics and 8 patients at their haematology clinic.

Review of patients discharged post-AKI (67) highlighted 29 patients whose discharge was expedited by renal ANP input; discharge could not be expedited in the remaining 38 patients (56.7% of those discharged) as LOS in these patients was influenced by other variables, such as wound healing and patient rehabilitation. Overall mean LOS (to discharge alive) was 20.8 days. LOS in those patients where discharge would have been delayed by AKI *alone* was an average 19.2 days; LOS in those not thought to be delayed by AKI *alone* was an average 26.4 days. This difference in LOS reflects that some patients with AKI have complex discharge needs refractory to ANP input.

Conclusion: Our renal advanced nurse practitioner role has improved the care of inpatients with renal disease and AKI across our Trust. This role has led to a reduction in length of stay (LOS) and bed occupancy for those affected by AKI. As we continue to finesse identification of AKI patients in our Trust and improve interaction with community services, we hope to see LOS improve even further. This effect may be heightened by the introduction of a nurse-led, AKI follow-up clinic in-centre.

References: [1]A Novel Role For A Renal-Trained Non-Medical Prescriber In Providing Continuity Of Care Across A Large Teaching Hospital, Allinson C, P149 UKKW 2016

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI, Patient outcome measures

Acute Kidney Injury

PO-018

DIALYSIS DEPENDENT ACUTE KIDNEY INJURY WITH SINGLE ORGAN FAILURE - TRENDS IN THE "NEW" MILLENIUM

M. Thomas [1,*], L. Hollingworth [1], J. Baharani [1]

[1]Renal Medicine, BIRMINGHAM HEARTLANDS HOSPITAL, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury has been well studied across populations and in the intensive care unit, but relatively little attention has been paid to non-critically ill, dialysis dependent AKI with single organ failure.

Objectives: We retrospectively reviewed all adults with non-critically ill, dialysis dependent AKI commencing at our centre between 01/01/2000 and 31/12/2015, studying patient characteristics and outcomes.

Methods: All patients whose first episode of haemodialysis for AKI was carried out in the acute dialysis unit were included in the study. Patients who developed AKI with a functioning transplant, or who commenced dialysis in intensive care were excluded. All outcomes were reviewed to identify the first major event after the onset of dialysis: recovery, a requirement for chronic renal replacement therapy (RRT), or death. The patients were divided into eight two year eras (2000-1, 2002-3, etc.) for an analysis of trends.

Results: 1391 patients were identified as AKI requiring dialysis by the treating nephrologist. The numbers dialysed by era varied considerably from a lower level of 113 at the start of the millenium, rising to a peak of 252 in 2006-7, then falling back somewhat in later eras. Age at first dialysis tended to rise from a median of 67-73 years in the first two eras, to 72-75 years in the last two eras, but the trend was not significant ($p=0.14$). The percentage of patients who were female varied by era between 34 to 46%, overall 38%, with no significant change ($p=0.28$). The proportion of diabetics increased significantly from 19-21% in the first two eras to 31-33% in the last two eras ($p=0.02$).

Overall 51% of patients recovered native kidney function as a first event; 18% went onto chronic renal replacement therapy, and 31% died whilst receiving acute HD. Recovery of native renal function improved from 47-49% in the first two eras to 54% in both of the last two eras ($p=0.01$). However, transfer to chronic RRT varied significantly ($p<0.001$) between 14-32%, with no improving trend. Survival analysis showed that 1018 (73%) died during a median followup of 209 days. 1 year survival was 47% across the entire group, and varied considerably across the eras between 38 and 56%. Three of the four eras with highest survival were during the second half of the study.

Conclusion: Our data on non-critically ill, dialysis dependent AKI reflected the rising prevalence of type 2 diabetes. There was also a trend towards take on of more elderly patients. In spite of this there were modest improvements in the proportion of patients recovering independent renal function. There may be slight improvement in 1 year survival, although this remains at about 50%. The price for this may be a continuing high proportion of transfers to chronic RRT of about 20%. Monitoring of outcomes in these patients should focus on medium-term outcomes. Recovery or switch to chronic RRT as a first event are simple and useful outcome indicators.

Disclosure of Interest: None Declared

Keywords: AKI, Audit, Haemodialysis

Acute Kidney Injury

PO-019

Dynamic Changes of Properdin and Effects of CHBP in Mouse Renal Ischemia Reperfusion Related Injury and Recovery Models

H. Wang [1], A. Liu [2], Y. Zhang [2], Y. Wu [3], Q. Wang [1], C. Yang [4], Y. Fan [1], B. Yang [5,*]

[1]Nephrology, Affiliated Hospital of Nantong University, [2]Basic Medical Research Centre, [3] Department of Pathology, Medical School of Nantong University, Nantong, [4]Department of Urology, Zhongshan Hospital, Fudan University; Shanghai Key Laboratory of Organ Transplantation, Shanghai, China, [5]Department of Infection, Immunity and Inflammation, University of Leicester, University Hospitals of Leicester, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction:

Acute Kidney Injury

PO-023

Incidence and outcomes of Acute Kidney Injury on an Acute Dependency Unit: An observational study

A. Isted [1,*], M. Chiarlo [1], J. Albuquerque [1], N. Annear [1], S. Brincat [1], J. Wang [1]

[1]Acute Medicine, St George's Hospital NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) occurs in up to 20% of all hospital inpatient admissions[1]. However incidence and outcomes for patients admitted with AKI onto an adult acute medical dependency unit (ADU) may differ. The ADU is an eight bedded unit with four level 2 beds under the care of the Acute Medicine directorate and admits patients mainly from unselected general medical takes

Objectives: This was an observational study to assess the incidence, demographics and outcome of patients who were admitted with AKI onto the ADU of a large teaching hospital.

Methods: Patient data was collected prospectively over a 3 month period. All patients admitted onto the ADU were included with the exclusion of those requiring pre-existing renal replacement therapy. Data were collected from patients' admission notes and electronic reporting system with AKI being identified according to the KDIGO classification system. Follow up data up to 6 months from the start of the study was collated for creatinine (>60days from discharge) and death. Baseline creatinine was taken as the measured value that best correlated to the mean of at least three 'stable' values in the preceding year. In the absence of a pre-admission renal function, a nominal creatinine was assigned using a reverse MDRD equation based on an eGFR of 75ml/ min/1.73m2. Univariate analysis of baseline characteristics and outcomes was performed using Mann-Whitney U and Chi-Squared tests where appropriate.

Results: In total there were 145 admissions (consisting of 140 patients) with 42.1% recognised to have AKI. Of these 61% were stage 1, 23% stage 2 and 16% stage 3. Of patient characteristics, only chronic kidney disease (CKD) was associated with AKI on admission ($p=0.01$). AKI was significantly associated with 'Sepsis' ($p=0.04$) as opposed to any other cause for admission. Though the APACHE II score was significantly greater in the AKI group ($P<0.01$) neither an EWS of >5 or a qSOFA score of >2 was associated with AKI. In those with AKI, 12.9% were oliguric. Only 48% had a urine dip performed. ARB/ACE inhibitors and diuretics were stopped in only 30% and 23% respectively.

AKI patients had both a longer length of stay (LOS) on the ADU ($p=0.04$) and in hospital ($p=0.02$). There was no significant difference in mortality between groups during admission though when follow up deaths were considered there was a significantly higher total mortality (combined inpatient and follow up) in the AKI group ($p=0.04$).

Only 57 patients had a repeat creatinine performed >60days from hospital discharge. A creatinine of >20% from original baseline at this time point was associated with AKI patients ($p<0.01$). However the mean follow up time in the AKI group (118 days) was deemed significantly different from the Non-AKI group 124 days; $p=0.02$).

Conclusion: In our cohort AKI occurred twice as frequently as expected for inpatient admission and was particularly associated with sepsis. Traditional parameters associated with AKI, such as age and diabetes, were not deemed significant in our study and higher early warning scores were poorly associated with AKI incidence. Both LOS and overall mortality was significantly greater in the AKI group. Creatinine > 60days from discharge were also significantly greater in the AKI group but this may be confounded by both a difference in follow up period and a lack of knowledge regarding patient well-being at time of follow up.

References: 1. National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) Report: Adding Insult to Injury (2009)

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI, Survival

Acute Kidney Injury

PO-024

INCIDENCE AND OUTCOME OF COMMUNITY ACQUIRED ACUTE KIDNEY INJURY- BASED ON A PILOT PROJECT IN PRIMARY CARE

S. Ahmed [1,*], U. Sharif [1], E. Bunni [1], C. Fairclough [2]

[1]Nephrology, [2]Clinical Chemistry, ROYAL LIVERPOOL UNIVERSITY HOSPITAL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury is known to cause significant co-morbidity and mortality in hospitalised patients. There has also been increase awareness in the community acquired acute kidney injury considering the high mortality post AKI episode in subsequent year. Our team has been involved with some innovative service development in managing AKI in our tertiary care hospital. As part of our holistic approach of AKI care, we also have set up a pilot project to identify AKI cases in community through a fully automated AKI alert algorithm linked to our laboratory information system (LIMS softwear)1. We also looked into the outcome of these cases.

Objectives: We have set up a pilot project with six primary care (GP practices) covering a population of 35,000. The aim was to provide tools to identify AKI cases in community and also provide support in early appropriate management of these cases. The long term goal was to improve overall patient outcome and also to help developing skills for primary care physicians in managing AKI cases.

Methods: We looked into the data collected through fully automated AKI alert system to identify AKI cases by comparing latest serum creatinine value to a base line serum creatinine value (determined by median serum creatinine value of all the results on previous 365 days). AKI alert system also provides staging of AKI cases based on KDIGO classification. We looked into a year data collected from June 2015. We also looked into the outcome in terms of renal recovery and mortality within the year.

Table:

AK*I* Stages (N)	Full recovery	Partial recovery	No recovery	Mortality 1 year
AKI 1 (68)	41%	43%	16%	26%
AKI 2 (13)	69%	8%	23%	31%
AKI 3 (7)	43%	14%	43%	57%

Results: A total of 16499 blood samples with renal function were requested during 1 year period from this population which were processed in our hospital central lab. There were a total of 119 alerts over 1 year period (0.64%). After removing the duplications, there were 88 total cases (AKI1 68, AKI2 13 and AKI3 7 cases). There was no recovery of renal function following an AKI episode in a significant number of cases leading to development of CKD (16-43% cases depending on severity of AKI, table 1). The mortality rate was also high within the year, ranging from 26% to 57 % (AKI1 26%, AKI2 31% and AKI3 57%, table 1)

Conclusion: Community acquired AKI remain a significant challenge with high mortality and morbidity. Therefore requires a co-ordinated holistic care approach in managing AKI in community with early identification, prompt response and also effective post AKI discharge information if admitted to hospital including follow up plans.

References:

Re: [1]Ahmed S, Curtis S, Hill C, Hine T. Nephron Clin Pract. 2014;128(1-2):166-70

Disclosure of Interest: None Declared

Keywords: AKI, CKD, Survival

Acute Kidney Injury

PO-025

Survival and renal outcome of ECMO patients with RRT requiring AKI

J. Kusic [1,*], G. Vlachopanos [1], C. Meadows [1], L. Camporota [1], K. Daly [1], C. Whiteley [1], N. Barrett [1], M. Ostermann [2]
[1]Department of Critical Care, [2]Department of Nephrology & Critical Care, Guy's & St Thomas Hospital, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is a common complication during critical illness. Little is known about the incidence and outcome of severe AKI in patients requiring treatment with extracorporeal membrane oxygenation (ECMO).

Objectives: Our objective was to analyse the incidence and outcome of ECMO patients requiring acute renal replacement therapy (RRT).

Methods: We analysed the data of 300 patients (mean age 44 years; 57% males) admitted to a national ECMO center between June 2013 and November 2016. Patients with pre-existing end-stage renal failure (ESRF) were excluded from the study. We recorded the worst stage of AKI as defined by the KDIGO consensus criteria.

Table: Incidence of AKI and outcome of ECMO patients

AKI stage in ICU	Incidence	ICU mortality
No AKI	66 (22%)	17%
AKI I	29 (10%)	14%
AKI II	15 (5%)	13%
AKI III	186 (62%)	32%

Results: 300 patients were admitted for veno-venous or veno-arterial ECMO. Following exclusion of 3 patients with ESRF, 297 patients were analysed. Their overall ICU survival was 74%. 231 patients (78%) developed AKI. (Table 1)
180 patients were treated with RRT. 36 patients were started on RRT within 12 hours of admission to our center, 1 patient was started on RRT prior to transfer and 143 patients were started on RRT after the 1st day of ECMO. The main indications for RRT were fluid overload and metabolic acidosis. In patients started on RRT after day one of ECMO, the mean cumulative fluid balance at time of initiation of RRT was +2263ml.
121 RRT patients were discharged from the ICU alive (67%). 39 patients (32%) were still RRT dependent at discharge from ICU. Of the remaining 82 patients, baseline renal function was known for 73 patients. In 59 patients (81%), serum creatinine at discharge from ICU was below their baseline value. 20 patients had a serum creatinine <50µmol/L.

Conclusion: AKI and RRT are very common in patients requiring ECMO and has an impact on survival and potentially on long term morbidity in patients who remain RRT-dependent. Long-term renal outcome is unclear as one third of patients are still RRT dependent on discharge from ICU and serum creatinine values at ICU discharge are likely to be confounded by prolonged illness and muscle wasting. More work is necessary to identify the best method of evaluating renal function in patients requiring ECMO.

Disclosure of Interest: None Declared

Keywords: Haemofiltration

Acute Kidney Injury

PO-026

Acute kidney injury in critically ill patients is associated with increased long-term mortality and end-stage renal failure

H. Leonard [1,*], R. Haines [2], J. Powell-Tuck [3], S. Ayis [4], M. Ostermann [3]

[1]Department of Nephrology, Guy's and St Thomas' NHS Foundation Trust, [2]Adult Critical Care Unit, Barts Health NHS Trust, [3]Department of Critical Care, Guy's and St Thomas' NHS Foundation Trust, [4]Division of Health and Social Care Research, King's College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is a common complication during critical illness. The long term prognosis of patients with different degrees of acute kidney injury (AKI) is not fully understood.

Objectives: To investigate whether there is an association between severity of AKI and long-term mortality or development of end-stage renal disease (ESRD) in ICU patients who survived to hospital discharge.

Methods: We analysed the data of all patients (n=3,243; 62.6% males) admitted to a multi-disciplinary ICU in a University Hospital between 2004 and 2008 and collected follow-up data up to June 2016. Mortality data were collected from the medical notes and a national register. AKI was defined according to the Kidney Disease Improving Global Outcome (KDIGO) classification. We examined the associations between AKI severity (no AKI, AKI stage I, II or III) and a composite outcome (mortality or ESRD requiring chronic dialysis) within 1 and 5 years of hospital discharge using Cox regression models. Patients with pre-existing ESRD or a renal transplant were excluded.

Table: Table 1: Long-term risk of mortality or chronic dialysis in patients with and without AKI adjusted for age and pre-ICU chronic comorbidities.

AKI stage in ICU	1 year outcome Hazard Ratio* (95% CI)	p-value	5 year outcome Hazard Ratio* (95% CI)	p-value
No AKI	1.0		1.0	
AKI stage I	1.12 (0.88-1.41)	0.36	1.04 (0.89-1.21)	0.63
AKI stage II	1.6 (1.16-2.37)	0.01	1.35 (1.04-1.74)	0.02
AKI stage III	1.4 (1.11-1.76)	<0.001	1.21 (1.04-1.41)	0.01

* adjusted for age and chronic comorbidities

Results: Results: Of 3,086 eligible patients, 1454 (47.1%) had no AKI, 776 (25.1%) had AKI I, 166 (5.4%) had AKI II, and 690 (22.4%) had AKI III during their stay in ICU. Patients with AKI II and III who left hospital alive had an increased risk of mortality or ESRD in the following 5 years (Table 1).

Conclusion: ICU patients with AKI stage II and III who leave hospital alive have an increased risk of ESRD or premature death during the following 5 years compared to patients without AKI. More work is necessary to establish the factors contributing to the increased risk. There was no significant association between AKI stage I and risk of death or chronic dialysis.

Disclosure of Interest: None Declared

Keywords: AKI, Dialysis

Acute Kidney Injury

PO-027

Properdin Deficiency Increased Tissue Protective Receptor Expression for Regeneration in 72-hour Renal Ischemia Reperfusion Injury Mice

Y. Wu [1,*], N. Brunskill [1], C. Stover [1], Z. Zwaini [1], W. Schwaeble [1], L. Chen [2], Y. Fan [3], B. Yang [1]

[1]Infection, Immunity and Inflammation, UNIVERSITY OF LEICESTER, Leicester, United Kingdom, [2]Pathology, University of Nantong, [3]Nephrology, Affiliated Hospital of Nantong University, Nantong, China

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury is a common problem associated with high mortality. Properdin positively regulates the alternative pathway of complement activation. Our previous work has demonstrated more severe damage in properdin deficient (P^{KO}) mice than its wild type (WT) upon renal ischemia reperfusion (IR) injury. The heterodimer receptor composed of EPO receptor (EPOR) and β common receptor (βcR) is known tissue protective.

Objectives: The aim of this study is to explore the correlation between EPOR, βcR and properdin in a renal IR injury model.

Methods: Bilateral occlusion of renal pedicles were performed on male C57BL/6 mice (WT: n = 9; P^{KO}: n = 8), followed by 72 h reperfusion, while the sham control groups (n = 4/5) were also included. The expression of total EPOR at both mRNA and protein level, as well as its protein localization, and the level of βcR mRNA in the kidney, were detected.

Results: Compared with the sham groups, the expression of EPOR protein in the kidneys was significantly increased in the IR groups, while that was further increased by IR injury in the P^{ko} murine kidneys in contrast to its WT. Weak EPOR staining in tubular cells was found in the sham kidneys, mainly accumulated in cytoplasm areas. IR injury enhanced the accumulation of EPOR in most proximal tubular cells, especially on the membrane of cytoplasm, located in the inner cortex, in both WT and P^{ko} kidneys. The increase trend of EPOR mRNA was also revealed in the IR kidneys, but without significance between any groups. Furthermore, the level of βcR mRNA was significantly increased by 9 and 17 folds in the IR kidneys compared with the sham kidneys in WT and P^{ko} mice respectively.

Conclusion: IR injury increased the expression of EPOR and βcR respectively, while properdin deficiency further increased the level of EPOR might be associated with not only tissue damage, but also repair. The impact of properdin on these tissue protective receptors and its biological significance are worthy for further investigation.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-028

A review of the introduction of an Acute Kidney Injury (AKI) alert into HIV care

A. Picken [1], D. Williams [2], E. Kingdon [3,*]

[1]Student research project IRP , Brighton and Sussex Medical School, [2]HIV, BSUH, [3]Renal, BRIGHTON AND SUSSEX UNIVERSITY HOSPITAL, Brighton, United Kingdom

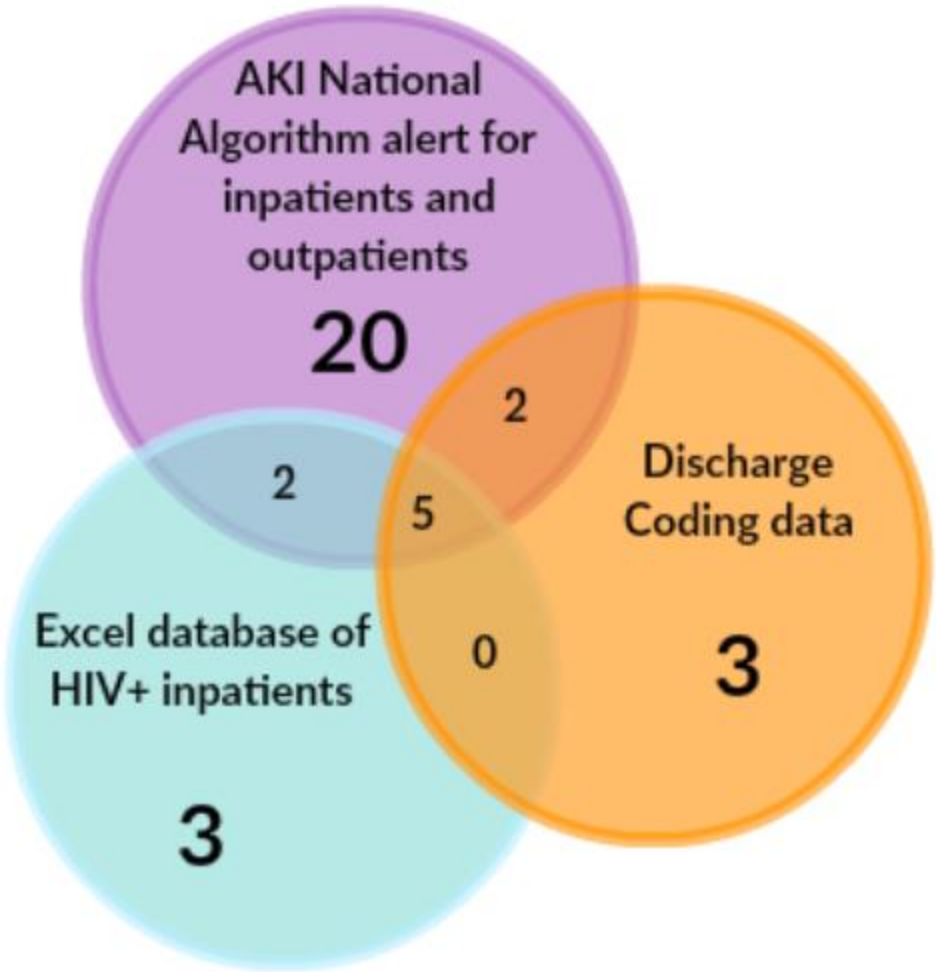
Preferred Presentation Method: Poster

Introduction: Acute kidney injury (AKI) and chronic kidney disease (CKD) may complicate infection with human immunodeficiency virus (HIV) & reflect medication toxicities, HIV-related kidney disease +comorbidities unrelated to HIV infection. Up to 20% of acute hospital admissions may have AKI. Prompt identification of AKI is likely to favourably influence short-term outcomes and sequelae.

Objectives: We sought to investigate AKI in a centre with a tertiary HIV practice and a regional renal unit. We planned to identify the population of HIV+ve patients developing AKI ascertained by 3 methods & to describe clinical parameters and outcomes.

Methods: This was a retrospective analysis of AKI in a centre serving 2400 patients with HIV. AKI cases were ascertained by 3 means a) the national AKI detection algorithm run in local middleware software (ICE- Sunquest) b) review of all coding data (cases with an AKI code (N179) + consultant caring for HIV+ve patients and c) an Excel database of HIV+ve in-patients. Data was collected between December 2015 and Nov 2016. Medical notes and electronic information resources were reviewed to identify clinical characteristics and outcomes.

Image:



Results: 39 Episodes of AKI were identified in 35 patients. (M 29:F6 Age 18- 84)
Case notes were available for 19 patients (20 AKI episodes M 17:F 2 Age 18-80). 8/20 AKI episodes were not associated with an in-patient episode. AKI episodes varied in severity but most were AKI 1 (AKI 1 n=15; AKI 2 n=2; AKI 3 n=:3). Half of patients had ³2 known NICE-defined risk factors for AKI and 6 had pre-existing CKD (CKD 2, n= 1; CKD 3 n=3; CKD 5 n=1). 1 patient had been previously diagnosed with glomerular disease (FSGS n=1). Aetiology: In 4 out of 8 out-patient AKI episodes it is unclear what precipitated AKI. A rise in creatinine was seen in 2 patients taking creatine supplements. In 2 patients, AKI followed significant episodes/binges of recreational drug use. The majority of cases (13/20) occurred after patients had one or more documented pre-renal insults, or were treated for sepsis or UTI. No HIV-AKI patients underwent renal biopsy. Past anti-retroviral (ARV) therapy and current ARV exposure was heterogeneous. Outcome: There was one death during the ascertained AKI episodes. One patient required renal replacement therapy (haemofiltration). There were 3 AKIs that resolved but left the patient with a change in CKD stage. One patient with previously normal function had residual CKD following an episode of AKI.
Conclusion: Our single centre retrospective study identified AKI occurring at a rate of 16 per 1,000 person-years of follow-up. Ascertainment is likely to have been influenced by where patients' baseline creatinine results were held and under what identity. The study was not able to identify HIV patients who developed AKI at other centres. AKI incidence and outcomes are likely to be strongly influenced by patient demographics and access to healthcare and ARV treatment.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-029

Achieving effective, reliable and sustainable AKI care

S. Doddridge [1], D. O'Donoghue [2,*] on behalf of AKI, R. Varia [3] on behalf of AKI and Acute Kidney Injury

[1]Advancing Quality, [2]Dept of Nephrology, Salford Royal NHS Foundation Trust, Manchester, [3]Dept of Medicine, St Helens and Knowsley Hospitals NHS Trust, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute Kidney Injury (AKI) is a significant cause of morbidity and mortality – estimated 20% mortality in the NW of England. It is responsible for about 53,000 admissions and 10,000 in-hospital deaths per annum[1]. Early recognition and management through use of care bundles can reduce mortality.

Objectives: Advancing Quality (AQ), the flagship programme of the North West Quality Improvement Programme, Advancing Quality Alliance (AQuA) is an established approach to reducing variation and improving outcomes for patients. It aims to improve clinical care by producing and implementing evidence-based bundles of care across a collaborative network of hospitals.

Methods: The National AKI Algorithm is used to identify patients with AKI. Trusts submit pathology reports and the AKI 3 patients are identified for care bundle compliance. The AKI patient data is also used to monitor stage progression of the disease for each locality. A standard data collection tool is used to assess management of patients with AKI stage 3; patients are assessed using compliance on individual measures and an Appropriate Care Score (ACS) – the percentage of patients who received all eligible measures.

The measure set was developed and launched in April 2015 and is consistent with recommendations from the National Institute for Health and Care Excellence. Collaborative events are used to promote the measure set and share best practice with performance results shared on a monthly basis.

The AQ AKI measure set was devised by a clinical expert group based on research/literature evidence produced by the British Medical Journal,

AKI-01 Urine Dipstick Test within 24 hours of 1st AKI Alert

AKI-02 Stop Angiotensin Converting Enzyme inhibitors and Angiotensin Receptor Blockers within 24 hours of 1st AKI Alert

AKI-03 Serum Creatinine test repeated within 24 hours of the 1st AKI Alert

AKI-04 Ultrasound Scan of urinary tract within 24 hours of 1st AKI Alert

AKI-05 Specialist Renal/Critical Care Discussion within 12 Hours of 1st AKI 3 Alert

AKI-06 Written self-management information prior to discharge

AKI-07 Pharmacy medication review

Image:

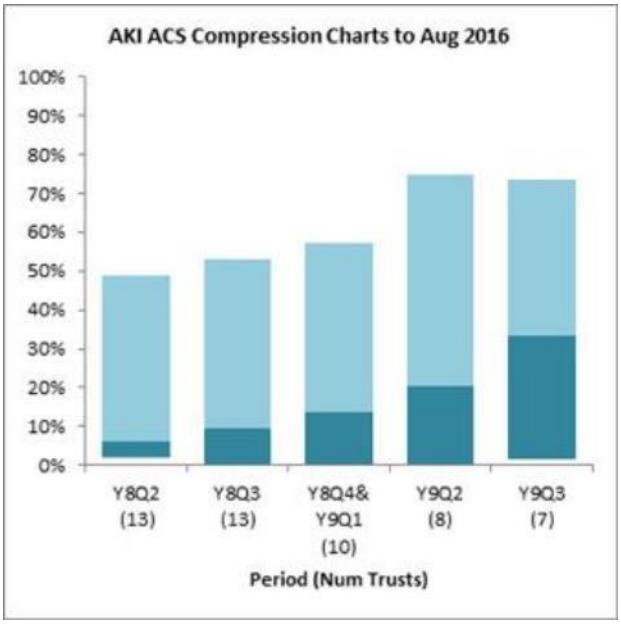


Table:

AQ AKI	Count	Bed Days	Ave Bed Days
Passed	851	12,662	14.9
Failed	4,201	83,684	19.9
Total	5,052	96,346	19.1

Results: The implementation of the AQ AKI measure set and collaborative work in the NW region of England appears to have improved management and outcomes of patients with AKI. Identifying this patient cohort has increased awareness to this disease and has supported improvement initiatives across the region in both primary and secondary care.
The compression chart shows improvement in the highest score achieved, the different colours represent the range of scores above and below the median.
For the 12 month period from July 2015 to June 2016, just over 5,000 patients were eligible for the AQ measures. The 16.8% of patients who received all measures for which they were eligible had a mean length of stay 5 days shorter than patients who did not receive all the measures. If the remaining 83.2% of patients (n 4,201) had matched the shorter length of stay, a potential savings of over 21,000 (4201 * (19.9-14.9)) bed days might have been realised.
Conclusion: Use of an evidence-based AKI bundle of care across a regional collaborative network of hospitals appears to have both directly and indirectly influenced the improvement in management and outcomes, in particular reduction in length of stay.
References: 1. Calculated using 2015/2016 PbR data for non-elective inpatients coded with ICD10 code N17 at any time during their stay

Disclosure of Interest: None Declared

Keywords: AKI, Clinical quality improvement, Pathology

Acute Kidney Injury

PO-030

Dietary Hydroxycinnamates and Resveratrol Reduce Oxidant Injury in Renal Cells

B. Elisha-Lambert [1], A. Pannala [1], P. Chatterjee [1,*]

[1]School of Pharmacy & Biomolecular Sciences, Huxley Building, UNIVERSITY OF BRIGHTON, Brighton, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute kidney injury (AKI) is associated with a high mortality rate especially in patients admitted to intensive care. Oxidative stress (OS) is implicated in the development and progression of AKI which involves oxidant injury to proximal tubular and other renal cells. Dietary constituents such as hydroxycinnamates and resveratrol are potent antioxidants *in vitro* which have the potential to reduce renal OS and oxidant injury.

Objectives: The aim of this study was to investigate and compare the effects of these dietary antioxidants on oxidant injury in rat renal proximal tubular cells.

Methods: An *in vitro* model of nephrotoxic AKI was developed using paraquat (PQ) to generate OS and oxidant injury in the NRK-52E rat renal proximal tubular cell-line. Both time (3mM, over 24 hours) and concentration (0-5mM) dependent profiles of protection by hydroxycinnamates and resveratrol against PQ-mediated oxidant injury were determined. Specifically, confluent cultures of NRK-cells were co-incubated with 3mM PQ and increasing concentrations of hydroxycinnamates or resveratrol. For pre-incubation experiments, cells were incubated with either incubation medium or 10µM hydroxycinnamate or resveratrol for 24 hours followed by up to 24 hours PQ incubation. Cell viability and death were measured using the MTT and lactate dehydrogenase (LDH) assays, respectively. Furthermore, the antioxidant capacities of the hydroxycinnamates and resveratrol were investigated using the ABTS radical scavenging assay and their internalization into renal cells over 24 hours was measured using LC-MS.

Table: Effects of pre-incubation of NRK-52E cells with hydroxycinnamates or resveratrol for 24 hours on cell viability (%) after subsequent incubation with PQ for up to 24 hours

	0 hours PQ	12 hours PQ	24 hours PQ
PQ only (3mM)	100 ± 5.63	53.7 ± 14.3#	7.17 ± 4.51#
FA (10µM) then PQ (3mM)	96.4 ± 2.94	74.5 ± 4.99«#	50.7 ± 6.66«#
MCA (10µM) then PQ (3mM)	97.7 ± 5.56	96.8 ± 6.06«	44.3 ± 6.82«#
RES (10µM) then PQ (3mM)	102 ± 5.96	94.5 ± 8.08«	25.4 ± 4.22«#

Table 1: NRK-52E cells were incubated with incubation medium, ferulic acid (FA), meta-coumaric acid (MCA) or resveratrol (RES) for 24 hours after which cells were incubated for 12 or 24 hours with paraquat (PQ). Data shown as mean ± SD, «*P*<0.05 *vs.* PQ only, #*P*<0.05 *vs.* 0 hours PQ, N=8 analysed using one-way ANOVA followed by a Bonferroni's post-test.

Results: Hydroxycinnamates and resveratrol demonstrated minimal toxicity up to 5mM after 24 hours. No significant protection was observed when NRK-52E cells were co-incubated with hydroxycinnamates or resveratrol and PQ together for 24 hours. In contrast, significant protection against PQ toxicity was demonstrated after 24 hour pre-incubation with a protective hierarchy of (1) ferulic acid, (2) meta-coumaric and (3) resveratrol after 24 hours when cell viability was measured (Table 1). A similar profile of protection was observed for cell death. Furthermore, these effects were paralleled by radical scavenging activity and internalization data.

Conclusion: This *in vitro* investigation demonstrates that pre-treatment of proximal tubular cells with hydroxycinnamates or resveratrol provides significant protection against nephrotoxic oxidant injury with the hydroxycinnamate ferulic acid providing the greatest protection. Intracellular levels of these compounds can be measured and demonstrate antioxidant properties. Taken together, these results suggest that dietary antioxidants may provide prophylactic protection against oxidant induced AKI if replicated *in vivo*.

Disclosure of Interest: None Declared

Keywords: AKI, ATN, Tubular epithelial cell

Acute Kidney Injury

PO-031

Effect of weekend admission on mortality associated with severe acute kidney injury in England: a propensity score matched, population-based study

N. Kolhe [1,*], R. Fluck [1], M. Taal [1]

[1]Department of Renal Medicine, ROYAL DERBY HOSPITAL, Derby, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Increased in-hospital mortality associated with weekend admission has been reported for many acute conditions, but no study has investigated "weekend effect" for acute kidney injury requiring dialysis (AKI-D). One explanation for this observation is that necessary dialysis therapy may not be initiated on a weekend as a result of limited physician, nurse staff or device availability. Little is known about the impact of the weekend effect on AKI-D in England, the incidence of which has increased more than 12-foldover the past 15 years[1].

Objectives: To examine mortality in patients with AKI-D when admitted over weekend as compared to weekday admissions in England.

Methods: In this large, propensity score matched cohort of AKI-D, we examined the impact of weekend admission in 53,170 AKI-D admissions between 1st April 2003 and 31st March 2015 using England's hospital episode statistic dataset. Propensity score matching (PSM) was performed to match 4284 weekend admissions with AKI-D with 14,788 admissions on weekdays using a "one to many" technique. The primary outcome variable was in-hospital mortality. The primary independent variable was day of hospital admission. Weekend admission was defined as admission on Saturday and Sunday.The associations between discharge status and gender, age group, ethnicity, AKI in diagnoses codes, method of admission, CCI, day of admission and deprivation were analyzed initially using univariable and multivariable logistic regression

Results: Of the 53,170 admissions with AKI-D, 12,357 (23%) were at weekends. Of the 12,537 admissions during weekends, 4284 were matched in a "one to many" technique with 14,788 admissions on weekdays. In the entire cohort, during weekends, there was a greater proportion of emergency admissions (73.8% versus 70.7%, p <0.001) and transfers from one hospital to another (14.4% versus 12.7%, p < 0.001) and lower proportion of elective admissions (9.9% versus 14.4%) as compared to weekdays. Patients admitted on weekends were from the most deprived (10%) category (8.5% versus 7.6%, p 0.036) and had lower prevalence of previous chronic kidney disease (35.9% versus 38.6, p < 0.001). The unadjusted mortality for weekend admissions was significantly higher compared to admissions on weekdays (40.6% versus 39.6%, p 0.046). However, in multivariable analysis of the PSM cohort, the odd of death for weekend admissions with AKI-D was 1.01 (95%CI 0.93, 1.09). Mortality was higher for weekend admissions in West Midlands (odds ratio (OR) 1.32, 95%CI 1.05, 1.66) and lower in East of England (OR 0.77, 95%CI 0.59, 1.00) but was not different to weekday admissions in all other regions. In 2003-04, weekend admissions had lower odds of death (OR 0.45, 95%CI 0.21, 0.96) and in 2010-11 higher odds of death (OR 1.28, 95%CI 1.00, 1.63) but in the other ten years observed, there was no significant difference in mortality between weekday and weekend admissions. In-centre nephrology services was associated with lower odds of death at 0.57 (95%CI 0.54, 0.62).

Conclusion: In this comprehensive national study we did not observe a "weekend" effect for mortality associated with AKI-D. Further research is warranted to elucidate the reasons for the lower mortality observed in centers with nephrology services.

References: 1. Kolhe NV, Muirhead AW, Wilkes SR, Fluck RJ, Taal MW. National trends in acute kidney injury requiring dialysis in England between 1998 and 2013. *Kidney international* 2015; **88**(5): 1161-9.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-032

Impact of an AKI care bundle and e-alerts in primary care on creatinine testing: report of a Patient Safety Collaborative quality improvement project

J. Barker [1,*], K. Smith Byrne [2], M. Sleeman [3], D. Lasserson [1], E. Vaux [4]

[1]Nuffield Department of Medicine, [2]Cancer Epidemiology Unit, UNIVERSITY OF OXFORD, Oxford, [3]Clinical Biochemistry Department, [4]Department of Renal Medicine, Royal Berkshire Hospital, Reading, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Early detection and management of acute kidney injury (AKI) is important for safe clinical practice. Publications to date have focused on evaluating care bundles and e-alerts on inpatient populations. AKI incidence in the community is high and detection is poor meaning implementation of such initatives should significantly improve care standards.

Objectives: To evaluate the effect of an AKI care bundle, co-designed by nephrology and primary care departments, together with AKI e-alerts in general practice on total serum creatinine (SCr) testing and follow up SCr testing.

Methods: Descriptive analysis of renal function tests was undertaken for a population across four clinical commissioning groups in Berkshire, UK. All SCr results for one year before and one year after the introduction of an AKI care bundle and e-alerts were analysed. The total number of SCr tests, number of unique individuals being tested and follow up testing defined as tests occurring within 30 days of initial SCr test were determined. Data on the location of patients at testing was taken from the laboratory information management system. Presented here is data for all locations of care, including primary care, emergency departments and hospital wards, and the subset of tests taken in primary care.

Results: In all healthcare locations 267,058 SCr tests were performed on 115,239 patients in the year prior to the intervention, increasing to 292,119 tests on 120,980 patients after intervention the year after (9.4% increase). The increase was due to more patients tested (5741, 4.9% increase) and an increase in follow-up testing: these data show a 1.8% reduction (-1,540 patients) having a single SCr test with a corresponding rise of 0.6% (1,760 patients) having two tests; a 0.6% rise (1,464 patients) having 3-5 tests; a 0.2% rise (464 patients) in patients having 6-10 tests; and 0.3% rise (494 patients) in patients having >10 tests within 30 days of first test.

Within primary care alone, there were 175,205 SCr tests taken on 110,111 patients in the one year prior to implementation, rising to 195,046 tests on 118,267 patients in the year afterwards, constituting an 11.3% rise in SCr tests. 8,156 more patients were tested in primary care after implementation (7.4% increase) with an increase in follow up testing: these data show a 2.2% reduction (-3,372 patients) having a single SCr test with a corresponding rise of 1.1% (2,668 patients) having two tests; a 0.9% rise (1,589 patients) having 3-5 tests; a 0.1% rise (313 patients) in patients having 6-10 tests; and 0.1% rise (210 patients) in patients having >10 tests within 30 days of initial test.

Conclusion: Implementation of the AKI care bundle together with e-alerting was associated with an increase in total SCr testing, due to more patients being tested and more follow up testing being undertaken. This pattern was observed for overall testing across all locations of care and importantly within primary care itself. Further analyses are planned to determine if AKI detection increased in primary care after implementation as well as the impact of the bundle and e-alerts on AKI admission rates, severity at admission, peak severity, renal recovery following AKI and mortality rates. These data are consistent with a change in clinician behaviour in SCr testing after implementation. Further work should consider annual variation in SCr testing rates and multiple regional laboratories to determine if these effects are seen consistently, rather than being a chance finding.

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI, Patient safety

Acute Kidney Injury

PO-033

Does the introduction of a standardised AKI alert algorithm improve AKI detection amongst Acute Medical inpatients?

E. Boynton [1,*], E. G. Bickmore [2], E. A. Rodrigues [1], J. Albuquerque [3], J. Wang [3], S. Brincat [3], D. Haswell [4], F. Boa [4], D. Banerjee [5], N. Annear [3]

[1]Acute Medicine, St George's University Hospitals NHS Foundation Trust, [2]Anaesthetics, Guy's & St Thomas' NHS Foundation Trust, [3]Acute Medicine & Nephrology, [4]Clinical Biochemistry, South West London Pathology, [5]Nephrology, St George's University Hospitals NHS Foundation Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Early detection of AKI is key to improving quality of patient care, providing impetus behind the introduction of an automated AKI alert algorithm at our institution from 2013. The STG-AKI alert algorithm calculated AKI stage by comparing serum creatinine with the lowest value measured over the previous 3 months. In June 2014, an NHS England patient safety alert heralded the introduction of an NHS-standardised AKI algorithm, that calculated AKI stage by comparing serum creatinine with the lowest value over the prior week, or average over the previous year; which has now been implemented at all UK NHS hospital biochemistry laboratories

Objectives: We sought to evaluate the efficiency of AKI detection by automated AKI alert algorithms by 1) comparing the STG-AKI algorithm against manual detection, and 2) test whether introduction of an NHS-standardised algorithm improved accuracy of AKI detection

Methods: Peak and baseline serum creatinine measurements of all acute medical inpatients presenting to the acute medical take in two cohorts, each of three weeks over April-May 2014 (Cohort 1) and Aug-Sept 2014 (Cohort 2). Local implementation of the NHS-standardised AKI-algorithm occurred on 12/8/2014. The manually calculated and AKI-alert reported stages were collated and statistically compared for each group

Table:

AKI Stage	**Cohort 1** **STG-AKI algorithm/Manual** (% correct)	**Cohort 2** **NHS-AKI algorithm/Manual** (% correct)	**Difference between Cohorts** (Fisher's Exact Test)
1	30/74 (40%)	51/77 (66.2%)	**(P=0.0019)
2	27/38 (71%)	19/28 (67.9%)	ns (P=0.8)
3	16/29 (40.5%)	15/16 (93.8%)	** (P=0.0082)
All AKI	73/141 (51.8%)	85/121 (70.2%)	**(P=0.0023)

Reported AKI stage vs. manual detection in Cohort 1 (STG-AKI algorithm) and Cohort 2 (NHS-AKI algorithm)

Results: Cohort 1: Of 622 inpatients (49% male, median age 73 yrs), 141 (22.8%) had AKI stages 1-3 during admission. Of these, 73 (51.8%) were correctly identified by the STG-AKI algorithm.

Cohort 2: Of 611 patients, (48.7% male, median age 74 yrs), 121 (20.8%) had AKI stages 1-3 during admission. Of these, 85 (70.2%) were correctly identified by the NHS-standardised AKI algorithm.

We show that introduction of a UK-standardised AKI algorithm has significantly improved the accuracy of automated AKI identification (**P=0.0023), but 30% of inpatient AKI episodes were missed compared with manual detection. Causes for missed AKI from Cohort 2 included: recurrent AKI (28%), variable baseline (20%), creeping creatinine (20%), previous recorded creatinine >1yr prior to admission (15%) and no prior creatinine on system (9%)

Conclusion: Despite refinement, the NHS-standardised AKI-alert algorithm remains an insensitive tool for AKI detection, missing around 30% of cases. This study highlights the need to retain manual calculation, alongside thorough clinical

assessment of patients as the gold standard for AKI detection, whilst work continues to develop a more reliable and robust standardised AKI alert algorithm

Disclosure of Interest: None Declared

Keywords: AKI, Creatinine, Patient safety

Acute Kidney Injury

PO-034

Paediatric AKI identified by a change in creatinine based electronic alert: A National Survey.

J. Holmes [1,*], A. Phillips [2], G. Roberts [3], K. May [1], K. Tyerman [4], J. Geen [5], J. Williams [2] and the Welsh AKI Steering Group
[1]Welsh Renal Clinical Network, Cwm Taf University Health Board, [2]Institute of Nephrology, Cardiff University, Cardiff, [3]Department of Clinical Biochemistry, Hywel Dda University Health Board, Aberystwyth, [4]Department of Paediatric Nephrology, Leeds Teaching Hospital NHS Trust, Leeds, [5]Department of Clinical Biochemistry, Cwm Taf University Health Board, Methyr Tydfil, United Kingdom

Preferred Presentation Method: Poster

Introduction: In contrast to adult Acute Kidney Injury (AKI) epidemiology, much less data is available describing paediatric AKI. Based on a presumption that early identification may help raise standards of care, an automated electronic (e)-alert system for AKI based on KDIGO criteria has been implemented nationally across the National Health Service in Wales.

Objectives: Our aim was to describe the utility and limitation of using a biochemistry based data set to characterise paediatric AKI. In addition, the AKI e-alert system uses patients' historical biochemical results to define baseline serum creatinine (bSCr). This approach is limited for a paediatric cohort in which the absence of previous biochemical results is common. We aimed to validate alternative models of defining bSCr. We also aimed to model a modification of KDIGO criteria proposed to overcome concerns relating to 'over-diagnosis' of AKI in neonates.

Methods: Using the Welsh electronic AKI reporting system, data was collected between 1st November 2013 and 31st May 2016 on all cases of paediatric (<18yrs of age) AKI identified by an e-alert. To compare alternative bSCr definitions with the Algorithm method, we used estimated creatinine clearance criteria ($eCCl_{120}$) and midpoint normative values (NormMid) for age and gender. We applied a modification to the e-alert system which involved suppressing alerts by neonates with a bSCr <0.5mg/dL that did not rise to >0.5mg/dL.

Results: We observed 2,087 e-alerts, representing 1,343 episodes of AKI, which translates into an incidence rate of 1.37/1,000 person-years. 34.5% of episodes occurred in neonates of which 83.8% represented AKI stage 1. Neonatal 30-day mortality was 4.1% with 73.3% of this being accounted for by patients requiring Intensive Care (ICU). In the non-neonatal group 76.1% of episodes were AKI stage 1. Hospital acquired (HA)-AKI accounted for 40.1% of episodes. Community acquired (CA)-AKI represented 29.4% of which 33.9% were hospitalised. Non-neonatal 30-day mortality was 1.2%, with 50.0% of this accounted for by patients requiring ICU. Non-recovery of renal function at 30 days occurred in 28.2% and was significantly higher in patients not hospitalised (45.1% vs. 20.0%). $eCCl_{120}$ resulted in an estimated bSCr significantly lower than that obtained from patients' historical results (Non-neonates: 0.40mg/dL vs. 0.52mg/dL; Neonates: 0.17mg/dL vs. 0.43mg/dL). NormMid more closely approximated bSCr (Non-neonates: 0.63mg/dL vs. 0.52mg/dL; Neonates: 0.38mg/dL vs. 0.43mg/dL). Bland-Altman analysis and a positive percentage bias for Algorithm-$eCCl_{120}$ confirmed that $eCCl_{120}$ underestimates SCr. 69.6% of neonatal alerts were by a bSCr <0.5mg/dL. Of these 52.4% represented rises to >0.5mg/dL and 47.6% (33.1% of all neonatal alerts) rises to ≤0.5mg/dL, for which there was no association with mortality or renal impairment.

Conclusion: The reported incidence of AKI in children is far greater than previously reported in studies reliant on clinical identification of paediatric AKI or hospital coding data. AKI is associated with significant mortality, and is highest in neonates and in ICU. Non-recovery of renal function and persistent renal impairment was more common in non-neonates and was especially high in CA-AKI not hospitalised. When historical biochemical results are unavailable, using the NormMid method to define bSCr is favoured over the $eCCl_{120}$ method when diagnosing paediatric AKI. In neonates, rises in SCr to ≤0.5mg/dL from values <0.5mg/dL may represent 'over-diagnosis' of AKI.

Disclosure of Interest: None Declared

Keywords: AKI, Children, Creatinine

Acute Kidney Injury

PO-035

Acute Kidney Injury: identifying those who might benefit from electronic alerts and care bundles. An observational study from one acute NHS trust.

D. A. Lewis [1,*], E. Sharples [2], B. Page [3], H. Norman [3], K. Lean [3], C. Vincent [3]

[1]Acute General Medicine, [2]Oxford Kidney Unit, OXFORD UNIVERSITY HOSPITALS NHS FOUNDATION TRUST, [3]Oxford Academic Health Sciences Network, Oxford, United Kingdom

Preferred Presentation Method: Oral

Introduction: Acute Kidney Injury (AKI) affects up to 25% of hospital patients and is associated with increased morbidity and mortality. A national patient safety campaign has established electronic alerts for AKI with care bundles in many acute NHS trusts. However there is a paucity of evidence to support their use and the small amount of evidence that exists is conflicting. AKI occurs in a wide variety of clinical scenarios, and often is self-limiting without specific intervention. In order to improve the quality of AKI care, one needs to develop robust measures of process and outcomes, and target interventions at those most likely to benefit.

Objectives: This study examines data from one acute NHS hospital trust in order to identify those who might derive most benefit from AKI alerts and care bundles. This study is part of a wider quality improvement initiative across our region, aiming to reduce the incidence of and harm from AKI.

Methods: Demographic and coding data from a single NHS acute trust were linked with routine biochemical data identifying all inpatients with AKI, defined using the national AKI algorithm, over a 14 month period (Feb 2015 to Mar 2016) prior to the launch of the AKI electronic alerts and care bundle.

Results: There were 20220 AKI alerts involving 7150 patients, of which 70% occurred within the first 48 hours from admission indicating community acquired AKI. 74%, 15% and 11% had AKI stages 1, 2 and 3 respectively as the initial AKI stage. Mean length of stay was 16 days. 17% died in hospital (16% stage 1; 19% stage 2; 23% stage 3), of whom 32% died within 48 hours of their first alert. Of those who alerted again, only 9% did so at a higher stage (i.e. had progressive AKI). Progression to higher AKI stage was more common in older patients (7% in those aged <40 years versus 13% in those aged ≥40 years). The primary diagnoses most commonly associated with progression to higher AKI stage were pneumonia and cardiac failure.

Conclusion: Less than 10% of AKI patients progressed to a higher AKI stage with only usual care and no specific intervention for AKI (i.e. no e-alert or care bundle). A similar proportion of patients with AKI died soon after admission or soon after alerting with AKI. Such patients have only a small window of opportunity during which an electronic alert and generic care bundle could be effective.

Given the small proportion of progressors and potential non-compliance with care bundles, an intervention targeting all patients with AKI is unlikely to reduce AKI progression. This intervention may also not affect mortality substantially, given that many of those who died, did so rapidly. It is possible that this intervention may reduce length of stay. Rather than targeting all patients admitted to hospital with AKI with a generic care bundle, one might be more effective in reducing AKI progression by targeting those at greatest risk.

Future studies will investigate whether outcomes have improved after introduction of the e-alerts and care bundles.

Disclosure of Interest: None Declared

Keywords: AKI, Clinical quality improvement, Management of AKI

Acute Kidney Injury

PO-036

Detection & Management of Acute Kidney Injury in Surgical Wards

L. Studd [1,*], S. Brincat [2]

[1]St. George's, University of London, [2]St. George's Hospital, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) is a significant cause of morbidity and mortality in UK hospitals. 13-18% of patients have AKI on admission to hospital [1]. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) study *Adding Insult to Injury* showed that only 50% of cases of AKI documented as cause of death received satisfactory care [2]. A 2012 study by Selby et al. of 3,930 patients found that in-hospital mortality was correlated to the severity of AKI [3].

Objectives: To assess the detection and management of AKI of surgical admissions, by auditing adherence to NICE Clinical Guidance 169; Acute Kidney Injury: prevention, detection and management.

Methods: Data was collected prospectively from 30 surgical patients admitted with AKI or who developed AKI during their stay in hospital between 6th June 2016 and 21st June 2016. AKI was defined as per international KDIGO guidelines. A proforma was used to gather demographics, clinical assessments, investigations, management and outcome of patients. Exclusion criteria were patients under the age of 18 and those admitted via the medical assessment unit. At the end of the audit, renal function was checked on the last day of the audit or on the date of discharge, if earlier.

Results: In our study, the population was elderly (mean age: 71 years) with equal sex distribution. 20 patients had AKI due to hypovolaemia, 3 patients due to a combination of hypovolaemia and sepsis, 6 patients due to other causes, and 3 patients had no cause of AKI identified in the notes.

The average Early Warning Score was 2.43. The median serum creatinine level on admission was 72mmol/L and the median peak serum creatinine was 175mmol/L.

Urinalysis was documented in 47% of cases. An ultrasound was indicated in 11 patients but only 7 patients had this performed. 93% of patients received timely intravenous fluids, and nephrotoxic medications were reviewed in 87% of patients. 77% of patients had a senior review within 12 hours. At the end of the study period, 63% of patients returned to their baseline renal function, 33% improved partially to a higher baseline renal function, and one patient required dialysis therapy within 48 hours of admission. The median creatinine on discharge or at the end of the study was 97mmol/L.

Conclusion: The most common cause of AKI is hypovolaemia. This was managed consistently with the administration of intravenous fluids and cessation of nephrotoxic medications. Rates of investigation with urinalysis and ultrasound, when indicated, was suboptimal. Our outcome data showed that AKI fully resolved in a significant proportion of patients, however a third do not return to baseline. A small proportion of patients required dialysis.

In future, there are plans to expand the service of the AKI clinic to surgical wards and this data will provide a platform to ensure that the appropriate governance measures and educational teach-ins are delivered.

References: 1: National Institute for Health and Clinical Excellence (NICE). Acute Kidney Injury: prevention, detection and management. August 2013 [Internet] London [cited 2016 June 24] Available from: www.nice.org.uk/guidance/cg169

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3. Selby NM, Kolhe NV, McIntyre CW, Monaghan J, Lawson N, et al. Defining the Cause of Death in Hospitalised Patients with Acute Kidney Injury. PLoS ONE 2012; 7 (11). DOI: http://dx.doi.org/10.1371/journal.pone.0048580

Disclosure of Interest: None Declared

Keywords: AKI, Management of AKI

Acute Kidney Injury

PO-037

ACUTE KIDNEY INJURY IN ELECTIVE ORTHOPAEDIC SURGERY: REDUCING THE INCIDENCE WITH PRE-OPERATIVE RISK ASSESSMENT AND POST-OPERATIVE MONITORING ACCORDING TO NICE CG169

E. Davies [1,*], M. Edwards [1], M. McNicholas [2], E. Naderali [3], C. Wong [3]

[1]Renal Medicine , [2]Orthopaedic , AINTREE UNIVERSITY HOSPITAL, [3]Department of Health Sciences , Liverpool Hope University , Liverpool , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: ACUTE KIDNEY INJURY IN ELECTIVE SURGERY: REDUCING THE INCIDENCE WITH NICE CLINICAL GUIDELINE 169 PRE-OPERATIVE RISK ASSESSMENT AND PERI-OPERATIVE MANAGEMENT

Objectives: To assess the efficacy of pre-operative assesssment of AKI risk factors, prevention and peri-operative management according to NICE AKI gudeline CG 169 in patients undergoing elective surgery.

Methods: A retrospective study was performed on patients that underwent elective hip or knee arthroplasty surgery at a University Hospital over a 12 month period from September 2014. The study was performed following the publication of hospital AKI guidelines on pre-operative risk assessment of patient for AKI according to the NICE Clinical Guideline CG169 Acute kidney injury: prevention, detection and management 2013. Patient's comorbidity, nephrotoxic medications, baseline eGFR, haemoglobin and blood pressure pre-operatively were collected in the pre-operative proforma. The blood pressure pre,intra and post-operatively, haemoglobin and creatinine post operatively were collected in hospital electronic notes and results. Statiscally analysis were performed using Cox Regression to identify the risk factor that help predict AKI.

Results: There were 565 patients that underwent hip and knee arthroplasty. The male to female ratio was 239:326. The patients age band were > 75 (n=130), 50-75 (n=400) and <50 (n=35). The average age was 67 (26-96). There were 51.7% with hypertension, 11.9% with Diabetes, 77.1% had Chronic Kidney Disease (CKD G3A n=84, 14.9%, CKD G3B n= 19, 3.4% and CKD G4 n=333, 58.9%). There were 193 patients on ACEI/A2RB, 101 on NSAID, 46 on Metformin and 15 on Furosemide.

Eleven patients acquired an AKI post-operatively. All incidences of AKI resolved and no deaths ensued. Seventy three percent of these patients had CKD G4 pre-operatively. Those CKD G4 not known to the nephrology team had been referred to nephrology pre-operatively. In the previous year there were incidences of AKI (n=18) and deaths (n= 7, 2 deaths from AKI).

Conclusion: When appropriate risk stratification occurs pre-operatively in the pre-op clinic, essential peri-operative prevention measures and management can reduce the incidences of AKI in patients undergoing elective arthroplasty.

References: 1. NICE AKI: prevention, detection and management Clinical Guideline 169

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-038

Case Series of Acute Oxalate Nephropathy (AON) induced AKI

S. Duffy [1,*], T. Shipley [1], D. Tez [1], K. Prasad [2]

[1]Renal Medicine, [2]Pathology Department, James Cook University Hospital, Middlesbrough, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute oxalate nephropathy (AON) is a rare but serious cause of crystal-induced AKI characterized by intratubular precipitation and deposition of calcium oxalate (CaOx) crystals. Calcium oxalate crystals are directly cytotoxic and have been shown to cause mitochondrial dysfunction, renal inflammation and tubular injury.[1] AON has been linked with a number of enteric disorders that promote secondary hyperoxaluria through fat malabsorption in the gut, such as inflammatory bowel disease (IBD), pancreatic insufficiency, bowel resection and gastric by-pass surgery.[1] More recently, diabetes mellitus (DM) and metabolic syndrome have been associated with enteric hyperoxaluria, although the pathophysiology is not fully understood.[2] There may be a delay in histological diagnosis of AON in patients with established diabetic nephropathy presenting with AKI due to low index of suspicion. We present a case series of 4 diabetic patients with biopsy proven AON who presented with AKI requiring renal replacement therapy (RRT).

Objectives: To identify risk factors which may point to a diagnosis of AON in diabetic patients who present with AKI.

Methods: We reviewed the case notes of 4 diabetic patients presenting to the Renal Unit at James Cook University Hospital with AKI requiring RRT over a 6 year period (2010-2016). All 4 patients had a diagnosis of AON on renal biopsy.

Results: All 4 patients were diabetic. 3 patients had type 2 (insulin resistance) diabetes mellitus on oral anti-glycaemic therapy and 1 had diabetes secondary to chronic pancreatitis. Before AON was diagnosed, 2 patients had underlying CKD secondary to diabetic nephropathy. All patients presented acutely to the renal service at JCUH with AKI and required hospital admission. All 4 patients progressed to ESRF and required RRT within 1 year. The mean time from presentation to histological diagnosis was 43 days. In all cases, renal biopsy showed diffuse crystal deposits, highly suggestive of oxalate crystals. In 2 cases, raised serum oxalate levels and urine crystal analysis were used to support the diagnosis. 2 patients were taking medication known to be associated with hyperoxaluria at presentation, namely ciprofloxacin and orlistat.

Conclusion: AON is a significant cause of crystal-induced AKI. Our case series suggests that diabetes mellitus may be a risk factor for secondary hyperoxaluria and highlights the importance of considering renal biopsy in all patients presenting with rapidly deteriorating kidney function, especially if risk factors for hyperoxaluria are present.

References: 1. Cartery et al. Oxalate Nephropathy Associated with Chronic Pancreatitis. Clinical Journal of American Nephrology. Aug 2011 6(8): 1895–1902.

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Disclosure of Interest: None Declared

Keywords: AKI, Diabetes

Acute Kidney Injury

PO-039

Process measures in Acute Kidney Injury[AKI]; do they lead to better outcomes?

T. Chandrasekar [1,*], K. Abraham [1], A. Balshaw-Greer [1], D. Cowell [2] on behalf of AKI Team, S. Gallagher [2] on behalf of AKI outreach team, J. Somers [3]

[1]nephrology, [2]Critical care outreach, [3]AQ programme Management Lead, AINTREE UNIVERSITY HOSPITALS NHSFT, Liverpool, United Kingdom

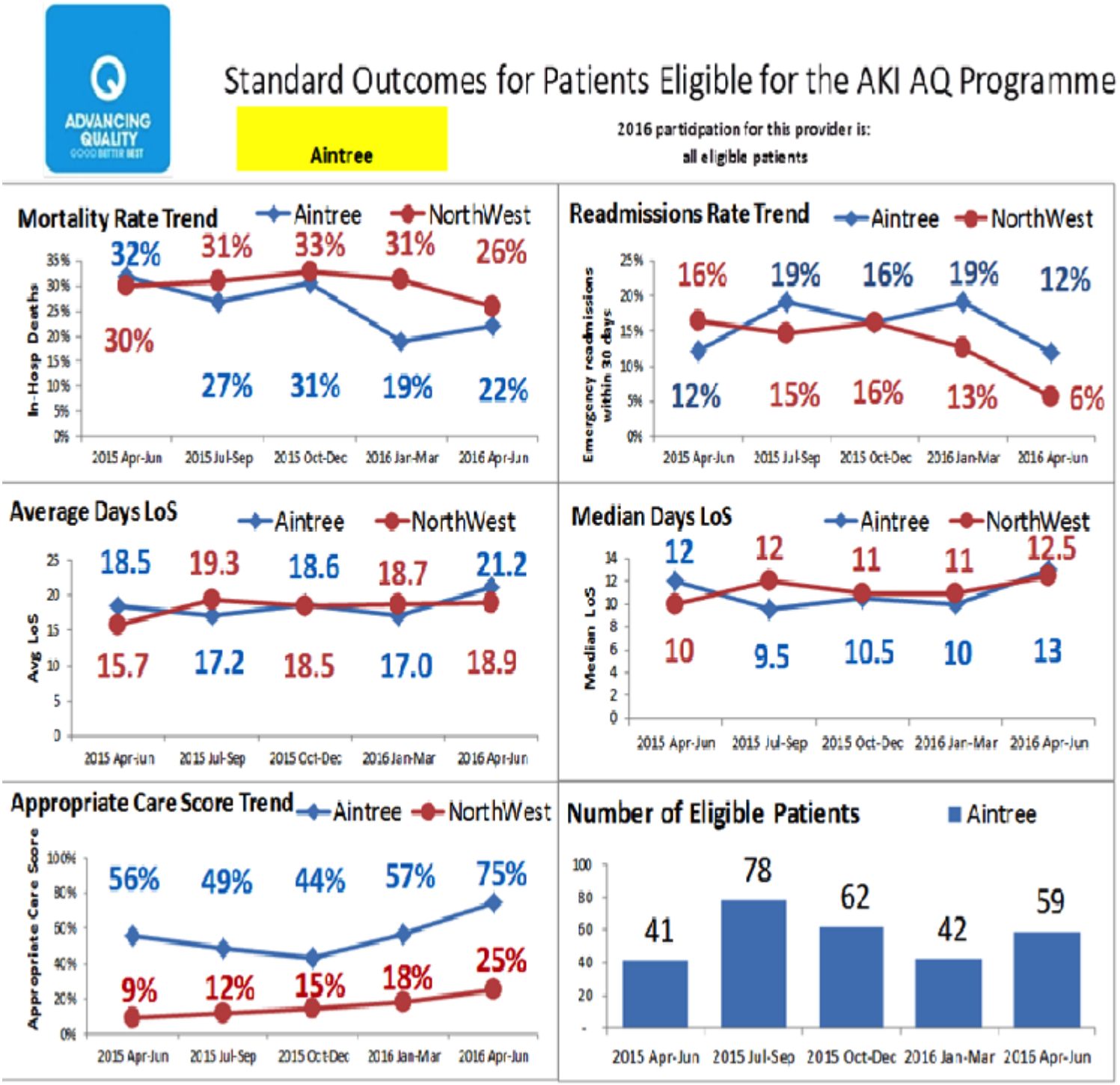
Preferred Presentation Method: Oral or Poster

Introduction: Quality improvement programmes often focus on measurement of recommended interventions to assess good care. Advancing Quality [AQ] is one such programme that was implemented by many hospitals in the northwest with AKI as one of its focus areas. Aintree joined the AQ AKI programme in May 2015.

Objectives: To assess whether the process measures collected by AQ correlate or further improve the outcome measures of mortality and length of stay that were being collected as part of the STOP-AKI project that was set up in Aintree from Oct 2013

Methods: Advancing Quality (AQ) is an NHS quality improvement programme which aims to improve the standards of care patients receive while in hospital. Clinicians across the North West agreed on 6 key process measures that will ensure every patient with AKI3 receive best possible care. The process measures collected were 1. Urine dipstick within 24hours of the 1st AKI alert, 2. Stop Nephrotoxic drugs, 3. Repeat Renal function tests within 24hours of the 1st AKI alert, 4. Ultrasound kidney in suspected obstruction within 24hours of the 1st AKI alert, 5. Specialist discussion within 12hours of 1st AKI3 alert and 6. Self Management information. The data for each patient is recorded as part of the normal clinical record and AQ scores how well trusts are delivering against these key qualities of care measures. An Appropriate Care score(ACS) is then calculated to establish best clinical processes are being followed and delivered at the same time in the same way for every patient. Outcome measures collected by Trusts are collated and published by AQ, shows how successfully the team are delivering to the agreed quality standards for the patients with AKI3. Prior to this the STOP-AKI project in Aintree was set up in 2013. Quality improvement methodology was used to develop an automated e-alert diagnostics system, an AKI treatment bundle, dedicated outreach team and a patient empowerment leaflet. Initially, trialled at ward level, the project was scaled up to becoming part of routine management for all admitted patients.

Image:



Results: Statistical process control analysis was used to verify outcomes over time. A shift in the in-hospital mortality rate corresponded to a relative 23.2% reduction in mortality and was sustained.. During this period AKI specific SHMI/HSMR mortality was less than the 99.8% lower confidence limit in comparison with all English acute trusts.. Length of stay also reduced shortly after onset of the project by 14.1% or 2.6 day reduction.In our first year (April 2015 to March 2016), year 8 of the AQ Programme, Aintree achieved a cumulative ACS of 50.2%. Our ACS for the period January

2016 to Sep 2016 is 70%. We have shown an improvement in the AQ process measures as a result of the AKI project work, which co-relates with the outcome measures

Conclusion: With the introduction of AQ, mortality has continued to improve although LoS has plateaued. Re-admissions have dropped and the process measures have shown a consistent improvement over time. Our findings suggest that the processes initiated through the AQ project have contributed to the further success of the STOP AKI project by improving patient outcomes.

Disclosure of Interest: None Declared

Keywords: AKI, Patient outcome measures, Patient safety

Acute Kidney Injury

PO-040

Population study of 12 Month mortality and renal function in different stages of Acute Kidney Injury

J. Littlewood [1,*], K. Abdulnabi [2]

[1]Renal Medicine, [2]Arrowe Park Hospital, Wirral, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute Kidney Injury (AKI) has a significant impact on mortality and length of hospital stay. Addressing this has become increasingly demanding in terms of increased specialty staff. Methods for triaging acute kidney injury to the correct care team alongside identification of false AKI is key to managing this work load.

Objectives: To measure and compare baseline and 12-month estimated glomerular filtration rates (eGFR), in-hospital and 12-month mortality, and 12-month renal replacement therapy (RRT) status in patients admitted to hospital with stage 1, 2, and 3 acute kidney injury (AKI).

To assess clinician diagnosis of AKI and to assess 12-month outcomes in clinician coded AKI patients.

Methods: Patients were included if they were coded as AKI in the first 20 days of May 2015. Coding was performed by the automated AKI algorithm or clinicians. Patients receiving long-term dialysis before presentation were excluded. Patients who were coded as AKI had their tests and notes scrutinised to confirm the presence of AKI. Where an alternative explaination for change in creatinine could be found patients we deeemed "false AKI".

eGFR was calculated by the Modification of Diet in Renal Disease formula. Baseline eGFR was calculated from the lowest creatinine measured in the preceding 3 months or the most recent creatinine before this. 12-month eGFR was calculated from a creatinine measured at 12 months or the nearest creatinine measured 12 months after AKI alert. Records were assessed for mortality, dialysis, and transplant status.

Table:

	Stage 1 AKI	Stage 2 AKI	Stage 3 AKI
Average 12-month change eGFR	-7 (-55 to +26)	-12 (-58 to +20)	-23 (-83 to +15)
In-hospital mortality	11% 16/145	15% 6/39	29% 10/35
12-month mortality	20% 29/145	28% 11/39	29% 10/35
12-month need for RRT	0.7% 1/145	0% 0/39	3% 1/35

Results: See table 1

259 patients were identified. Patients had an average age of 74. The automated AKI algorithm identified 216 patients and clinicians identified 43 patients.

40 patients were deemed false AKI. 19 did not meet diagnostic criteria (100% from clinician coding), 18 had IV fluid related drops in creatinine prior to AKI trigger (100% from AKI algorithm), 1 had sampling error (100% from AKI algorithm), and 2 showed a progressive CKD (100% from clinician coding).

219 cases of true AKI were analysed: 112 female and 107 male. Patients had an average age of 74.7. The automated AKI algorithm identified 197 patients and clinicians identified 22 patients.

57 patients (26%) had no 12-month follow up creatinine measurements.

Both patients requiring renal replacement therapies were receiving haemodialysis.

Conclusion: The degree of renal impairment and mortality rate at 1 year is higher in AKI stage 2 and 3 than 1. Need for chronic dialysis following any stage of AKI is relatively uncommon in the identified population.

False AKI is a common occurrence in both automated and manual AKI diagnostic methods. A combination of automated and human assessment produces the most accurate diagnostic yeild.

Disclosure of Interest: None Declared

Keywords: AKI, CKD Progression

Acute Kidney Injury

PO-041

Ciprofloxacin-Induced Acute Tubular Necrosis: A Case Report Crystallising the Pathophysiology of this Rare Association

M. Madhra [1,*], R. Clark [1], K. Wood [2], C. Tomson [1]

[1]Nephrology, Freeman Hospital, [2]Histopathology, Royal Victoria Infirmary, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Poster

Introduction: We report the case of a 45 year old, 86kg man, who developed non-oliguric stage 3 acute kidney injury following commencement on oral Ciprofloxacin.

Objectives: The patient had completed escalated BEACOPP chemotherapy for Hodgkin's lymphoma 2 weeks earlier, and was in remission. He had been treated as an inpatient for line sepsis and E. coli bacteraemia with Piperacillin-Tazobactam. He was discharged to complete a 7 days of Ciprofloxacin 500mg bd. His creatinine at discharge was 59µmol/l. His baseline, despite previous admissions with infection and diarrhoea, had never exceeded 63µmol/l.

5 days later, routine blood tests were performed, which demonstrated Cr 521µmol/l.

His other medication, which had not changed in over 6 months, included Aciclovir 200mg bd, Co-Trimoxazole 480mg od and Lansoprazole 30mg od.

There were no features in the history consistent with even a mild pre-renal insult. The patient appeared well, and was entirely asymptomatic. Examination confirmed euvolaemia and there was no documented absolute, or relative hypotension.

Methods: Urinalysis was negative for blood, protein and leucocytes. Renal ultrasound was unremarkable.

C3/C4 and a plasma cell dyscrasia screen were normal.

Ciprofloxacin, Aciclovir and Co-Trimoxazole were withdrawn on admission. He received 3l of IV fluid but his creatinine continued to rise.

A renal biopsy was performed on day 2 of admission. This demonstrated acute tubular necrosis (ATN). No intratubular crystals were identified with special stains, and there was no interstitial inflammation.

Creatinine peaked at 904µmol/l on admission day 5, fell on day 7, and reached baseline (giving eGFR >90 ml/min/1.73m^2) by day 20. Dialysis was not required.

We reviewed the literature to clarify the likely diagnosis.

Results: Several drugs, including Aciclovir, Sulfonamides, Indinavir & Methotrexate, are associated with formation of insoluble crystals in urine. Risk factors include high doses, CKD & hypovolaemia.

Approved orally in 1987 and intravenously in 1991, Ciprofloxacin had been reported to cause crystalluria in animals and very rarely (1 in 63000 cases) in humans, in whom it was considered an unlikely complication as urine pH >6.8 was thought to be required for crystal precipitation. Several cases of Ciprofloxacin-associated AKI with crystalluria have subsequently been reported, most without renal biopsy. Rates of renal recovery were similar to this case.

To our knowledge, acute tubular injury with tubular crystals on biopsy has been reported only once. ATN following high dose intravenous Aciclovir, without intraluminal crystals or crystalluria, has also been reported once.

This is the first case of isolated ATN with Ciprofloxacin. The mechanism is unclear, but could be mediated by intraluminal micro-crystals excreted before renal biopsy was performed, or direct tubular injury.

No usual risk factors for crystalluria were present; significance of co-prescription of 3 potentially crystalluric agents is unknown.

Conclusion: Ciprofloxacin-related acute kidney injury is rare, and may be mediated by crystal nephropathy or acute tubular necrosis. It can occur at normal drug doses, without pre-existing CKD and without superimposed hypovolaemia.

Disclosure of Interest: None Declared

Keywords: ATN, Drug toxicity

Acute Kidney Injury

PO-042

What is the cause of death in patients managed in the community with Acute Kidney Injury?

H. Hobbs [1], L. Forbes [2], K. Cheema [3], S. Coulton [2], C. Farmer [1,*]

[1]Kent Kidney Care Centre, EAST KENT HOSPITALS UNIVERSITY NHS FOUNDATION TRUST, [2]Centre for Health Service Studies, University of Kent, Canterbury, Kent, [3]NHS South Central and West Commissioning support unit, Eastleigh, Hampshire, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: It is recognised that a large amount of AKI occurs in the community thus there is a need for measures for early identification, prevention and management in primary care[1]. In April 2016 routine reporting of AKI with a serum creatinine result was rolled out to Primary care with the aim of alerting GPs to assist the delivery of optimum care[2]. We have previously described the mortality rate and demonstrated that there is an increased risk of death with AKI managed entirely in the community[3]

Objectives: To establish the cause of death in patients who are managed in the community with AKI and whether the death can be attributed to AKI

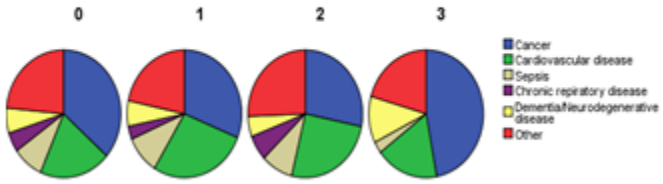
Methods: The data was taken from the regional data base, collected over a 6-month period, all patients aged >18 who had had a serum creatinine requested by a GP in our region over February to August 2009, we identified those who had died within 30 days of serum creatinine being reported by the laboratory. Cause and place of death was ascertained using records from the Office for National Statistics by matching NHS number and date of death. Primary cause of death and underlying secondary cause of death were then categorised using ICD 10 codes.

Image:

Table 1 Mortality rate by stage of AKI

Stage AKI	Mean age	Deaths within 30 days of creatinine result	
	(years)	n	(%)
0	79	71	(0.1)
1	82	52	(1.4)
2	78	23	(9.9)
3	78	18	(17.6)
Total		165	(0.3)

Figure 1 Underlying cause of death by AKI stage.



Results: 4432 deaths occurred during the study period, 165 (52% male) occurred within 30 days of the serum creatinine result. 93 patients had AKI. Table 1 shows mean age, number and percentage of deaths within 30 days by stage of AKI. Cause of death by stage of AKI is shown in Figure 1. None of the patients had AKI recorded as the primary or underlying cause of death. Of the 93 patients with AKI, 78 (84%) had a severe chronic illness or were on an end of life pathway based on cause or place of death; 5 (5%) died in nursing/residential care (mean age 88), suggesting they had been frail; 10 (11%) died in hospital: 5 had been admitted electively for major surgery and 5 died in Accident and Emergency prior to being admitted acutely with a condition unrelated to AKI.

Conclusion: The results demonstrate that 30 day mortality rate increases with worse AKI stage and 89 % of patients who died with AKI in the community were frail, had a severe chronic illness, or were on an end of life pathway. The remaining 11% died of an acute event not related to AKI. This suggests that the decisions to manage some people with AKI in the community are appropriate in our region.

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Disclosure of Interest: None Declared

Keywords: Patient outcome measures, Patient safety

Acute Kidney Injury

PO-043

Folic acid and aristolochic acid induced acute kidney injury and recovery: using HK2 cells as experimental model

S. Welham [1,*] and Y Li and S Welham

[1]Nutritional Sciences, UNIVERSITY OF NOTTINGHAM, Loughborough,, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute kidney injury (AKI) is defined as a sudden injury of kidneys which results in the loss of renal function over hours or days, it is a frequent clinical complication and associated with high mortality and morbidity. Renal ischemia-reperfusion injury or certain drugs like aristolochic acid (AA) and folic acid (FA) can cause AKI, and the consequences range from ischemia or tubular dysfunction or death. Aristolochic acid (AA) is a chemical component that was found in aristolochia, it is an effective contraceptive that was commonly used in ancient China. Folic acid (FA), which is also known as vitamin B_9, it is essential for numerous functions including DNA synthesis and repair. However, consumption of either of these, in elevated concentrations may lead to acute kidney injury. We were interested in establishing a working model which would enable us to examine the processes of damage and repair after exposure to these nephrotoxins and establish their similarity.

Objectives: We set out to make use of proximal tubule cells (HK2) to test the damage and recovery after treating cells with folic acid (FA) or aristolochic acid (AA).

Methods: HK2 cells were seeded in 96-well plates and incubated with FA (10 mM, 14 mM, 18 mM and 23 mM)/AA (44 µM, 60 µM, 73 µM, 88 µM and 117 µM) in FBS-free Dulbecco's Modified Eagle's Medium (DMEM) for 24h or 48h. Cells were then allowed to recover in DMEM with 10% FBS for up to 120h. MTT assays were performed and cell viability was calculated as percentage to non-treated cells.

Results: A dose-dependent decrease on cell viability was observed in both FA and AA treatments after 24h incubation. Cell viability in AA treated group was significantly decreased ($p<0.05$) by 25% at 88 µM, and it even dropped to only 50% after incubated with AA at 117 µM ($p<0.01$). Similarly, 18mM and 23 mM FA treatment showed significant difference ($p<0.05$) to control groups. In addition, a time-dependent decrease on cell viability was observed in both treatments. Cell viability was significantly decreased ($p<0.05$) in FA (18mM) treated cells by massively 70% after 48h incubation while the cell viability in AA treated cells decreased by 40% (88 µM) and 65% (117 µM). During recovery, FA (24h) treated cells showed no significant difference to controls after up to 48h recovery while AA (24h) treated cells took up to 72h to recover. On the other hand, Both FA and AA (48h) treated cells showed no significant difference to controls after up to 120h recovery.

Conclusion: HK2 cells were able to respond to injury induced by FA and AA in dose and time dependent pattern, and HK2 cells were capable to recover after injury, permitting their use for further investigation of relevant mechanisms.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-044

Amino acid restriction for protection against oxidative stress during renal ischaemia reperfusion injury

S. Welham [1], H.-H. Liu [1,*]

[1]Nutritional Sciences, UNIVERSITY OF NOTTINGHAM, Loughborough,, United Kingdom

Preferred Presentation Method: Oral

Introduction: Ischaemia/reperfusion (I/R) is a common cause of acute kidney injury (AKI). Ischaemia can be detrimental if prolonged; however, cells may adapt to survive. Upon reperfusion, the lethal cell injury normally occurs due to oxidative stress. Nutritional support is frequently required for patients with AKI and yet to be defined. Recent studies found that reperfusion at acidic pH or nutrient restriction/deprivation was protective against I/R injury by enhancing cell resistance to oxidative stress.

Objectives: This paper investigated: i) whether the amino acid supplementation (AAS) may protect against the immortalized adult human proximal tubular epithelial (HK-2) cells in the presence of H_2O_2 after starvation; and ii) the nutrient and stress sensing pathways including mammalian target of rapamycin (mTOR) and unfolded protein response (UPR).

Methods: HK2 cells were grown in media comprised of HBSS, with or without essential amino acid supplement at either 50% or 100% of recommended concentration, penecillin, streptomycin. pH was maintained at either pH7.5 or pH6.8 and cells were exposed to H2O2 during restoration of amino acid supply after 12-24hrs restriction.

Results: Our findings showed that nutrient deprivation attenuated HK-2 cell death during oxidative stress by reducing mTOR activity and increasing chaperone protein Brp78 expression. Furthermore, the replenishment of AAS (pH 7.5) under oxidative stress caused cell death due to the activation of mTOR with Brp78 expression which failed to alleviate endoplasmic reticulum stress. Finally, AAS (H 6.4) exacerbated cell death despite mTOR inhibition as it also inhibited Brp78 expression, subsequently blocking the chance for adaptive UPR activation for HK-2 cell survival.

Conclusion: Exposure to elevated levels of amino acids upon recovery from starvation exacerbates the damage induced by exposure to oxidative stress. This is worsened in a reduced pH environment.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-045

A comparison of national AKI algorithm performance in LIMs and middleware platforms in a single acute provider

R. Macaulay [1], M. Harris [1], C. Ball [1], M. Renshaw [2], E. Kingdon [3,*]

[1]Pathology IT, [2]Quality and Safety, BSUH NHS Trust, [3]Renal Medicine, SUSSEX KIDNEY UNIT, Brighton, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is an important clinical condition and prompt identification is likely to improve outcomes.

The utility of laboratory information management systems (LIMs) may vary depending on IT hardware and availability of interfaces with other information resources, version-specific performance of complex tasks and with the quality of demographic and clinical data entered.

Objectives: We sought to compare performance of the national AKI identification algorithm in LIMs and middleware platforms in a single acute provider

Methods: We compared cases of AKI (all severity) identified by BSUH LIMs (WinPath v5.32 SP28) and the local middleware software used to make results available to users in primary and secondary care (ICE v5.4.1). Cases were ascertained for a laboratory serving an 896 bed acute trust and a primary care catchment of approximately 500,000. Ascertainment was between1/ 04/16 and 31/07/16. The BSUH clinical coding database was interrogated to identify an AKI diagnosis.

Table:

	Total Middleware AKI Ascertainment	Total LIMs AKI Ascertainment	Isolated Middleware AKI Ascertainment	Isolated LIMs AKI Ascertainment
AKI 1	3902	895	2780	410
AKI 2	1024	109	719	60
AKI 3	1248	158	737	64
AKI (all)	6173	1162	4236	534

Results: A total of 7335 AKI warning test results were identified in the review period. Thirty five percent (2565 were) identified by both LIMs and middleware.

The national AKI algorithm run on the local middleware platform identified 92% of all AKI warning test results.

Middleware AKI warning test results were associated with 1361 BSUH admissions (3.2% of admissions in this 4 month period). The proportion of admissions associated with an AKI warning test that were coded for AKI (N179 in any position) increased with increasing severity of maximum AKI warning test result identified during the admission (AKI 1 30.6 % AKI2 53.4% AKI 3 59.4%)

Conclusion: Our study identified significant differences in performance when the national AKI algorithm is run in the local LIMs and the local middleware platform. We speculate that this reflects local mechanisms for record consolidation and identity resolution.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-046

Using IT systems in AKI coding leads to a significant incidence of false AKI diagnosis

J. Littlewood [1,*], M. Y. Baig [1], A. Attaelmanan [1], N. Bailey [1], N. Naz [1], I. Daryanani [1], T. Ledson [1], A. Banerjee [1], L. Williams [1], K. Abdulnabi [1]

[1]Renal Medicine, Arrowe Park Hospital, Wirral, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute kidney injury (AKI) diagnosis has increased significantly since the introduction of the national electronic AKI alert between 2014 and 2015. AKI diagnosis has been automatically added to discharge summaries in some NHS trusts via their I.T. systems. A proportion of these patients have changes in their creatinine not attributable to renal injury: "False AKI". This raises an ethical dilemma of providing an inaccurate diagnosis along with the concern it may cause patients and relatives when they view their discharge summary.

Objectives: To identify and assess whether patients with a peak AKI creatinine less than 100 µmol/L have significant 12-month mortality and renal dysfunction to justify the label of AKI.

Methods: Patients who were automatically coded as AKI by the national automated AKI algorithm from the first 20 days of May 2015 with a peak creatinine less than 100 µmol/L were included. Case notes and blood tests were reviewed to identify the probable causes of change in creatinine.

Table: Average creatinine change (µmol/L)

Baseline Creatinine	Admission Creatinine	Peak Creatinine	Discharge Creatinine	12 month Creatinine
55 (33-83)	67 (27-99)	77 (52-100)	60 (31-99)	60.4 (28-96)

Results: 50 patients met inclusion criteria: average age 64 (27-90), female 34 and male 16, Stage 1 AKI 44 and Stage 2 AKI 6, average length of stay 16.6 days (0-66), in-hospital AKI 34 and pre-admission AKI 16.

See table for average creatinine changes.

In-hospital mortality occurred in 0 patients. 6 patients (6%) died by 12 month follow up with causes of death including malignancy, respiratory sepsis, stroke, and hepatic failure.

18 patients (36%) were identified as false AKI. 16 patients (32%) had received preoperative intravenous fluids which dropped their creatinine significantly so that when fluids were stopped and their creatinine returned to baseline an AKI was triggered.

32 patients (64%) were identified as true AKI with aetiology being infection or dehydration in the majority of cases.

Conclusion: A significant proportion of AKI diagnosis is triggered by the national AKI algorithm. Patients with a peak AKI creatinine <100 µmol/L are identified as false AKI in over a third of cases. All patients with a peak AKI creatinine <100 µmol/L have similar average creatinine at one year and a low rate of mortality associated with non-renal causes of death in our population.

We suggest that I.T. systems should not be used to generate an automated AKI diagnosis when the peak AKI creatinine is <100 µmol/L.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-047

A novel multimodal imaging strategy suggests that haemodynamic factors may contribute to renal dysfunction in a mouse model of Adriamycin-induced nephropathy

J. Sharkey [1], L. Scarfe [1], N. De Bois Brillant [2], L. Ressel [3], B. Park [2], B. Wilm [1], P. Murray [1,*]

[1]Cellular and molecular physiology, [2]Pharmacology & Therapeutics, [3]Veterinary Science, UNIVERSITY OF LIVERPOOL, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: Adriamycin (ADR) causes podocyte injury in rodents and is used as a model of focal segmental glomerulosclerosis. We have previously shown that glomerular filtration is significantly reduced in ADR-dosed mice from week 2 onwards, which correlates with the extent of glomerular damage[1]. However, the acute effects of ADR on renal function have not previously been explored, despite the fact that within 4 days after dosing, the mice display severe ill health, weight loss and highest mortality. Besides the kidney, ADR has adverse effects on many other organs and tissues. Our aim here was to investigate the effect of ADR on renal function in this acute period in order to elucidate any association between impaired renal function and general morbidity, and to simultaneously assess the effect of ADR on heart and liver function.

Objectives: implement a non-invasive imaging strategy to assess renal, liver and cardiac function longitudinally in mice during the first 4 days following ADR dosing.

Methods: Male Balb/c mice were dosed with 0.9 % saline (control; n=4) or 20 mg/kg ADR (n=6) intraperitoneally. At time zero, day 1 and 4 following ADR dosing, cardiac function was assessed using high frequency ultrasound, and kidney and liver function (days 1 and 4) using a novel imaging technology called multispectral optoacoustic tomography (MSOT)[1]. Clearance of IRDye 800 carboxylate (exclusively filtered by kidneys) and indocyanine green (ICG) (exclusively eliminated by the liver) were measured to assess kidney and liver function. Mice were culled on d4 and serum biomarkers of kidney (blood urea nitrogen; serum creatinine) and liver function (alanine aminotransferase) were quantified.

Results: MSOT assessment of kidney function showed no delay in the renal excretion of IRDye800 on day 1, but by day 4, a significant delay was observed in ADR-treated mice, indicating severely impaired renal function at this time point. MSOT assessment of liver function showed a significantly delayed clearance of ICG from the blood of ADR mice on both days 1 and 4. Assessment of cardiac function using ultrasound indicated that the ejection fraction was not altered at day 1, but was significantly elevated in mice that received ADR by day 4. All serum biomarkers were elevated at day 4.

Conclusion: Renal function was severely impaired in the initial stages following ADR administration, and this was associated with increased cardiac output. These effects might result from ADR-induced systemic vascular leak[2], which has recently been reported in a mouse ADR model.

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2. Bar-Joseph H et al (2015) Chemotherapy-induced vascular toxicity: real-time in vivo imaging of vessel impairment. *J Vis Exp* (95) e51650

Disclosure of Interest: None Declared

Keywords: AKI, FSGS, Podocyte

Acute Kidney Injury

PO-048

Acute kidney injury(AKI) referrals to renal services and potential AKI alerts – a comparison

D. Ratnapala [1,*], A. Marks [1]

[1]RENAL, NHS GRAMPIAN, Aberdeen, United Kingdom

Preferred Presentation Method: Oral

Introduction: Acute kidney injury (AKI) is common, serious and associated with significant mortality. The introduction of computerised AKI alert based on a algorithmic change in creatinine values (in line with KDIGO definitions) for an individual over the previous 48 hours, 7 days and 1 year has been advocated as a means to identify individuals with deteriorating renal function earlier. NHS Grampian is considering introduction of AKI alerts and we wished to explore the potential difference that an AKI alert might have had on identification of AKI and referral.

Objectives: To study the characteristics of patients, causes of AKI and outcomes in individuals referred to NHS Grampian renal services for AKI and explore the timing of when potential AKI alerts would have been issued and when patients were actually referred.

Methods: In Grampian we aim to record all patients referred to renal services (whether phonecall advice or clinical review) in a single spreadsheet. All patients referred for "AKI" in May 2016 were included in this analysis. Patient notes, renal management system, patient management system and renal referrals spreadsheet were available for information. The patient characteristics, timeline of AKI development, date of referral, clinical opinion as to aetiology of AKI, AKIN category, provision of renal replacement therapy and 90 day mortality were described. The patients' creatinine results (which were available to clinicians) and AKI alerts (which weren't available) were analysed. The AKI alerts were produced using the Laboratory Information Management System running the "iLab AKI v2.0 build 6" AKI algorithm. The total number of AKI alerts for the region during the same period was also summarised.

Table:

Results: During the study period, the AKI-alert algorithm generated 1233 AKIN 1, 377 AKIN2 and 581 AKIN3 alerts for 249, 40 and 56 people respectively. During the same time period there were 55 documented referrals for AKI to renal services. These patients were generally elderly (mean age 67.4 years) and the majority were male(73%. Of patients who were referred, those who presented to hospital with AKIN 3 at admission were referred promptly to renal services. However, patients who had AKI 1 and 2 or developed AKI during admission showed a lag period between 1 to 6 days between potential alert and referral. The commonest aetiological factor was dehydration (23.6%).Seven (12.7%) patients received haemodialysis. Ninety-day mortality was 34.5%. There were 5 referrals where they clinically had AKI but did not generate an AKI alert, explained by the previous episodes of AKI in the last year that lead to a high median creatinine.

Conclusion: There is a difference in timing between potential AKI alert 1 and 2 and referrals and those with AKI 3 alerts. Thus, AKI alerts may offer a tool to more prompt identification and management of AKI particularly for current in-patients. However, clinical vigilance is still required for those at risk of recurrent AKI.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-049

AKI alerts in a Scottish region: auditing potential volume, location and outcomes

A. Marks [1,*], C. Black [2], L. Clark [1], G. Osler [3], S. Sawhney [1]

[1]Renal Unit, NHS GRAMPIAN, [2]Institute of Applied Health Sciences, University of Aberdeen, [3]Health Intelligence, NHS GRAMPIAN, Aberdeen, United Kingdom

Preferred Presentation Method: Oral

Introduction: The release of AKI alerts beside creatinine results is a potential means of improving the early recognition and care of unwell people. However, to ensure clinicians are adequately prepared, an assessment of the burden and relevance of alerts is necessary.

Objectives: To inform such education and information requirements locally, we audited the volume, location and outcomes of provisional AKI-alerts in Grampian.

Methods: The English AKI alert (based on KDIGO) algorithm for laboratory information management systems (LIMS), was piloted in the region, although no AKI alerts were released to clinicians. All creatinine results and alerts are available for a year from March 2016 but were analysed for a period of 16 weeks (5th March - 25th June 2016). Samples for the very young (<16), old (>100 years) and visitors to the region were excluded. The number of samples, alerts, people and locations involved were summarised. The health board supplied outcomes (date of death, dates of admissions and discharge diagnoses where available) at the 8th July 2016 (to be updated). Seven and 30 day mortality was calculated.

Results: During the first 16 weeks 192536 creatinine results for 92781 adults (45% male, median age 61) out of an estimated population of ~500,000 were available. Out of ~48,000 creatinine results per month, 929-1109 had AKI 1, 249-358 AKI 2 and 224-314 for AKI 3. This pertained to an average 375, 89 and 56 individuals having a maximum alert of AKI 1, 2 and 3 per month. However 15-17% of samples had no reference value to determine if AKI had occurred.

103208 (53.6%) creatinine samples came from general practice, which accounted for 18.3%, 7.1% and 5.3% of AKI 1, 2 and 3 alerts in the region. 57444 (29.8%) creatinine samples came from the main hospital in-patients, which accounted for 63.1%, 75.4% and 75.2% of AKI 1, 2 and 3 alerts in the region. The remainder came from other in-patient, out-patient and day-case sources.

For individual in-patients, the first AKI-alert occurred in A&E for 14%, the medical admissions unit for 16%, orthopaedics for 5% the renal ward for 2% and care of the elderly for 6%. Whereas these areas accounted for only 9%, 7%, 3.5%, 2.5% and 4.4% of all creatinine blood tests. In those with an AKI alert there was a 3% immediate, 13% 7day and 24% 30 day mortality.

Conclusion: The introduction of e-alerts confirms a large and widespread burden of AKI in hospitals. However, this audit illustrates that there is a preponderance of AKI, and poor outcomes with AKI in key in-patient locations. These areas should now perhaps be specifically targeted in patient safety and education initiatives.

Disclosure of Interest: None Declared

Keywords: None

Acute Kidney Injury

PO-050

A Single Tertiary Renal Centre Experience of Acute Interstitial Nephritis

L. Baines [1], A. Brown [1], H. Mabillard [1,*]

[1]Renal Services, NHS, Newcastle upon Tyne , United Kingdom

Preferred Presentation Method: Poster

Introduction: The incidence of acute interstitial nephritis (AIN) is up to 10% in published renal biopsy registries. Previously the most common drug aetiology was beta lactam antibiotics, whereas more recent series report a variety of drugs, infections and tubule-interstitial nephritis and uveitis syndrome (TINU) as causes. Persistent vigilance is therefore required to identify new triggers. There is some suggestion that corticosteroid treatment leads to more rapid renal recovery but timing, dosing and duration of steroid treatment are very variable in reported series.

Objectives: To describe the characteristics and clinical course of all biopsy-proven AIN cases in a tertiary renal centre over 8 years.

Methods: All biopsy proven diagnoses of 'Acute interstitial nephritis' from the last 8 years were identified from departmental renal biopsy database. Clinical records were extracted from the Trust's electronic record system. X^2 testing was used to test for differences between groups.

Results: AIN was diagnosed in 54 patients, 57% female, 78% aged over 50 years. 24% of patients had classical clinical symptoms of AIN, 35% had eosinophilia, 37% had bland urinary sediment, and 56% had evidence of tubular dysfunction. 70% had normal sized kidneys on ultrasound.

17% had KDIGO stage 1 AKI, 26% stage 2 AKI and 57% stage 3 AKI. 13% of all patients required dialysis.

Causes of AIN were attributed as follows: 'unknown' 6%, NSAIDs 9%, PPIs 39%, antibiotics 26%, TINU 11%, other drugs 9%, infections 6% and sarcoidosis 6%. 89% were treated with oral corticosteroids, with severe steroid side effects in 33% of these. Only 6% of all patients had full recovery of renal function - 26% developed CKD 4/5 by 1 year and 13% of patients became HD dependent within 2 years. In patients with PPI-attributed AKI, severity was worse in patients taking Lansoprazole compared to Omeprazole (p=0.04). AKI severity, presence of eosinophilia and greater renal size did not relate to likelihood of renal function recovery. Duration of trigger therapy did not relate to AKI severity or recovery in renal function.

Conclusion: An increasingly diverse aetiology of AIN was seen in our population, who had a high risk of residual CKD despite corticosteroid treatment in the majority. Given this and the high incidence of severe steroid side effects, we suggest that the duration, dose and the associated risk: benefit of steroid treatment should be carefully reviewed.

Disclosure of Interest: None Declared

Keywords: Acute tubulointerstitial nephritis

Acute Kidney Injury

PO-051

Effect and Acceptability of AKI Education Using Peer Review Audit in Primary Care

J. Mckennell [1,*], N. Kolhe [2], L. Woods [2], S. Bassett [2], N. Selby [2]

[1]Derby Teaching Hospitals NHS Foundation Trust, Derby, , [2]Derby Teaching Hopsitals NHS Foundation Trust, Derby, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Primary care has a significant role in AKI management: two-thirds of AKI originates in the community and post-AKI care is important. We aimed to increase awareness and knowledge levels of AKI in primary care via an CCG wide education programme that included nephrology led case-based discussion (peer review audit) and to evaluate the programme's acceptability and impact.

Objectives: Primary care has a significant role in AKI management: two-thirds of AKI originates in the community and post-AKI care is important. We aimed to increase awareness and knowledge levels of AKI in primary care via an CCG wide education programme that included nephrology led case-based discussion (peer review audit) and to evaluate the programme's acceptability and impact.

Methods: Over a 12 month period, peer review audit sessions were delivered at practices to GPs and the primary care MDT. Peer review audit sessions consisted of a short presentation by a consultant nephrologist followed by discussion of individual cases. Qualitative feedback was collected from all participants at each peer review session. Web-based, CCG-wide questionnaires incorporating factual and clinical questions were used to assess baseline and post-intervention knowledge levels (participation incentivised by a Locally Commissioned Service Framework). Primary care AKI guidelines were launched and two large group teaching sessions were held. Figure 1. A significant improvement in percentage of knowledge based questions that were correctly answered in the follow up questionnaire (shown in green) as compared to baseline (shown in blue).

Image:

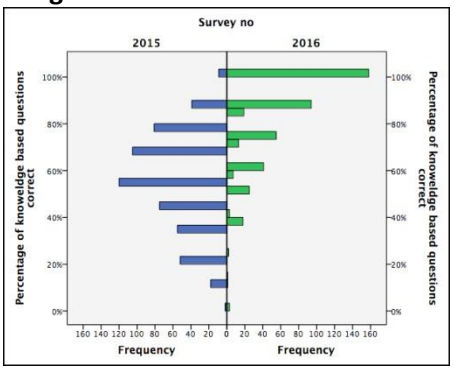

Table: Table 1.

	First Survey	Second Survey	p value
Self-reported confidence in making AKI diagnosis	28%	59%	p<0.001
Attended AKI teaching in last 12 months	22%	64%	p<0.001
Read AKI article in last 12 months	59%	79%	p<0.001

Results: All 55 practices within the CCG had a least one representative at the large group teaching sessions; 25 practices participated in peer review audit sessions whilst 28 of the remaining 30 practices performed an internal AKI audit without consultant nephrologist involvement. 93% of participants (94 responses) found the peer review audit sessions useful, particularly the presence of nephrologist. 45% of participants were anxious about group discussion of cases,

although 36% thought they were the most useful component of the sessions. Formal presentations were ranked as the most popular format of receiving education. 996 individuals completed the questionnaires (556 at baseline, 440 at 1yr, 228 participated in both). At baseline 61% were GPs, 27% practice nurses and 8% Advanced Practitioners, with similar proportions at 1yr. Exposure to AKI teaching, self-reported awareness and confidence levels were higher in the second questionnaire and there was a significant improvement in test scores (combination of factual questions and AKI cases), as shown in figure 1 and table 1

Conclusion: Primary care education can improve knowledge and awareness of AKI. Small group teaching with involvement of a nephrologist was popular, although there were mixed responses to group discussion of real cases. These results suggest that there is a need to tailor education styles to individual preferences, and peer review audit may not be universally acceptable in primary care.

Disclosure of Interest: None Declared

Keywords: None

Anaemia

PO-052

Predictors of response to iron and erythropoietin treatment in dialysis anaemia

S. Hildebrand [1], M. Busbridge [2], R. Mclean [3], N. Duncan [1], F. Tam [1], D. Ashby [1,*]

[1]Imperial College Renal & Transplant Centre, [2]Department of biochemistry, [3]Department of haematology, IMPERIAL COLLEGE HEALTHCARE NHS TRUST, London, United Kingdom

Preferred Presentation Method: Oral

Objectives: In the management of dialysis anaemia, functional iron deficiency and erythropoietin resistance lead to reduced efficacy and treatment toxicity, but are difficult to predict, usually being defined only by the response after treatment. In many dialysis units, ferritin is used to guide treatment choices, but the accuracy of this test, and role of emerging biomarkers, are unknown.

Methods: Stable haemodialysis patients who became moderately anaemic (Hb 90-104g/l) on routine testing with unremarkable ferritin (100-800ng/l), were randomly allocated to treatment with either intravenous iron (1g divided over 5 consecutive sessions, IVFE group) or increased erythropoietin (either starting 3000unit/week or median increase 50%, EPO group). No further treatment was given for 2 months.

Novel and established biomarkers were measured, and baseline characteristics predictive of a response to treatment were analysed using Fisher's and t-tests with log transformation where appropriate.

Table:

Results: In 194 patients recruited and followed for up to 18 months (2438 patient-months observed), there were 158 anaemia episodes with completed randomisation and follow-up (mean age 63, 72% male). A positive haemoglobin response (increase by at least 5g/l by 2 months) was observed in 54/76 patients randomised to receive IVFE, and 59/82 patients who received EPO (71.1 vs 72.0%, p=1.0).

In the IVFE group, compared to non-responders, those achieving Hb response had lower hepcidin (101 vs 160ng/ml, p=0.011), lower mean cell volume (90.4 vs 94.8, p=0.017) and lower reticulocyte Hb (33.8 vs 35.6, p=0.049). In the EPO group only low CRP was predictive of a positive response (13.4 vs 28.6, p=0.031).

Ferritin was not predictive of response to IVFE or EPO (p=0.75 and 0.22 respectively). Weaker associations with response, specific for one group only, were found for gender, B12 levels, Hb gradient prior to randomisation, prior EPO dose and warfarin use.

Conclusion: Ferritin is a poor predictor of treatment response in anaemic dialysis patients. A combination of established and novel biomarkers, such as hepcidin, could be used to develop an evidence-based protocol for more accurate treatment of dialysis anaemia. This could lead to improved response rates, with reduced treatment toxicity and reduced requirement for transfusion.

Disclosure of Interest: None Declared

Keywords: Anaemia, Clinical trial, Haemodialysis

Anaemia

PO-053

Development of an Algorithm to Refine Iron Dosing in Chronic Kidney Disease: Utility and Clinical Implications

R. Borrows [1], M. Chowrimootoo [1,*], J. Hodson [1]

[1]Renal, QEHB, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Intravenous iron dosing in CKD should ideally maximise clinical effectiveness and safety, and cost-effectiveness.

Objectives: An algorithm to predict changes in haemoglobin (Hb) level and ferritin level may have advantages. The purpose of this project was to establish such an algorithm.

Methods: 554 patients with CKD stage III-V, but not requiring dialysis, were studied. Median age was 64 years; 56.5% were female; 33.6% were diabetic; 26.2% received ESA (the doses of which remained unchanged during the study). Data was collected at the time of routine iron administration. Ferrinject was administered in all cases as a single infusion, with doses between 500mg and 1000mg.

The outcome measures of interest were Hb and ferritin levels 6 weeks following iron dosing. Multivariable analyses were performed to identify independent predictors of these 6-week measures. Ferritin values followed a skewed distribution; log2-transformations were applied and the resulting coefficients from the model then anti-logged, and converted into percentage increases, to simplify their interpretation.

Results: Both Hb and Ferritin levels increased significantly after treatment (110.4 ± 11.9 vs 101.1 ± 10.8 g/L, and 428 [IQR: 284 – 587] vs 78 [IQR: 35 – 138) respectively; $p<0.001$ for both).

Multivariable analysis revealed the following baseline measures were significantly associated with Hb 6-weeks post iron infusion: baseline Hb (effect: 0.70; 95%CI: 0.64, 0.76), baseline ferritin (effect: -2.94; 95% CI: -2.45, -3.44), baseline CRP (effect: -0.13; 95% CI: -0.05, -0.21), diabetes (effect: 5.15; 95% CI: 3.73, 6.57), and ESA therapy (effect: 3.20; 95% CI: 1.63, 4.78). After accounting for these factors, the iron dose administered (normalised to body weight) was **not** found to significantly predict Hb increment (p=0.771).

The following baseline measures were significantly associated with serum Ferritin 6-weeks post iron infusion: baseline Hb (effect per 10g/L: 8.0%; 95% CI: 3.9% - 12.3%), baseline ferritin (effect: 37.5%; 95% CI: 33.4%, 41.7%), age (effect per decade: 2.7%; 95% CI: 0.2% - 5.3%), male patient (effect: 11.8%; 95%CI 3.6% - 19.5%). In addition, increasing dose (per Kg body weight) was independently associated with 6-week ferritin level (effect: 5.4%; 95% CI: 3.4% - 7.4%).

Based on these results, the model above was then converted into a formula to predict (and therefore enable the clinician to 'target') 6-week ferritin level. To test the performance of this algorithm, the predicted and actual post-treatment Ferritin levels were then compared. Although the model explained a moderate amount of the variability in post-treatment Ferritin (R^2: 0.476), the 95% prediction interval (i.e. the margin of error within which 95% of predictions would fall) was high, equivalent to a ±2.6 fold difference. For example, if a six week Ferritin level of 300 was predicted/targeted, then the actual value would be expected to fall within a range 115 – 780.

Conclusion: 1] This study describes independent predictors of Hb and Ferritin levels in a population receiving bolus iv iron; 2] it suggests no association between iv iron dose (per Kg) and Hb increment, at least across the dose range used in standard clinical practice, and that reduced dosing may be just as efficacious, with increased cost-effectiveness and potentially reduced risk of iron overload; 3] although iv iron dose predicts **population-level** changes in Ferritin levels, the accuracy of the algorithm is insufficient to predict response in **individual** patients.

Disclosure of Interest: None Declared

Keywords: Anaemia

Anaemia

PO-054

Predictors of response to iron and erythropoietin treatment in dialysis anaemia

S. Hildebrand [1,*], M. Busbridge [1], F. Tam [1], R. McLean [1], N. Duncan [1], D. Ashby [1]

[1]Imperial College Renal and Transplant Centre, HAMMERSMITH HOSPITAL, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: In the management of dialysis anaemia, functional iron deficiency and erythropoietin resistance lead to reduced efficacy and treatment toxicity, but are difficult to predict, usually being defined only by the response after treatment. In many dialysis units, ferritin is used to guide treatment choices, but the accuracy of this test, and role of emerging biomarkers, are unknown.

Objectives: This study aims to identify accurate predictors of response to iron and erythropoietin in dialysis patients.

Methods: Stable haemodialysis patients who became moderately anaemic (Hb 90-104g/l) on routine testing with unremarkable ferritin (100-800ng/l), were randomly allocated to treatment with either intravenous iron (1g divided over 5 consecutive sessions, IVFE group) or increased erythropoietin (either starting 3000unit/week or median increase 50%, EPO group). No further treatment was given for 2 months.

Novel and established biomarkers were measured, and baseline characteristics predictive of a response to treatment were analysed using Fisher's and t-tests with log transformation where appropriate.

Results: In 194 patients recruited and followed for up to 18 months (2438 patient-months observed), there were 158 anaemia episodes with completed randomisation and follow-up (mean age 63, 72% male). A positive haemoglobin response (increase by at least 5g/l by 2 months) was observed in 54/76 patients randomised to receive IVFE, and 59/82 patients who received EPO (71.1 vs 72.0%, p=1.0).

In the IVFE group, compared to non-responders, those achieving Hb response had lower hepcidin (101 vs 160ng/ml, p=0.011), lower mean cell volume (90.4 vs 94.8, p=0.017) and lower reticulocyte Hb (33.8 vs 35.6, p=0.049). In the EPO group only low CRP was predictive of a positive response (13.4 vs 28.6, p=0.031).

Ferritin was not predictive of response to IVFE or EPO (p=0.75 and 0.22 respectively). Weaker associations with response, specific for one group only, were found for gender, B12 levels, Hb gradient prior to randomisation, prior EPO dose and warfarin use.

Conclusion: Ferritin is a poor predictor of treatment response in anaemic dialysis patients. A combination of established and novel biomarkers, such as hepcidin, could be used to develop an evidence-based protocol for more accurate treatment of dialysis anaemia. This could lead to improved response rates, with reduced treatment toxicity and reduced requirement for transfusion.

Disclosure of Interest: None Declared

Keywords: Dialysis

Biomarkers

PO-055

A Comparison of Antibody Markers in Early Pregnancy in Women who Subsequently developed Pre-eclampsia Compared to Matched Healthy Controls

N. Sarween [1,*], E. Knox [2], P. Nightingale [3], T. Plant [4], C. Day [1], M. Drayson [4], G. Lipkin [1]

[1]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, [2]Maternal Medicine, Birmingham Women's Hospital NHS Foundation Trust, [3]Medical Statistics, University Hospitals Birmingham NHS Foundation Trust , [4]Clinical Immunology, University of Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The cause of Pre-eclampsia (PE) a leading cause of maternal and fetal morbidity and death remains poorly understood with multiple pathophysiological pathways implicated including immunological and angiogenic system disturbances. It is hypothesised that PE occurs in 2 stages; a pre-clinical phase defined by a failure of adequate placentation and a subsequent maternal inflammatory response leading to widespread endothelial dysfunction and clinical symptoms. Our research team has recently demonstrated in a cross-sectional study that PE at the time of diagnosis is characterised by an increase in levels of serum free light chain levels (sFLC) independent of kidney function and to other markers of inflammation compared to healthy 3rd trimester pregnancy. A reduction in IgG (specifically subclasses 1 and 3), albumin, C4 and an increase in CRP and Beta2 microgblobulin (B2-M) were also demonstrated [1].

Objectives: We aimed to determine whether these immunological abnormalities are present in the pre-clinical phase in pregnant women who subsequently develop PE compared to matched healthy pregnant controls.

Methods: Cases of PE were identified using hospital coding data from 7354 pregnancies at a tertiary maternity hospital over an 8 month period. Non-singleton pregnancies were excluded. Pregnancies complicated by PE were matched for age, ethnicity, BMI and primigravidity with women without hypertensive disorders in pregnancy. Stored (-20oC) serum samples (8-14 weeks gestation) routinely collected where available for identified women, were retrieved and anonymised. Samples were batched and analysed on the Roche Cobas platform: sFLC, IgG/A/M (including G subclasses), CRP, B2-M, serum creatinine, cystatin-c, albumin and complement factor 3 and 4. IBM SPSS was used for statistical analysis. Conditional logistic regression analysis was performed to identify early predictors of PE in cases versus matched controls. Forward logistic regression analysis was also used to identify if any of the study markers were predictive of adverse clinical outcome in the PE group.

Results: A total of 203 cases of PE and 477 matched controls with stored booking samples available were identified; 117 cases were matched with 3 controls, 56 cases with 2 controls and 14 cases with 1 control leaving 16 unmatched cases. At booking, women who developed PE were significantly more likely to have higher B2-M (p=0.031) and lower IgM (p=0.007) levels compared to their matched controls. Higher FLC levels (p=0.026) levels were predictive of early delivery (less than 34 weeks) in women with PE and a higher total immunoglobulin concentration (p= 0.020), was predictive of need for neonatal ventilation in this group.

Conclusion: The humoral and complement system abnormalities we have previously identified at the time of clinical manifestation of PE are not detectable early on in pregnancy (less than 14 weeks). However, other antibody marker changes were demonstrated in women who went on to develop PE supporting early onset immunological disturbances in PE. Furthermore higher sFLC levels at booking may predict more severe early PE & delivery. Longitudinal sample collection will help further characterise the onset & nature of these immunological changes helping increase our understanding of disease pathogenesis in PE.

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Disclosure of Interest: None Declared

Keywords: Immunoglobulins, Pre-eclampsia, Pregnancy

Biomarkers

PO-056

Discordant selective IgG responses to different pathogens in chronic kidney disease suggest immune dysregulation rather than immune failure.

N. Wall [1,*], C. Dominguez-Medina [1], S. Faustini [1], A. McClean [2], M. Jesky [3], A. Richter [1], P. Cockwell [3], P. Moss [1], A. Cunningham [1], L. Harper [1]

[1]University of Birmingham, Birmingham, [2]University Hospitals of North Midlands NHS Trust, Stoke-on-Trent, [3]University Hospitals Birmingham NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic kidney disease (CKD) patients have diminished immunocompetency with poorer immune responses to bacteria, viruses and vaccines and an exponential increase in the risk of infection with worsening renal function resulting in significant morbidity and mortality [1-4].

Objectives: To better understand the nature of this increased susceptibility to infection we sought to assess the level of antibodies against a range of commonly encountered pathogens and vaccines in age-matched individuals with and without CKD.

Methods: Serum from 43 non-dialysis CKD patients and 39 age-matched controls was evaluated for IgG directed against 2 protein subunit vaccine antigens - tetanus and diphtheria toxoids using a Luminex method. Circulating IgG to 2 persistent antigens: cytomegalovirus (CMV) and lipopolysaccharide (LPS) from *Salmonella enterica* serovar *Enteritidis* (*S.enteritidis*) was evaluated using ELISA. Cell-independent killing of *S.enteritidis* (function of anti-LPS IgG and complement activation) was assessed using a serum bactericidal assay.

Results: CKD patients had a median age of 63 years and estimated glomerular filtration rate of 25ml/min/1.73m^2 with ischaemic/hypertensive nephropathy, polycystic kidney disease and diabetic nephropathy the most common renal diagnoses. CKD patients had significantly higher markers of inflammation than controls, including hsCRP (2-tailed Mann-Whitney p=0.0052).

CKD patients had similar long-term IgG memory of historical vaccine antigens as controls – anti-TT and anti-DT IgG titres and the proportion of individuals with WHO protective IgG levels to either vaccine antigen were not significantly different between the subject groups.

Proportions of CMV seropositive subjects were similar between CKD patients and controls, but seropositive CKD patients had significantly higher anti-CMV IgG titres than seropositive controls (2-tailed Mann-Whitney p=0.0127) and disease group remained a significant independent predictor of anti-CMV IgG titre in a multivariate linear regression model that included disease group and age (p=0.024).

Anti-LPS IgG titres were not significantly different between CKD and control subjects and serum killing of *S.enteritidis* in CKD patients was not inferior to controls in a subgroup of subjects with highest anti-LPS IgG titres (“saturated” antibody capacity to kill bacteria), suggesting intact complement activation.

Conclusion: Our findings suggest that the phenomenon of secondary immunodeficiency seen in CKD is not simply an abject failure to mount an immune response to pathogen, but a dysregulation of the adaptive immune response, with evidence of a selective bias towards an exaggerated humoral response to the persistent viral antigen - CMV.

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2. Steenkamp, R., C. Shaw, and T. Feest, *UK Renal Registry 15th Annual Report: Chapter 5 Survival and Causes of Death of UK Adult Patients on Renal Replacement Therapy in 2011: National and Centre-Specific Analyses.* Nephron Clinical Practice, 2013. **123**: p. 93-123.

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Disclosure of Interest: None Declared

Keywords: CKD, Immunoglobulins, Infection/immunity

Biomarkers

PO-057

Association of novel Biomarkers with long-term outcomes in atherosclerotic renovascular disease.

D. Vassallo [1,*], H. Alderson [1], J. Ritchie [1], D. Green [1], C. Chrysochou [1], P. Kalra [1]

[1]Renal Department, Salford Royal NHS Foundation Trust, Salford, United Kingdom

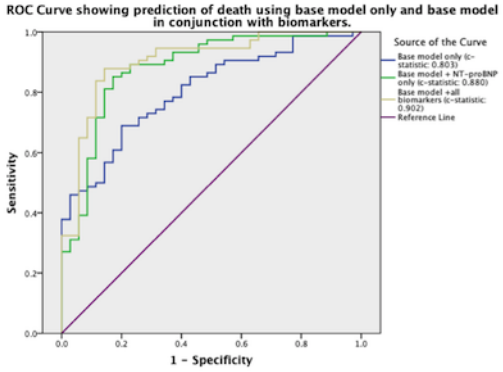
Preferred Presentation Method: Oral or Poster

Introduction: Several novel biomarkers have been shown to be associated with long-term adverse end-points in patients with chronic kidney disease[1,2], however their role in patients with atherosclerotic renovascular disease (ARVD) has not yet been investigated.

Objectives: In this study we investigate the association between novel biomarkers and long-term adverse outcomes in patients with ARVD, and whether their addition to a conventional model based on traditional cardiovascular and renal risk factors could aid risk prediction in this specific patient cohort.

Methods: Patients recruited to the Salford Renovascular Study who had the following biomarkers analyzed on a stored baseline sample were included in this study: fibroblast growth factor-23 (FGF-23), cystatin C, kidney injury molecule-1 (KIM-1), myeloperoxidase, neutrophil gelatinase-associated lipocalin (NGAL), N-terminal pro-Brain Natriuretic peptide (NT-proBNP), high-sensitivity Troponin T and anti-apolipoprotein A1 IgG. Multivariable analyses were performed to study the effects of a 'base model' consisting of traditional risk factors (e.g. age, cardiovascular comorbidities, baseline renal function and proteinuria) and then further models composed of novel biomarkers added to the base model, on the following end-points: death, progression to end-stage kidney disease (ESKD), cardiovascular events (CVE) and a composite outcome of all these events.

Image:



Results: 112 patients were followed-up for a median of 59.9 months (IQR 33.6-86.9), NT-proBNP was the only biomarker that maintained a statistically significant association with death (HR 1.62 [95% CI 1.26-2.10], p<0.0005), progression to ESKD (HR 1.51 [95% 1.19-1.91], p=0.001), CVE (HR 1.56 [95% CI 1.23-1.97], p<0.0005) and any event (HR 1.48 [95% CI 1.19-1.84], p<0.0005). The addition of NT-proBNP to a model composed of traditional risk factors also improved prediction of all four clinical end-points and risk reclassification although our small sample size limits interpretation of this effect.

Conclusion: Despite the limited power of our study, our results suggest that NT-proBNP is an independent marker of increased risk of all adverse events in ARVD and may improve risk prediction when used in combination with more traditional risk factors.

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Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, Epidemiology, Renovascular disease

Biomarkers

PO-058

Performance evaluation of a urinary L-FABP point of care device and its potential utility in Chronic Kidney Disease

N. Mitsides [1,*], A. Saha [1], I. Read [1], S. Mitra [1]

[1]Nephrology Department, Central Manchester University Hospitals NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Liver-type fatty acid binding protein (L-FABP) is expressed by the proximal renal tubule during oxidative stress. Urinary L-FABP indicates tubular injury and has been established as a biomarker in Acute kidney injury. However its value in Chronic Kidney Disease (CKD) and its progression has not been well defined. Application of such a biomarker in routine clinical practice could be greatly enhanced by assessing its validity in CKD and the design of a point of care assay (POC).

Objectives: We wished to evaluate a) the clinical performance of a semi-quantitative POC device for the detection of urinary L-FABP and b) assess the value of urinary L-FABP as a biomarker at different stages of CKD.

Methods: We report the baseline analysis of ELUDE, a multicentre study in Greater Manchester involving patients with CKD stages 3-5. Urine samples collected from consenting individuals were tested for urinary protein creatinine ratio (PCR in mg/mmol) using establlished laboratory proceddures and urinary L-FABP using a semiquantitative POC & a quantitative ELISA (ug/gCr). A concomitant serum sample was analysed to calculate estimated glomerular filtration rate (MDRD eGFR expressed in ml/min/1.73 m^2). CKD was staged as 3A (eGFR 45-59), 3B (eGFR 30-44), 4 (eGFR 15-29) and 5 (eGFR <15 but not on dialysis) [KDOQI].

Results: In 543 CKD participants, 15% had CKD3A (eGFR=51.0±4.5; PCR=55.0±97.1), 28% CKD3B (eGFR=36.4±4.5; PCR=79.4±125.6), 39% CKD4 (eGFR=21.9±4.5;PCR=135.7±185.8) and 17% CKD5 (eGFR=10.9±2.4; PCR=246.0±266.8). The mean urinary L-FABP ELISA measurement was 22.39 ug/gCr. L-FABP levels increased with advancing stages of CKD (CKD3A: 4.0±12.1ug/L; CKD3B: 8.4±22.5ug/L; CKD4: 23.9±48.6ug/L; CKD5 57.9±83.8ug/L). L-FABP correlated negatively with eGFR (r= -0.445, p=<0.01) and positively with PCR (r=0.589, p<0.01). The association of L-FABP with eGFR was more pronounced at advanced stages of CKD. In a linear regression model for prediction of eGFR, L-FABP was an independent predictor in CKD stages 4 (beta= -0.176, p=0.02) and 5 (beta= - 0.233, p=0.03) while PCR was not (CKD4: beta= 0.034, p=0.65; CKD5: beta= -0.192, p=0.08). POC derived L-FABP measurements correlated well with ELISA (r=0.642, p<0.001).

Conclusion: The study findings suggest that in advanced stages of CKD, L-FABP may be a more reliable predictor of eGFR than proteinuria. High levels of L-FABP in advanced CKD 4 and 5 could reflect dominant tubular damage and atrophy and may act as a useful biomarker of progressive disease. Longitudinal follow-up data from this study will further inform these findings. The POC device used in this study provides a reliable way of measuring urine L-FABP and may be of utility in the clinical setting.

Disclosure of Interest: N. Mitsides Conflict with: CMIC Holdings, Japan, A. Saha Conflict with: CMIC Holdings, Japan, I. Read: None Declared, S. Mitra Conflict with: CMIC Holdings, Japan

Keywords: CKD Progression, Proteinuria

Biomarkers

PO-059

Investigating the utility of anti-Müllerian hormone in young women with chronic kidney disease

S. Stoumpos [1,*], J. Lees [1], P. Welsh [2], C. Geddes [1], S. Nelson [3], P. Mark [2]

[1]Renal and Transplant Unit, Queen Elizabeth University Hospital, [2]Cardiovascular Research Centre, [3]School of Medicine, University of Glasgow, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Females with chronic kidney disease (CKD) have menstrual and gonadal dysfunction mainly manifesting as hormonal imbalance. Anti-Müllerian hormone (AMH) has been described as a potential measure of the ovarian reserve and has been demonstrated to be a biochemical marker of ovarian health in females without CKD.

Objectives: To measure serum AMH concentrations in young females with impaired renal function.

Methods: We examined in a prospective cohort study circulating AMH levels in females of childbearing age with CKD, determined associations with clinical characteristics, and compared AMH levels with age-matched healthy individuals.

Results: AMH concentrations were measured in 77 females with renal disease [mean age 32.9 (SD 5.4) years]; 26 had CKD stages 3-5 [mean eGFR 34.4 (SD 15.3) mL/min], 26 were on dialysis, and 25 had a kidney transplant [mean eGFR 67.2 (SD 27.7) mL/min]. We demonstrate that in univariate and multivariate models, random AMH levels are higher in females on dialysis and that circulating levels decline with increasing age. More specifically, on multiple linear regression, AMH was 1.7 (95%CI 0.7-2.7, p=0.001) ng/mL higher in females on dialysis compared to females with CKD stages 3-5 and decreased by 0.1 (95%CI 0.1-0.2, p=0.001) ng/mL per year increase in age. AMH was lower by 33% in females with renal impairment compared to 600 age-matched healthy controls (2.4±2.0 vs 3.6±2.4ng/mL, p<0.001) but females on dialysis had similar AMH to healthy individuals (3.3±2.4 vs 3.6±2.4ng/mL, p=0.53).

Conclusion: AMH may have clinical utility as a biomarker in female renal patients with non-dialysis dependent CKD pursuing pregnancy as it is generally lower than, but behaves in a similar manner to the general population. AMH is high and difficult to interpret in females on dialysis.

Disclosure of Interest: None Declared

Keywords: CKD, Pregnancy

Biomarkers

PO-060

Monitoring Kidney Transplant Patients with Urine Flow Cytometry

N. Goerlich [1,*], H. Brand [1], V. Langhans [1], A. Grützkau [2], P. Reinke [3], A. Paliege [4], P. Enghard [3]

[1]Deutsches Rheuma-Forschungszentrum Berlin, Charité Universitaetsmedizin, [2]Deutsches Rheuma-Forschungszentrum Berlin, Deutsches Rheuma-Forschungszentrum Berlin, [3]Nephrology, Charité Universitaetsmedizin, Berlin, [4]Nephrology, Universitaetsklinikum Carl Gustav Carus Dresden, Dresden, Germany

Preferred Presentation Method: Oral or Poster

Introduction: Nina Goerlich conducts her research at Charité University Berlin. She works at 'Deutsche Stiftung Organtransplantation' (German Organ Transplant Organisation) and is highly interested in nephrology and transplantation medicine. She holds a scholarship from the Foundation of German Business (sdw) and started her research at the nephrology department in 2015. The aim of her scientific work is to consolidate basic scientific research and clinical research to improve the treatment of renal patients.

Objectives: Currently, no biomarkers are available to reliably monitor renal transplant patients making renal biopsies inevitable in cases of graft deterioration. An increase of urinary T cells in patients with acute kidney rejection has been previously described. The aim of this study was to identify different urinary immune cells as potential biomarkers for kidney transplant patients.

Methods: The urinary cells of two patient groups were analysed. Group A were patients with suspected graft rejection undergoing renal biopsy (n=38). All samples were analysed within three days of the biopsy. Patients were divided into five subgroups according the histological diagnosis. Group B were patients undergoing renal transplant (n=23) that were longitudinally monitored in the follow up. Urine samples were analysed immediately after collection. Immune cells were purified using Ficoll. Immune cell populations were distinguished using specific antibodies and flow cytometry (for T cells anti-CD3-AB, CD4-AB, CD8-AB, for macrophages anti-CD45, CD36-AB, CD14-AB, for neutrophilic granulocytes (NG) anti-CD66b-AB).

Results: In group A, significantly higher numbers of CD8+ cells were found for patients with acute cellular rejection (ACR) ($p \leq 0.05$). This marker had a sensitivity of 100% and a specificity of 71% (AUC of RUC = 0.87). In group B, cases with transplant associated complications showed an increase of CD4+ cells, CD8+ cells and of macrophages in days five to ten ($p \leq 0.05$). For patients without associated complications a significantly higher number of NG was found at day one after transplantation ($p \leq 0.05$). A common pattern across all analysed immune subsets was observed in the follow up: High numbers of urinary immune cells in patients without complications at day one, a decrease over the following days. In contrast, patients with transplant cases with transplant associated complications started out with low numbers of urinary immune cells which increased at day five.

Conclusion: The analysis of urinary CD8+ cells via flow cytometry might have potential for diagnosing ACR. Findings of urinary immune cells after transplantation indicate an ability to describe graft development. Initial results suggest the potential of urinary biomarkers to monitor renal transplant patient. This study is restricted by a currently limited patient number and cellular autofluorescence.

Disclosure of Interest: None Declared

Keywords: Rejection, T cell, Transplant immunology

Biomarkers

PO-061

Modifying TRPM7 Function by Synthetic Small Interfering RNA and CHBP in Mouse Renal Epithelial Cells

A. Liu [1], J. Wu [2], C. Yang [3], L. Yuan [2], H. Wang [2], Y. Zhang [1], Y. Wu [4], Q. Wang [2], Y. Long [5], T. Zhu [3], Y. Fan [2], B. Yang [6,*]

[1]Basic Medical Research Centre, Medical school of Nantong University, [2]Nephrology, Affiliated Hospital of Nantong University, Nantong, [3]Department of Urology, Zhongshan Hospital, Fudan University; Shanghai Key Laboratory of Organ Transplantation, Shanghai, [4]Pathology, Medical school of Nantong University, Nantong, [5]CAS Key Laboratory of Receptor Research, Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai, China, [6]Infection, Immunity and Inflammation, University of Leicester, University Hospitals of Leicester, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Transient receptor potential melastatin 7 (TRPM7) is a nonselective cation channel, and its activation leads to calcium overload and subsequent injuries. Our previously revealed that TRPM7 expression was increased in renal related ischemia reperfusion injury (IRI) *in vitro* and *in vivo* models, which was reversed by a novel cyclic helix B peptide (CHBP), erythropoietin derivative. Synthetic small interfering RNA (siRNA) transiently silenced target genes posttranscriptionally in renal IRI.

Objectives: Here, we further investigated the effects of modifying TRPM7 by siRNA or CHBP on its down stream function in mouse renal epithelial TCMK-1 cells.

Methods: After TCMK-1 cells were transfected with synthetic TRPM7 siRNA using a cationic lipid-based transfection regent lipofectamine 2000, the expression of TRPM7 mRNA expression was detected to select the most effective sequence of TRPM7 siRNA. Using whole-cell patch-clamping, TRPM7-like currents were first recorded in TCMK-1 cells, and then the regulation of TRPM7-like currents by TRPM7 siRNA or CHBP was also investigated.

Results: In the TCMK-1 cells transfected with TRPM7 siRNA with sequence number 3239, 1793 and 5326, the expression of TRPM7 mRNA was respectively reduced by 33%, 42% and 28% compared to the cells treated by the negative control siRNA for 24 h. In addition, inward and outward TRPM7 currents were time-dependently increased using pipette filled with internal Mg2+-free solution, and the TRPM7-like current was successfully identified in TCMK-1 cells. Furthermore, TRPM7 siRNA 1793 sequence at 40 nM for 48 h caused a noticeable reduction of outward TRPM7 current in comparison to cells treated with the negative control siRNA. In addition, CHBP treatment at 100 nmol/L also inhibited the TRPM7-like current in TCMK-1 cells.

Conclusion: Synthetic siRNA targeting TRPM7 and CHBP both decreased TRPM7-like currents, suggesting a potential renoprotection that might associate with the inhabitation of calcium overload. However, the function and mechanism of TRPM7 in renal IRI, as well as the renoprotection of CHBP, are worthy to be further investigated.

Disclosure of Interest: None Declared

Keywords: Physical function, Tubular epithelial cell

Biomarkers

PO-062

The Role of Urinary Chemokines in Distinguishing Causes of Renal Allograft Dysfunction

S. Chong [1,*], C. Magee [2], M. Harper [2], R. Fernando [3]

[1]nephrology, ROYAL LONDON HOSPITAL, [2]nephrology, UCL Centre for Nephrology, [3]nephrology, Anthony Nolan laboratories, london, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The aetiology of renal transplant dysfunction is varied, and diagnosis often relies upon transplant biopsy, an invasive procedure that carries significant risk. Availability of a reliable, non-invasive test to determine the cause of graft dysfunction and facilitate longitudinal monitoring of an individual patient is therefore of significant clinical interest.

Recent studies have shown that levels of urinary chemokines may distinguish causes of allograft dysfunction, and, furthermore, correlate with long-term graft function. We have previously shown that urinary levels of osteoprotegerin (OPG), monokine induced by interferon-γ (MIG) and interferon-induced protein-10 (IP-10) were significantly higher in patients with acute rejection compared to controls. In this study, we extended this analysis to renal transplant patients with quiescent graft function or allograft dysfunction, including patients with ATN, rejection, BKV infection and those with an index of chronic damage (ICD) >20%.

Objectives: To determine if urinary levels of osteoprotegerin (OPG), monokine induced by interferon-γ (MIG) and interferon-induced protein-10 (IP-10) are significantly different in patients with acute rejection compared to patients with BKV infection or ATN or patients with chronic damage and controls.

Methods: 360 urine samples were collected prospectively from 133 patients undergoing a protocol or clinically indicated biopsy, including 27 patients with rejection, 7 with BK viraemia/viruria, 18 with ATN, 27 with ICD >20% and 54 controls. Samples were analysed in duplicate using the Life TechnologiesTM InvitrogenTM Plexmark® 3 Renal Biomarker Panel kit.

Image:

Chemokine	Controls	Rejection	BKV infection	ATN	ICD > 20%	ANOVA
IP-10	23.71±4.1	144.8±4.8	187.5±59.58	22.52±5.75	64.51±36.86	p=0.0035
MIG	33.6±6.29	141.1±49.93	219±83.67	29.63±3.96	43.05±10.32	p=0.0072
OPG	308.1±38.76	619.9±79.67	428.3±63.22	705.4±90.07	540.4±64.24	p=0.0004

Results: As shown in Table 1, there were significant differences in the mean levels of IP-10, OPG & MIG between groups. There were also significant differences in each of the chemokines when pairwise comparisons were made according to diagnoses, particularly when comparing controls to those with rejection or BKV infection. There were no significant differences in the levels of any chemokine when patients with rejection were compared to those with BKV infection, but it was possible to distinguish patients with ATN or an ICD >20%.

Conclusion: These data support accumulating evidence that urinary biomarkers are a useful, non-invasive tool in the diagnosis of graft dysfunction.

Disclosure of Interest: None Declared

Keywords: Rejection, Renal transplant, Transplant outcome

Biomarkers

PO-063

Relationship between serum free light chains and adverse outcomes in chronic kidney disease: a systematic review and meta-analysis

A. Fenton [1,*], S. Fraser [2], S. Harris [2], A. Shardlow [3], S. Liabeuf [4], Z. Massy [5], A. Burmeister [6], C. Hutchison [7], M. Landray [8], J. Emberson [8], P. Kalra [9], P. Cockwell [1], M. Taal [3]

[1]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, Birmingham, [2]Academic Unit of Primary Care and Population Science, University of Southampton, Southampton, [3]Centre for Kidney Research and Innovation, University of Nottingham, Derby, United Kingdom, [4]Centre de recherche clinique, CHU d'Amiens-Picardie, Amiens, [5]Division of Nephrology, Ambroise Paré Hospital, Paris, France, [6]Binding Site, Birmingham, United Kingdom, [7]Hawke's Bay District Health Board, Hawke's Bay, New Zealand, [8]Nuffield Department of Population Health, University of Oxford, Oxford, [9]Renal Services, Salford Royal NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Studies of the association between polyclonal serum free light chains (sFLC) and mortality and progression to end-stage renal disease (ESRD) in patients with chronic kidney disease (CKD) have reported inconsistent results.

Objectives: We conducted a systematic review and meta-analyses of individual patient data to assess the associations further.

Methods: In December 2016, we searched MEDLINE, Embase, and PubMed, among other sources, for studies presenting an independent analysis of the association between sFLC and mortality or progression to ESRD in patients with CKD. Risk of bias was assessed in the following domains: sample selection, measurement, attrition, reporting, and funding.

Results: Five prospective cohort studies were included, which were of moderate to good quality, and involved a total of 3921 participants. In multivariable meta-analyses, sFLC levels were independently associated with mortality (5 studies, 3688 participants; HR 1.04 [95% CI 1.03 to 1.06] per 10 mg/L increase in sFLC), and progression to ESRD (3 studies, 1848 participants; HR 1.01 [1.00 to 1.03] per 10 mg/L increase in sFLC). sFLC values above the upper limit of normal (43.3 mg/L) were independently associated with a hazard ratio of 1.45 (1.14 to 1.85) for mortality and 3.25 (1.32 to 7.99) for ESRD.

Conclusion: These analyses confirm that higher levels of sFLC are independently associated with a higher risk of mortality and ESRD in patients with CKD. Our study provides the basis for future work to explore the biological role of sFLC in adverse outcomes in CKD, and their use as a biomarker in risk stratification.

Disclosure of Interest: None Declared

Keywords: CKD, ESRD, Survival

Biomarkers

PO-064

Follicular T helper and regulatory cells in Transplantation

E. Wallin [1,*], M. Chen [2], S. Fuggle [2], M. Linterman [3], K. Wood [1]

[1]Nuffield Dept Surgical Sciences, UNIVERSITY OF OXFORD, [2]Transplant Immunology & Immunogenetics, Oxford Transplant Centre, Oxford, [3]Lymphocyte Signalling ISP, Babraham Institute, Cambridge, United Kingdom

Preferred Presentation Method: Oral

Introduction: Kidney transplantation is the optimal treatment for end-stage renal failure, however graft lifespan remains limited. A major cause of graft loss is chronic antibody-mediated damage. Understanding more about how these antibodies are produced, and how immunosuppression affects cells producing them, may allow both prediction of recipients at risk and identify a mechanism for preventing or minimising antibody production, therefore improving graft lifespan. In particular, interest has grown in CD4 T cells known as circulating T follicular helper (cTfh) and T follicular regulatory (cTfr) cells, which appear to correlate with antibody production in vaccination, autoimmunity. We hypothesised that alterations in cTfh and cTfr would be associated with alloantibody production after transplantation, and that immunosuppression would alter their phenotype and function.

Objectives: To assess the potential of cTfh and cTfr cells as biomarkers of donor specific antibody (DSA) formation in kidney and simultaneous kidney pancreas (SPK) transplant recipients, and how commonly used immunosuppressive drugs affect these cells.

Methods: Kidney and SPK transplant recipients without pre-existing DSA were recruited to a prospective study and cTfh, cTfr, T and B cell subsets were immunophenotyped over the first two years post transplant. Patients were also assessed for de novo HLA antibody formation, and specifically DSA, using Luminex.

Image:

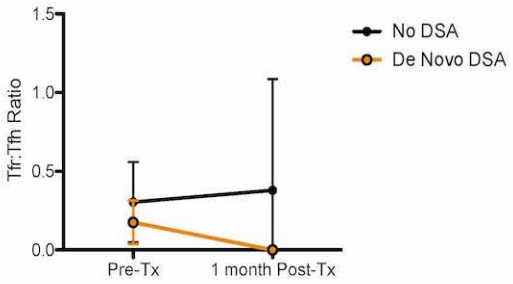


Figure 1: Ratio of IL-7R^{lo}FOXP3^{+}CXCR5^{+}CD4^{+} cTfr to PD-1^{+}CXCR5^{+}CD4^{+} cTfh in patients developing *de novo* DSA compared to those with no *de novo* DSA.

Results: 61 patients were recruited to the study (42 kidney; 19 SPK). cTfh were higher and cTfr lower in patients developing de novo DSA compared to those who did not (example in fig 1). Different immunosuppressive regimens had different risks of de novo DSA formation; reflected in their effects on cTfh and cTfr. The combination of basiliximab induction with azathioprine and tacrolimus maintenance had the lowest risk of de novo DSA formation, reflected in the low levels of cTfh on phenotyping. Patients receiving alemtuzumab induction had low cTfr at all time points despite previous studies showing a high level of Tregs in the recovering CD4 T cell population. They also had higher levels of cTfh, and a higher risk of de novo DSA formation compared to those receiving basiliximab induction.

Conclusion: This study suggests that cTfh and cTfr may be useful as biomarkers for predicting de novo DSA formation. Surprisingly, immunosuppressive regimens traditionally considered as less intensive appear to have greater effects on cTfh and cTfr than those considered more intensive. These effects may influence the likelihood of DSA development and suggest that at-risk patients may benefit from alternative immunosuppressive strategies.

Disclosure of Interest: None Declared

Keywords: Donor-specific antibodies, Transplant immunology

Cardiovascular Disease

PO-065

Comparison of Two-dimensional and Three-dimensional Echocardiographic Parameters and Association with Mortality in Hemodialysis Patients

D. Vassallo [1,*], P. Kalra [1]

[1]Renal Department, SRFT, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Real-time three-dimensional echocardiography (RT3DE) is becoming widely available. Yet it is unclear how reproducible RT3DE is and how it compares with standard 2D echocardiographic (2DE) measurements in haemodialysis (HD) patients and her the measurements of left ventricular (LV) volumes and mass provides the same prognostic implications for mortality.

Objectives: In this study we will investigate:

1. the inter-observer agreement of RT3DE and 2DE measurements.
2. the correlation between LV mass, volume and LVEF determined by 2DE and RT3DE.
3. the association of both RT3DE and 2DE measures of LV mass, volume and LVEF with all-cause mortality.

Methods: This was a prospective observational study performed at a single center. 219 patients were recruited and underwent both 2DE and RT3DE, on a non-dialysis day. Comparison between and within 2DE and RT3DE measurements were made using linear regression and Bland-Altman analysis. Prospective follow-up of patients was undertaken until death, renal transplantation or 16th November 2015. Cox regression analysis was utilised to investigate the relationship with mortality.

Image:

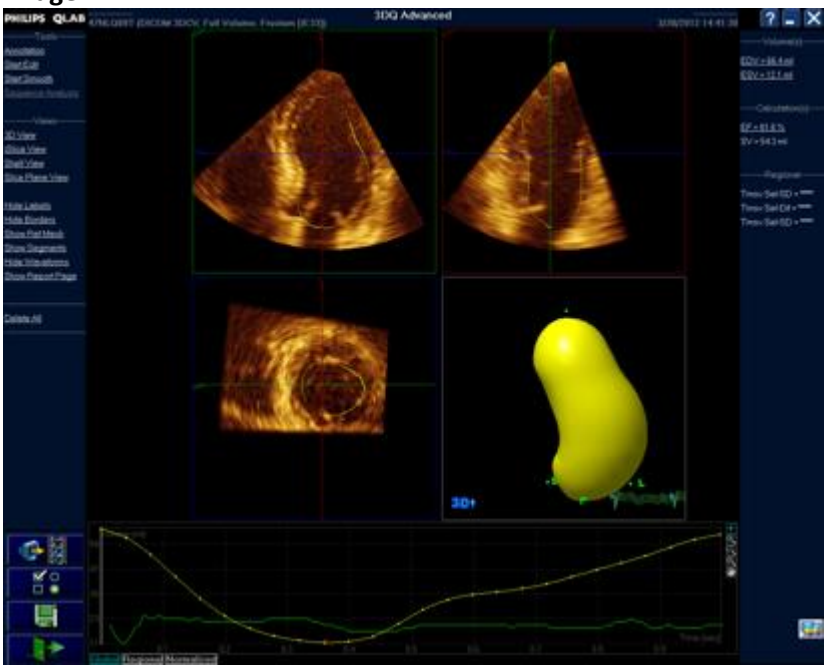


Table:

LV parameter measured	2DE	RT3DE	p
LVEDV (mL)	96.5 (31.4)	97.1 (96.5)	0.832

LVESV (mL)	35.2 (18.5)	39.3 (20.4)	0.002

Results: 198 patients had adequate 2D echocardiograms but only 69 patients (median age 62.1years, 62% male) had optimal datasets for both 2DE and RT3DE. Diabetic patients (44% vs 30%, p=0.023) and those with a high BMI [KP1] (27.7 kg/m^2 vs 25.1 kg/m^2, p=0.001) were more likely to have inadequate 3D images. In patients with full datasets, there was good correlation between 2DE and RT3DE for EDV and LVEF (r: 0.74 and 0.78, respectively) but r was 0.58 for LVMI/$HT^{2.7}$.

Conclusion: RT3DE is comparable to 2DE measurements of LV volume and LVEF. 2DE overestimated values for LVMI/$HT^{2.7}$ compared with RT3DE.[KP1] RT3DE had better reproducibility compared with 2DE. However, adequate RT3DE images can be obtained in far fewer patients than 2DE, and this, together with a lack of improved prognostic power, may limit its value in large scale studies in HD patients. However, it may be useful in specific cases.

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, Creatinine, Dialysis

Cardiovascular Disease

PO-066

INORGANIC PHOSPHATE (Pi) INHIBITS PP2A PHOSPHATASE AND REGULATES PP2A/SRC/DAPK-1/TPM-3 SIGNALING IN ENDOTHELIAL CELLS: A MOLECULAR MECHANISM FOR Pi-INDUCED MICROPARTICLE RELEASE IN URAEMIC CARDIOVASCULAR DISEASE

N. Abbasian [1,*], J. O. Burton [2], K. E. Herbert [3], A. H. Goodall [3], N. J. Brunskill [2], A. Bevington [1]

[1]Departments of Infection, Immunity, and Inflammation, [2]John Walls Renal Unit, UHL, [3]Department of Cardiovascular Sciences, University of Leicester, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Hyperphosphataemia in chronic kidney disease (CKD) contributes to the risk of cardiovascular disease (CVD), in part through a direct effect of inorganic phosphate (Pi) on endothelial cells (ECs). Pro-coagulant microparticles (MP) shed from ECs in CKD are both a marker and a potential cause of CVD. The precise molecular mechanism of Pi-induced EC stress and MP release is still unclear.

Objectives: We hypothesised that Pi entering ECs is sensed by directly inhibiting the key phosphoprotein phosphatase PP2A, thus enhancing inhibitory phosphorylation of the kinase DAPK-1 and resulting in the Tropomyosin-3 (TPM-3) hypophosphorylation, loss of actin-stress fibre formation and MP generation that we have previously reported [1].

Methods: EAhy926 ECs were treated with control (1mM [Pi]) vs. high (2.5mM [Pi]) for 90min. The protein expression level of phosphorylated and total Src, PP2A-C, and TPM-3 was quantified by immuno-blotting cell lysates using antibodies against Src, p-Src, PP2A-C, p-PP2A-C, TPM-3, and p-(S284)-TPM-3. Endogenous human DAPK-1 was immuno-precipitated from cell lysates and subjected to immuno-blotting with phosphospecific antibody against p-(S308)-DAPK-1. The direct inhibitory effect of Pi on PP2A-C was tested by pulling-down endogenous PP2A-C from cell lysates and subjecting this to phosphatase catalytic activity assay.

Results: Immuno-blotting demonstrated that (as % of control$\pm$SEM) high Pi results in increased p-Src (134.6$\pm$5.3%, P=0.023), p-PP2A-C (320.7$\pm$69%, P=0.04), and p-DAPK-1 (153.9$\pm$10.8%, P=0.037) and decreased p-TPM-3 (60.9$\pm$4.9%, P=0.006). Pi (40µM) inhibits PP2A catalytic activity (25.9$\pm$3.9%, P=0.003).

Conclusion: Direct Pi-induced inhibition of PP2A enhances inhibitory phosphorylation of DAPK-1, leading to hypophosphorylation of cytoskeletal regulatory protein TPM-3 at S284 and MP generation from the cell membrane. In addition p-Src is known to perform inhibitory phosphorylation on DAPK-1 but also on PP2A-C. However, PP2A-C can itself dephosphorylate (and therefore inhibit) p-Src. The direct inhibition of PP2A-C by Pi is therefore amplified by the feedback loop between PP2A-C and p-Src, resulting in further PP2A-C inhibition. We have thus demonstrated, for the first time, that PP2A/Src/DAPK-1/TPM-3 signaling is a potent mechanism for sensing of increases in intracellular [Pi], resulting in MP formation which is both a marker and potential cause of CVD in CKD.

References: [1] Abbasian, N et al J Am Soc Nephrol, 2015. doi: 10.1681/ASN.2014070642

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Endothelial cell

Cardiovascular Disease

PO-067

Outcomes after transcatheter aortic valve implantation and surgical aortic valve replacement in patients with established end stage renal disease

F. Chan [1,*], J. Afoke [2], J. Anderson [2], G. Mikhail [3], I. Malik [3], M. Willicombe [1]

[1]Imperial College London Renal & Transplant Centre, [2]Department of Cardiothoracic Surgery, [3]Department of Cardiology, Imperial College Healthcare NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Transcatheter aortic valve implantation (TAVI) is an emerging treatment for symptomatic aortic valve replacement, often reserved for patients at high surgical risk. Chronic kidney disease itself has been associated with increased post-operative mortality after cardiac operations. Several studies have examined the impact of renal function on TAVI outcomes, but less is known about patients on established renal replacement therapy (RRT).

Objectives: The aim of this study was to characterise our centre's experience in RRT patients undergoing TAVI as compared to those undergoing surgical aortic valve replacement (SAVR).

Methods: The departmental TAVI and SAVR databases retrospectively identified patients on RRT. Baseline demographic and outcome data were collected from medical records.

Results: Between 2008-2016, 19 patients on RRT underwent either TAVI (10 patients) or SAVR (9 patients). The mean follow-up period was 2.64±1.47 years. There were two females in the TAVI group; all the remaining patients in the study were male. The patients in the TAVI group were older, with a median age of 76.23 (67.16-79.29) years compared with 55.43 (46.54-74.24) years in the SAVR group, (p=0.02). Baseline medical comorbidities were comparable. In terms of modality of RRT, in the TAVI group one patient had a functioning transplant, one patient was on peritoneal dialysis and the remaining patients were on haemodialysis (HD). All SAVR patients were on HD at the time of procedure. There was no difference in length of time receiving RRT prior to procedure between the TAVI and SAVR groups at 8.68 (3.44-20.07) and 9.06 (1.57-20.63) years respectively (*p*=0.93). There was also no difference in the aetiology of ESRD between the groups [glomerulonephritis 8/19 (42.1%), diabetes 5/16 (26.3%), APKD 2/19 (10.5%) and others 4/19 (21.1%)].

Overall, one and two-year patient survival was 84.2% and 65.2% respectively. There was no statistical difference in patient survival between the TAVI and SAVR groups [hazard ratio 1.70 (0.38-7.58), *p*=0.48]. There were two in-hospital deaths in the TAVI group (2/10) and one in the SAVR group (1/9) (*p*=0.99). One patient suffered a post-procedure stroke in the TAVI group. The two groups had a similar length of hospital stay (LOS) post-procedure; the median LOS in the TAVI group was 10.50 (5.62-27.19) days compared with 11.00 (7.81-23.32) days in the SAVR group (*p*=0.60).

Conclusion: Longer follow up, incorporation of valve functional measures and patient reported outcomes are needed. However, this study has focused on an under reported area, and although limited by small numbers, has not demonstrated any significant difference in complications or survival in patients with ESRD undergoing TAVI compared with SAVR.

Disclosure of Interest: None Declared

Keywords: cardiovascular disease, RRT

Cardiovascular Disease

PO-068

FGF23 is not predictive of functional cardiovascular reserve in advanced CKD patients before or kidney transplantation

K. Lim [1,*], S. Ting [2], D. Xu [1], S. Kalim [1], I. Wilkinson [3], R. Thadhani [1], D. Zehnder [4], T. Hiemstra [3]

[1]Division of Nephrology, Massachusetts General Hospital, Harvard Medical School, Boston, United States, [2]Department of Medicine, Heart of England NHS Trust, Birmingham, [3]Division of Experimental Medicine and Immunotherapeutics, University of Cambridge, Cambridge, [4]Warwick Medical School, Coventry, United Kingdom

Preferred Presentation Method: Poster

Introduction: Chronic kidney disease (CKD) patients exhibit impaired functional cardiovascular reserve with reduced peak exercise oxygen consumption (VO_2max), a predictor of survival. In CKD, bone derived FGF23 is elevated and has been implicated in the development of cardiovascular disease.

Objectives: We sought to determine whether FGF23 is a predictor of cardiovascular functional reserve in CKD patients and after improvement of VO_2max by kidney transplantation.

Methods: In this prospective cohort study, we enrolled 171 advanced CKD patients and 88 controls with essential hypertension: age 46.7±14.3 vs. 53.2±8.1 years ($p<0.001$), male 60.2% vs. 48.9%, MAP 98±13.4 vs 104.2±9.5, $p<0.001$). Patients were followed longitudinally for up to 1 year after kidney transplantation (n=81). VO_2max was determined by cardio-pulmonary exercise testing (CPET) and left ventricular mass index (LVMI) by 2D echocardiogram.

Results: Kidney transplantation conferred a significant improvement in VO_2max at 1 year ($p=0.01$) and reduction of FGF23 by 2 months ($p=0.007$). Multivariate regression analysis revealed that baseline lnFGF23 was predictive of LVMI before ($\beta=0.22$, $p=0.003$) and after kidney transplantation at 1 year ($\beta=0.42$, $p=0.007$). However, lnFGF23 levels was no longer predictive of LVMI following kidney transplantation ($\beta=0.08$, $p=0.571$). We next showed that lnFGF23 at baseline was not associated with VO_2max in advanced CKD ($\beta=-0.13$, $p=0.067$) or controls patients ($\beta=-0.02$, $p=0.847$). Additionally, neither baseline lnFGF23 ($\beta=-0.13$, $p=0.251$) or post-transplant lnFGF23 ($\beta=-0.05$, $p=0.570$) was predictive of VO_2max after kidney transplantation at 1 year.

Conclusion: FGF23 levels are predictive of LVMI in advanced CKD patients. However, FGF23 is not predictive of alterations in cardiovascular functional reserve before or after kidney transplantation.

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD-MBD, Prognosis

Cardiovascular Disease

PO-069

ATRIAL FLUTTER/FIBRILLATION IN CHRONIC KIDNEY DISEASE (CKD): OVER- AND UNDER-TREATMENT

M. Thomas [1,*], L. Lock [1], H. Abid [1]

[1]Renal Medicine, BIRMINGHAM HEARTLANDS HOSPITAL, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Atrial flutter/fibrillation is an important comorbidity in CKD. We studied its prevalence and management in our large prospective cohort of patients seen at their first attendance at a non dialysis CKD clinic.

Objectives: We compared the CHA_2DS_2VASc and HAS BLED scores for all AF patients, and related this to their anticoagulant and antiplatelet therapy at their first visit.

Methods: At their first visit, procedures included nurse measured BP, an ECG, and a full recording of all comorbidities and drug therapies. Previous paroxysmal or persistent flutter/fibrillation was defined by a history of AF, when the patient was in sinus rhythm at the first visit. CHA_2DS_2VASc and HAS BLED scores were calculated as reported by Lip et al and Pisters et al. As an indicator of the potential benefit of anticoagulation, we used the 1 year stroke/thromboembolism risk for each level of the CHA_2DS_2VASc score. As an indicator of the potential risks of anticoagulation, we used the % bleeding risk per year for each level of the HAS BLED score. The net benefit of anticoagulation was estimated by subtracting the HAS BLED risk from the CHA_2DS_2VASc risk.

Table: 1. Net benefit (CHA_2DS_2VASc minus HAS BLED) and antithrombotic therapy used.

Drug therapy	Likely net benefit >+2.5% per yr	Limited net benefit 0 - +2.5% per yr	No benefit /possible harm -12.5 - <0% per yr
Anticoagulant alone	19	38	11
Anticoagulant + antiplatelet(s)	0	6	6
Antiplatelet(s) alone	5	38	38
None	13	45	10

Results: 1455 patients were seen in the CKD clinic between 2007 and the end of November 2016; ECGs were available for 1451 patients. 236 (16%) either were in AF (likely permanent AF, n=134, 57%), or had a history of AF (n=102, 43%) but were in sinus rhythm at first visit. Of the 134 in AF, 26 (19%) had no known history of previous AF, representing new diagnoses. The cause(s) of AF were largely non-valvular cardiac disease, with 34 (14%) having a history of valvular disease, and only 11 (5% of all AF) having valve replacements [six of these were metallic]. We used the net difference between the CHA_2DS_2VASc and HAS BLED risks as an indicator of the potential benefit of anticoagulation in patients without metallic valve replacements, n=230 (table 1). 17 (7%) were on anticoagulants when they had no net benefit / possible harm from them (net benefit from <0 to -12.5% per yr). 44 (19%) were on anticoagulants when they had limited benefit from them (net benefit from 0 to +2.5% per yr). 18 (8%) were not on oral anticoagulant therapy when they would likely benefit from them.

Conclusion: Atrial flutter/fibrillation was present in about 1 in 6 of our CKD cohort, and was undiagnosed in about a fifth of permanent AF. In patients without metallic valve replacements, a small but significant group who would likely benefit from anticoagulation were not on such therapy. A larger subgroup were on anticoagulants when they were at risk of

harm or at best derived limited benefit from them. CKD patients with AF are both under- and over-treated with regards to anticoagulation. CHA_2DS_2VASc and HAS BLED scores should be routinely used in this group.

References: Refining clinical risk stratification for predicting stroke and thromboembolism in atrial fibrillation using a novel risk factor-based approach: the Euro Heart Survey on Atrial Fibrillation. Lip GY, et al. *Chest* 2010; 137:263–272.
A Novel User-Friendly Score (HAS-BLED) To Assess 1-Year Risk of Major Bleeding in Patients With Atrial Fibrillation. Pisters R, et al. *Chest* 2010; 138(5):1093–1100.

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Prescribing

Cardiovascular Disease

PO-070

Adding function to anatomy by in silico renal artery haemodynamics: proof-of-concept

A. Mandaltsi [1,*], A. Marzo [1], J. Kadziela [2], A. Witkowski [2], P. Kalra [3], T. Ellam [4], P. Brown [5], A. Odudu [6]

[1]Insigneo Institute for In Silico Medicine, University of Sheffield, Sheffield, United Kingdom, [2]Department of Interventional Cardiology and Angiology, Institute of Cardiology, Warsaw, Poland, [3]Department of renal medicine, Salford Royal Hospital, Salford, [4]Department of Cardiovascular Science, University of Sheffield, [5]Department of Radiology, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, [6]Division of Cardiovascular Sciences, University of Manchester, Manchester, United Kingdom

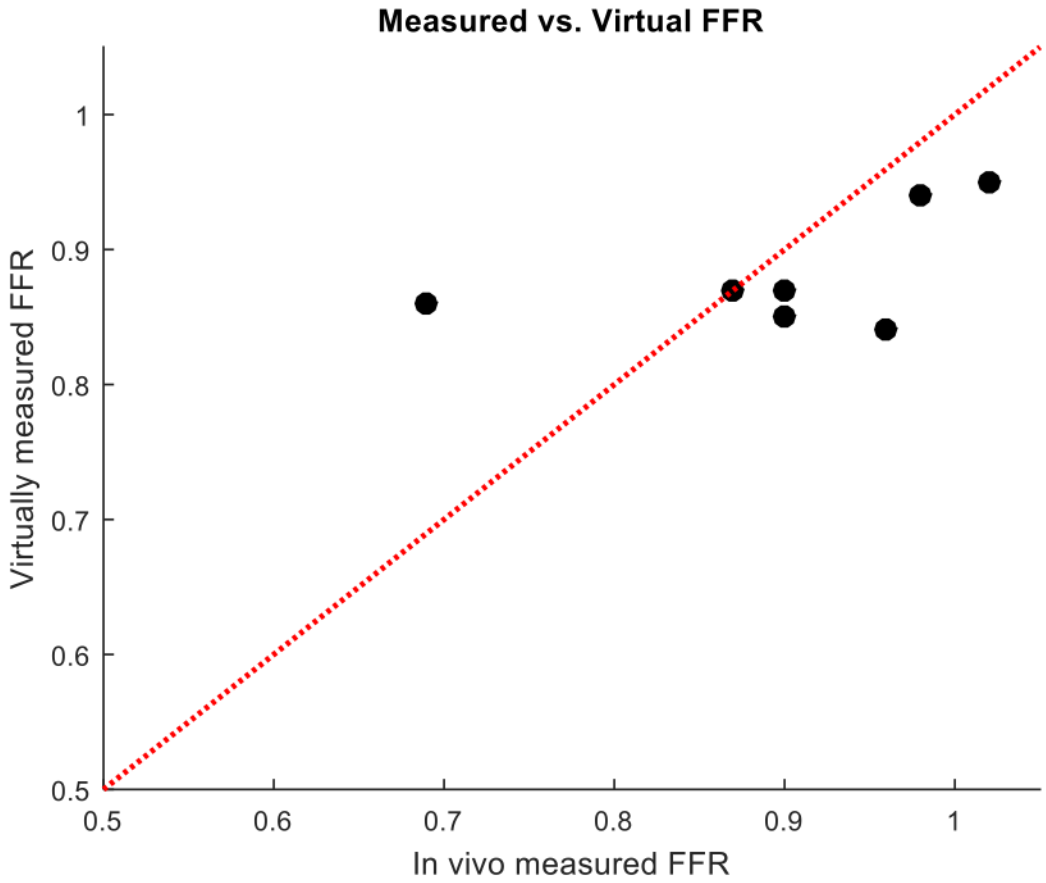
Preferred Presentation Method: Oral or Poster

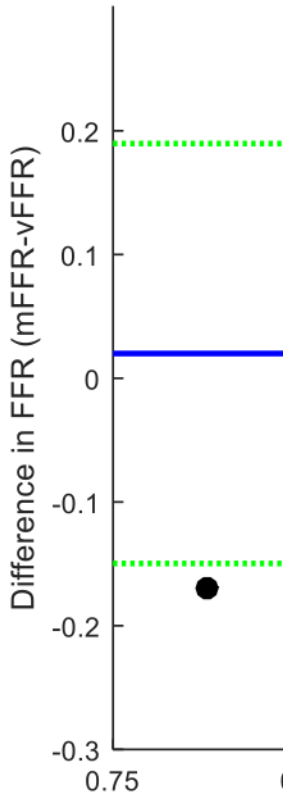
Introduction: *In silico* medicine describes the use of computer simulation in the diagnosis, treatment or prevention of a disease. There is a lack of techniques to non-invasively measure renal blood flow and pressures (haemodynamics) to facilitate functionally directed interventions and allow new insights into renal physiology. This proof-of-concept study describes a novel approach that combines routine anatomical imaging of renal arteries with computer simulations to non-invasively estimate renal artery haemodynamics.

Objectives: To develop and compare *in silico* renal artery haemodynamics to a gold-standard invasive technique.

Methods: Fractional Flow Reserve (FFR) describes the ratio by which pressure falls distally compared to proximally across an arterial stenosis. FFR of 1 means a stenosis has no haemodynamic significance, whilst FFR of 0.8 describes a 20% pressure drop. FFR is widely used in coronary angiography to direct whether to perform angioplasty and stenting. We used imaging data from patients investigated for suspected atherosclerotic renal artery stenosis. Renal FFR was measured (mFFR) by invasive intra-arterial pressure transducers that compared pressure before and after the arterial stenosis at rest and under maximum perfusion by infusion of the renal-specific vasodilator papaverine. A workflow was developed using computed tomography (CT) renal angiographic images in each patient to construct a 3-dimensional volumetric mesh of the stenotic renal artery with a density of 2000 elements per cubic millimeter. Computational fluid dynamics permitted real-time mathematical simulation of steady and transient flow along the renal arterial segment and calculated *in silico* or virtual FFR (vFFR). Each simulation took between 30 minutes and one day to compute.

Image:





Results: We studied 7 arterial stenoses in 6 patients (bilateral stenosis in 1 patient). Simulating haemodynamics under challenging under maximum perfusion was challenging. There was a good correlation (rho=0.54) between measured and virtual FFR at rest whilst Bland-Altman plots showed good agreement (Figure).
Conclusion: We report the first *in silico* estimation of invasive renal arterial haemodynamics using routine CT angiographic images. Prospective studies will refine these techniques with the ultimate aim of testing their utility to enhance clinical decisions in managing renal artery stenosis or renal denervation for resistant hypertension.
References: 1. Relationship between hemodynamic parameters of renal artery stenosis and the changes of kidney function after renal artery stenting in patients with hypertension and preserved renal function. Blood Press. 2015 Feb;24(1):30-4.

Disclosure of Interest: None Declared

Keywords: Imaging, Renal blood flow

Cardiovascular Disease

PO-071

Is bioimpedance-defined overhydration an independent predictor of survival in end stage renal failure: a systematic review.

M. Tabinor [1,*], E. Elphick [1], M. L. Dudson [2], M. Lambie [2], S. Davies [2]

[1]Kidney Unit, University Hospital of North Midlands (UHNM), [2]Guy Hilton Research Centre, Institute for Science and Technology in Medicine (ISTM), Stoke-on-Trent, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Overhydration and co-morbidity predict mortality in dialysis patients. What remains unclear is whether overhydration is of prognostic value in predicting mortality, independently of the effects exerted by co-morbidity

Objectives: To explore whether bio-impedance (BIA) defined overhydration is an independent predictor of mortality in the dialysis population.

Methods: A systematic review was performed in accordance with the Cochrane guide for systematic review, using a pre-specified review protocol. PubMed, EMBASE, PsychInfo and the Cochrane trial database were searched (1990-2015). The target population was adult dialysis patients within secondary care services, who had whole body bio-impedance (BIA) measurements to quantify overhydration. Exclusion criteria included: the use of segmental / intra-thoracic BIA; studies where only abstracts, posters or case reports were available; and studies where no English translation was available. Two independent reviewers appraised studies, including methodological quality (assessed using the QUIPS tool). Data were summarised using Excel (2011) and SPSS (Version 16.0).

Results: Of 3663 identified citations, 34 matched inclusion criteria (29 separate cohorts; 9779 patients; 74% on haemodialysis and 26% on peritoneal dialysis; 1703 mortalities). BIA measures reported included phase angle (42%), overhydration index (30%), extracellular water ratio (23%) and BIA vector (5%). 28 out of 29 cohorts had multivariable analyses, with adjustment for age (86%), gender (72%), diabetes mellitus (72%), dialysis vintage (59%), albumin (52%), nutritional markers (31%), dialysis adequacy markers (31%) and inflammation (CRP/IL-6 – 24%). In cohorts with a multivariable analysis, 26 demonstrated BIA-defined overhydration independently predicted mortality. Within 3 cohorts containing echocardiographic data this was not independently predictive of mortality. BNP in a single cohort was independently predictive of mortality.

Conclusion: BIA-defined overhydration predicts mortality in dialysis patients independent of the influence of dialysis related co-morbidities, including structural cardiac disease. Further research is needed to explore the relationship between fluid overload, loss of lean body mass, structural myocardial changes and mortality in the dialysis population.

Disclosure of Interest: None Declared

Keywords: Bioimpedance, Cardiovascular Disease, Dialysis

Cardiovascular Disease

PO-072

Cardiopulmonary exercise testing detects subclinical cardiac limitation to exercise in early stage CKD

M. Hayer [1,*], A. Price [1], S. Baig [2], B. Liu [2], C. J. Ferro [1], N. C. Edwards [1], J. N. Townend [1], R. P. Steeds [1]

[1]Birmingham Cardiorenal Group, [2]Department of Cardiology, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Effort tolerance is impaired in end stage kidney disease. Peak oxygen uptake (VO_2peak) is a powerful predictor of survival in haemodialysis patients. A low percent predicted VO_2 at the anaerobic threshold (VO_2AT) has also been associated with excess mortality in patients undergoing kidney transplantation. Data on effort tolerance and cardiovascular disease in early chronic kidney disease (CKD) are very sparse though it is well recognized that cardiovascular mortality begins to increase at a glomerular filtration rate (eGFR) of about 75ml/min/m^2.

Objectives: To understand whether subclinical cardiac limitation, as measured by VO_2peak and VO_2AT, begins early in CKD independently of conventional cardiovascular risk factors.

Methods: This study examined effort tolerance, cardiac structure and function in 60 patients with CKD (stages 2 to 5) without known cardiovascular disease or diabetes. All patients underwent a cardiopulmonary exercise bicycle test using an individualised ramp protocol. Myocardial ischaemia was excluded by exercise stress echocardiography or 99m technetium tetrofosmin single photon electron computed tomography. Lung disease was excluded by formal lung function testing. Cardiac magnetic resonance imaging without gadolinium contrast was used to assess cardiac function and structure. The Kruskall Wallis test was used to compare the difference in mean values across stages of CKD. Correlation coefficients were measured to look for trends between continuous variables.

Table: Exercise data across stages of CKD. *p<0.05 using the Kruskall Wallis test.

	Stage 2	Stage 3	Stage 4	Stage 5
Age (years)	59(45-67)	65(54-67)	57(53-69)	46(33-58)
% Predicted VO_2peak*	84(77-109)	86(82-94)	80(73-88)	73(62-91)
% Predicted VO_2AT*	55(42-69(	61(55-66)	49(41-56)	46(39-60)
RER	1.19±0.05	1.17±0.11	1.18±0.08	1.18±0.12

Results: Left ventricular function was preserved across all stages of CKD (Mean ejection fraction 70±8%). Mean left ventricular mass was higher in CKD 5 compared with earlier stages (62±13g/m^2, 60±15 g/m^2, 62±9 g/m^2, 84±38 g/m^2 from CKD stage 2 to 5 respectively; p=0.01). Percent predicted peak VO_2 was positively correlated with eGFR (r=0.358, p=0.007) even after correction for age and haemoglobin (p=0.005). NT pro-BNP was negatively associated with eGFR (r=-0.586, p=0.001), even after similar correction (p<0.001). The percent predicted VO_2 at the anaerobic threshold was also associated with worsening eGFR (r=0.282, p=0.039). Exercise capacity (VO_2AT) was negatively associated with increasing LV mass (r=-0.382, p=0.006) but there was no significant association with left ventricular (LV) size, ejection fraction or global longitudinal strain.

Conclusion: Effort tolerance falls from the earliest stages of CKD in association with a progressive increase in LV mass and NT pro-BNP. This is the first study to examine exercise capacity in patients with early stage CKD in whom coronary artery disease has been excluded, and further study is needed to confirm whether the reduction in exercise capacity is a reflection of diastolic impairment and myocardial fibrosis that characterize end-stage kidney disease.

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Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Exercise

Cardiovascular Disease

PO-073

Defining cardiac function early after renal transplantation: challenges unravelled by cardiac magnetic resonance imaging

M. K. Hayer [1,*], A. Price [1], J. N. Townend [1], C. J. Ferro [1], R. P. Steeds [1], N. C. Edwards [1]

[1]Birmingham Cardiorenal Group, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Successful kidney transplantation is associated with reduced cardiovascular (CV) mortality compared to patients who remain on dialysis, but this risk is still high compared to the general population. Longitudinal data reporting changes in uremic cardiomyopathy after renal transplantation are conflicting; studies with echocardiography have reported regression of left ventricular (LV) hypertrophy and improved systolic function. However, these findings have not been replicated using cardiac magnetic resonance imaging (CMR), which is volume independent and does not depend on geometric assumptions. The CV response early after transplantation with restoration of normal renal function has not been reported on CMR.

Objectives: To assess changes in LV structure and function before and acutely (<8 weeks) after renal transplantation in patients with end-stage kidney disease.

Methods: All subjects were prospectively recruited prior to live-donor kidney transplantation. Patients had no history of CV disease or diabetes and underwent CMR pre-operatively and within eight weeks post-operatively. Ischaemic heart disease was excluded with stress echocardiography or a myocardial perfusion scan. Haemodialysis patients were scanned at dry weight or on the day after dialysis, and peritoneal dialysis patients were scanned at their dry weight. CMR data were analyzed using CVi42 (Calgary, Canada).

Table: CMR data before and <8 weeks after kidney transplantation. P value <0.05 indicates statistical significance of change in variable following transplantation. Data are mean±SD or median and interquartile range.

	Pre-operative	Post-operative	Change	P Value
EF (%)	66±10	72±8	6±7	0.028
LV End-diastolic volume index (ml/m^2)	91±33	72±17	-19±19	0.012
LV Mass Index (g/m^2)	82(60-91)	77(64-94)	-6(-13 to 5)	0.185
LA volume index (ml/m2)	51±18	34±12	-14±15	0.012

Results: In total 10 patients were studied (male gender 70%, age 45 years [30-60], dialysis 50%, dialysis vintage 15±9 months). Cardiac MRI data is presented in table 1. Pre-operative studies demonstrated; median left ventricular mass 82g/m^2 with 2 patients reaching criteria for LV hypertrophy; increased segmental wall thickness >11mm in 8 patients; mean LV ejection fraction (LVEF) 66±10%, with only 2 patients reaching criteria for mild LV impairment (LVEF 50-55%). The mean estimated glomerular filtration rate (eGFR) increased after transplantation without a change in body weight (11ml/min/1.73m^2 vs. 53ml/min/1.73m^2). Left ventricular and left atrial (LA) volumes decreased at follow up without a change in LV mass. The reduction in indexed left ventricular diastolic volume was associated with an increase in ejection fraction (r=-0.810, p<0.001), and with an increased mitral annular excursion (long axis systolic function; r=-0.868, p=0.001).

Conclusion: A reduction in LV volumes early after renal transplantation is associated with improved prognostic markers of LV function and left atrial size. Echo assessment of LV structure and function is limited by the significant changes in fluid status, with CMR being the method of choice for defining the natural history of uremic cardiomyopathy in longitudinal studies after renal transplantation.

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Patel RK et al. Renal Transplantation is Not Associtaed with Regression of Left Ventricular Hypetrophy: A Magnetic Resonance Study. Clin J Am Soc Nephrol. 2008; 3(6):1807-1811.

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Imaging

Cardiovascular Disease

PO-074

Impact of Non-Alcoholic Fatty Liver Disease on Cardiovascular outcomes and Mortality in Advanced Chronic Kidney Disease

R. Chinnadurai [1,*], J. Ritchie [1], D. Vassallo [1], D. Green [1], P. Kalra [1]

[1]Department of Renal Medicine, Salford Royal NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Non-Alcoholic Fatty Liver Disease(NAFLD) is regarded as the hepatic component of metabolic syndrome and is associated with a high risk of developing Cardiovascular disease(CVD)[1]. NAFLD is also considered to be a risk factor for CKD and CKD contributes to NAFLD pathogenesis within a vicious cycle by oxidative stress and an inflammatory Milieu[2]

Objectives: To study the association of NAFLD on Cardiovascular Outcomes and mortality in a cohort of patients with advanced CKD.

Methods: All patients recruited in the Salford Kidney Study (SKS) who had an Ultrasound (US) of the liver performed between January 2000 to December 2014 were sampled in this retrospective observational study. Follow up data on Major Cardiovascular Events(MACE) (Non-Fatal Myocardial Infarction(MI), Congestive Cardiac Failure(CCF),Cerebrovascular Accidents(CVA), Peripheral Vascular Disease) was collected for all patients from the date of Ultrasound (study start date), until the study end which included commencement of Renal Replacement Therapy (RRT) or eGFR <10 ml/min in patients pursuing conservative care, loss to follow up or Death. Data was obtained from electronic patient records including baseline patient characteristics and blood results, and was analysed using SPSS software

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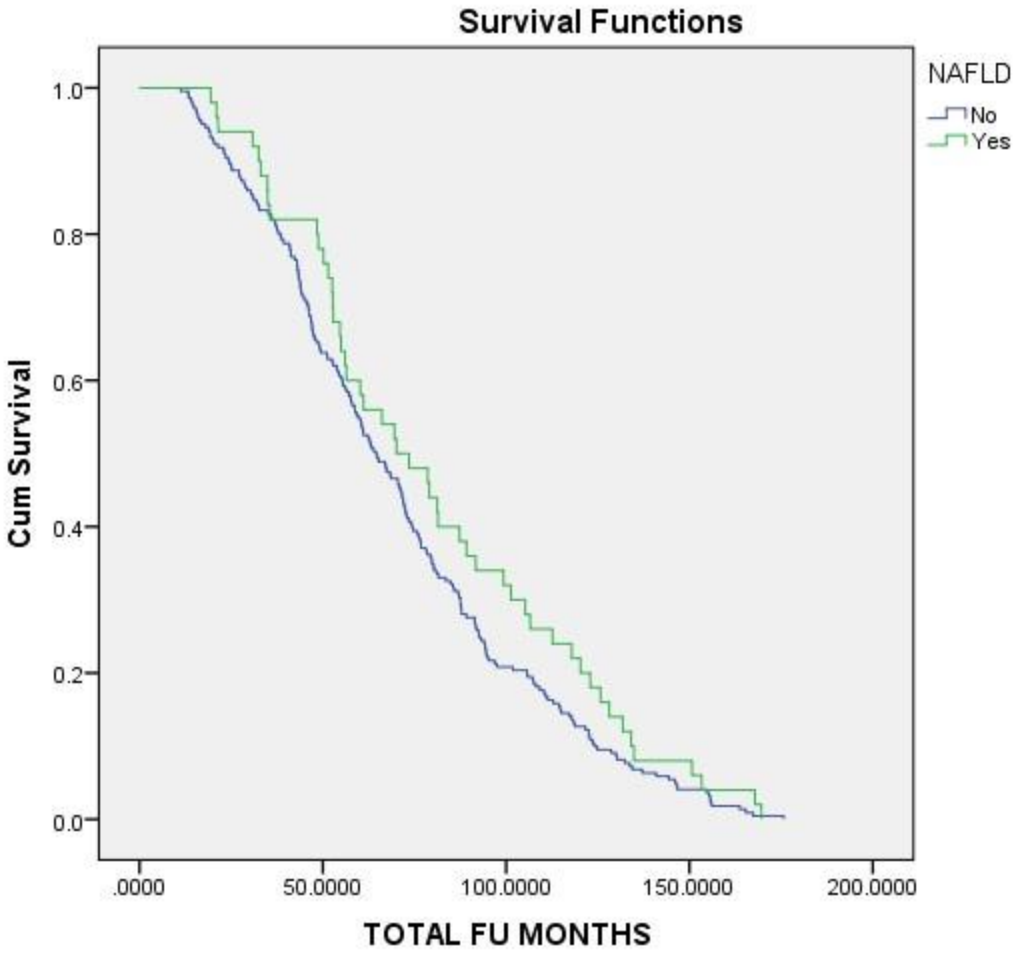

Table:

Cox-Regression Model Multivariate Analysis	HR (95% CI)	P- Value
NAFLD	2.04(1.33-3.14)	0.001
AGE	1.02(1 -1.04)	0.028
H/o IHD at Baseline	2.53(1.60-4)	0.000
H/o CVA at Baseline	2.15(1.29-3.5)	0.003

Results: Of the 3061 patients registered in the SKS, 1419 patients had a liver US during the study period. After excluding patients based on pre-set exclusion criteria (eg: liver disease from other causes), a sample of 852 (183 NAFLD and 669 with normal liver US) patients with complete datasets was achieved on whom comparative analysis was performed.
At baseline, median age of the study group was 66 years and median eGFR was 33.5 mL/min/1.73m^2. Patients with NAFLD had more Hypertension, Diabetes Mellitus and Hypercholesterolemia. Body Mass Index was significantly higher in NAFLD group 31 vs 27 kg/m^2(p= <0.0001). Median value of ALT and GGT was statistically higher(p<0.01) in the NAFLD group.
Median Follow up time was 73 months with no difference between groups(p=0.176). A total of 46(25.13%) MACE were recorded in the NAFLD group compared to 82 (12.25%) in the Normal US group (p<0.05).
Multivariate Cox-Regression Models showed NAFLD as an independent risk factor (HR 2.04, p<0.001) for MACE even after adjustment for all factors of the Metabolic Syndrome and Cardiovascular risk in the model (Table). There was no significant difference in survival between the two groups over the follow-up period (p>0.05) as shown in Kaplan-Meyer Survival Curve.(Image)

Conclusion: Our study has shown, that NAFLD has a strong independent association with Cardiovascular events, even in an advanced CKD population with high comorbidity. Although Liver functions test were higher in the NAFLD group, these were generally not high enough to justify routine screening for liver disease. Further prospective studies are needed to guide a screening strategy for this important hidden risk factor and to tailor interventions to prevent CVD in this high risk comorbid population.

References: 1.Hong Liu et al.NAFLD and cardiovascular disease.World J Gastroenterol 2014 July14;20(26):8407-8415
2.Vasilios Athyros et al.Cardiovascular risk across the histological spectrum and the clinical manifestations of non-alcoholic fatty liver disease: an update. World J Gastroenterol 2015 June14; 21(22):6820-6834

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD Progression, Diabetes

Cardiovascular Disease

PO-075

Correlation of QRS-T angle with echocardiographic measurements in a prevalent haemodialysis population

D. Green [1], K. Hnatkova [2], S. Skampardoni [1,*], M. Malik [2], P. Kalra [1], D. Poulikakos [1]

[1]Renal Medicine, SALFORD ROYAL NHS TRUST, Salford, [2]National Heart and Lung Institute, Imperial College, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Cardiovascular disease remains the main cause of mortality in dialysis patients and risk stratification remains an unmet clinical need due to difficulties in characterising uraemic cardiomyopathy with conventional diagnostic tools.

Objectives: Echocardiographic measurement of myocardial deformation with speckle tracking echocardiography and calculation of abnormal QRS- T angle calculated with computer-aided three dimensional reconstruction of the electrical activity based on the surface digital electrocardiogram have shown promising results for cardiac risk stratification in dialysis patients. The aim of the study was to examine their association**.**

Methods: This was a single centre study of chronic haemodialysis patients aged ≥18 years. Echocardiography and ECG were performed on the same non-dialysis day during a short midweek break with the patient clinically stable. Laboratory and dialytic prescription measurements were calculated by taking the mean value of all routine outpatient measurements over the 3 months prior to echocardiography. The three dimensional angle between repolarisation and depolarisation so called QRS-T angle was calculated as total cosine R-to-T (TCRT) expressed in degrees from the 10 second segment ECG using singular value decomposition with the aid of custom written software.

Correlations were calculated using Pearson co-efficient with 2 sailed significance set at $p \leq 0.05$.

Results: There were 170 patients: mean age 61±15 years, time on dialysis 4±7 years, 66% male gender, 17% coronary artery disease. Echocardiography showed mean left ventricular ejection fraction (LVEF) 66±12%, LV end diastolic volume (EDV) 108±38mL, left ventricular mass indexed to height (LVMIht) 50±19g/$m^{2.7}$, global longitudinal strain (GLS) -13±5%. The mean TCRT was 88 ± 39^{o}, and TMD 30 ± 24^{o}.

The parameters with which TCRT showed significant correlation were GLS (co-efficient 0.31, $p<0.001$), LVEDV (0.20, $p = 0.010$), LVMIht (0.20, $p = 0.009$), haemoglobin (0.26, $p<0.001$), and troponin T (0.24, $p = 0.011$). There was no significant correlation with LVEF, age, time on dialysis, pulse wave velocity (PWV), serum creatinine, serum potassium, C-reactive protein, any other laboratory measurement, QRS duration, or QT interval.

Conclusion: The association between myocardial structural changes and QRS-T angle in dialysis patients may reflect the phenotype of uraemic cardiomyopathy and warrants further investigation.

References: 1. Poulikakos et al. Physiol Res, 2015; 64(4):487 -93

2. Green et al. J Nephrol. 2014; 27(1): 81-6.

3. Chua et al. J Cardiovasc Electrophysiol. 2016; 27(7): 833-9.

Disclosure of Interest: None Declared

Keywords: None

Cardiovascular Disease

PO-076

QRS-T angle predicts major cardiac events in a cohort of prevalent haemodialysis patients

D. Green [1], K. Hnatkova [2], S. Skampardoni [1,*], P. Kalra [1], M. Malik [2], D. Poulikakos [1]

[1]Renal Medicine, SALFORD ROYAL NHS TRUST, Salford, [2]National Heart and Lung Institute, Imperial College, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Cardiovascular disease is the most common cause of mortality in ESKD but accurate risk prediction is lacking. Non atherosclerotic risk factors are believed to significantly contribute to the burden of cardiac disease although the pathogenic mechanisms are not fully understood in this population.

Objectives: Wide spatial QRS-T angle calculated from resting digital 12 lead ECG is a marker of global repolarisation heterogeneity which is associated with increased cardiac risk in non CKD population. The aim of this study was to assess its prognostic value in haemodialysis patients.

Methods: This was a single centre prospective study of adult haemodialysis patients. Echocardiography and ECG were performed on the same non-dialysis day during a short midweek break with the patient clinically stable. QRS-T angle was calculated from the 10 second ECG as the total cosine R-to-T using singular value decomposition with the aid of custom written software and expressed in degrees. Abnormal QRS-T angle (TCRT) was defined as ≥100^{o}. Follow up was until death, transplantation, or most recent dialysis session. Follow up was censored at transplantation. End points were death and major cardiac events (MACE: acute coronary syndrome, coronary revascularisation, hospitalisation due to heart failure or arrhythmia, cardiac or sudden cardiac death).

The association of TCRT ≥100^{o} with these end points was calculated using a Cox proportional hazard model adjusted for age, gender, time on dialysis, left ventricular ejection fraction, and left ventricular mass indexed to height.

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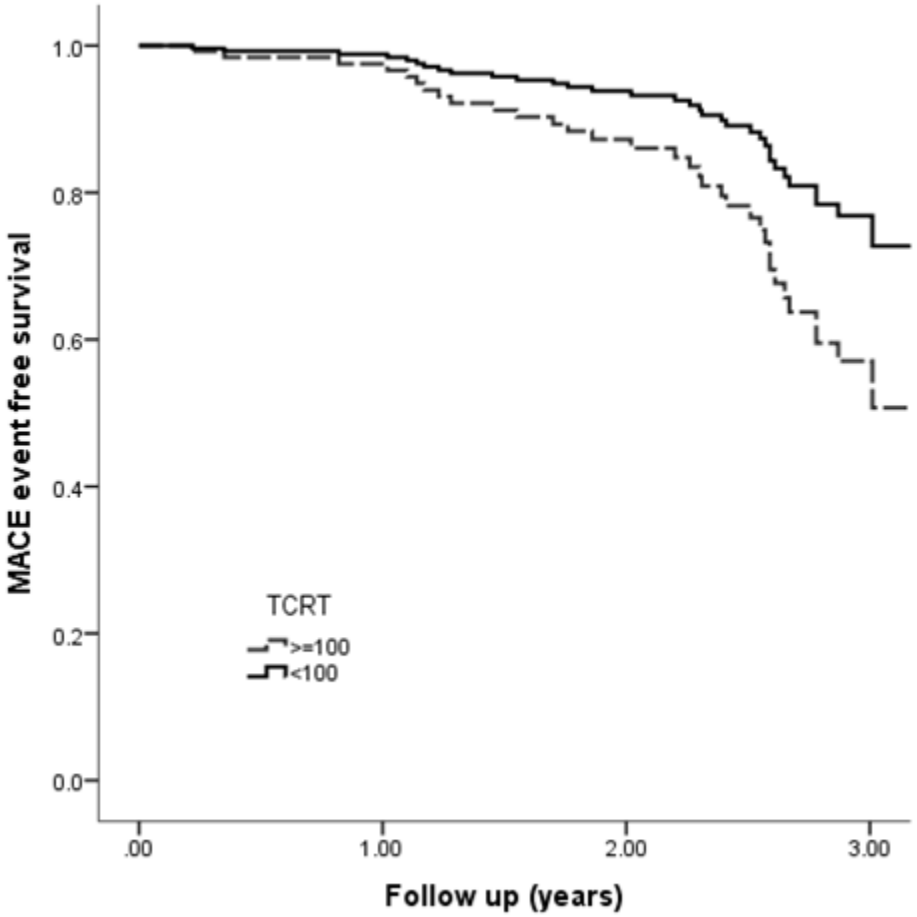

Results: There were 170 patients: mean age 61±15 years, time on dialysis 4±7 years, 66% male gender, 17% coronary artery disease. The mean TCRT was 88 ± 39°,70 patients (41% had TCRT ≥100°). Follow up was 2.1 ± 0.8 years during which there were 40 deaths (24%) and also 40 MACE. The hazard ratio for death if TCRT ≥100° was 0.80 (0.40 – 1.59), p = 0.524. The HR for MACE was 2.1 (1.0 – 4.4), p = 0.039

Conclusion: Wide QRS-T angle (TCRT) is associated with MACE, independent of echocardiographic parameters. This is likely to reflect its association with arrhythmia and may yet become a useful prognostic indicator in this regard

References: 1**.** Poulikakos et al. Physiol Res. 2015;64(4):487-93.
2. Green et al. J Nephrol. 2014;27(1):81-6.
3. Chua et al. J Cardiovasc Electrophysiol. 2016;27(7):833-9

Disclosure of Interest: None Declared

Keywords: None

Cardiovascular Disease

PO-077

The association of longitudinal change of QRS-T angle with cardiac outcome in haemodialysis patients

D. Green [1], K. Hnatkova [2], S. Skampardoni [1,*], M. Malik [2], P. Kalra [1], D. Poulikakos [1]

[1]Renal Medicine, SALFORD ROYAL NHS TRUST, Salford, [2]National Heart and Lung Institute, Imperial College, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Dialysis is associated with increased risk of cardiac arrhythmia. Wide QRS-T angle calculated from the surface digital ECG reflects global repolarisation heterogeneity and has been recently associated with adverse outcome in ESKD.

Objectives: Increases in QRS-T angle over time have been linked with heightened arrhythmic risk in the general population. We hypothesised that maintenance haemodialysis would be associated with longitudinal changes in QRS-T angle and would correlate with adverse cardiac outcome.

Methods: This was a single centre prospective study of adult haemodialysis patients. ECG was performed on two occasions 12 months apart, both on a non-dialysis day during a short midweek break with the patient clinically stable. QRS-T angle was calculated from the 10 second ECG as the total cosine R-to-T expressed in degrees (TCRT) using singular value decomposition with the aid of custom written software

Follow up was until first major cardiac event (MACE: acute coronary syndrome, coronary revascularisation, hospitalisation due to heart failure or arrhythmia, cardiac or sudden cardiac death), transplantation, or most recent dialysis session. The univariate association of above versus below median annualised change with MACE was calculated using a Cox proportional hazard model.

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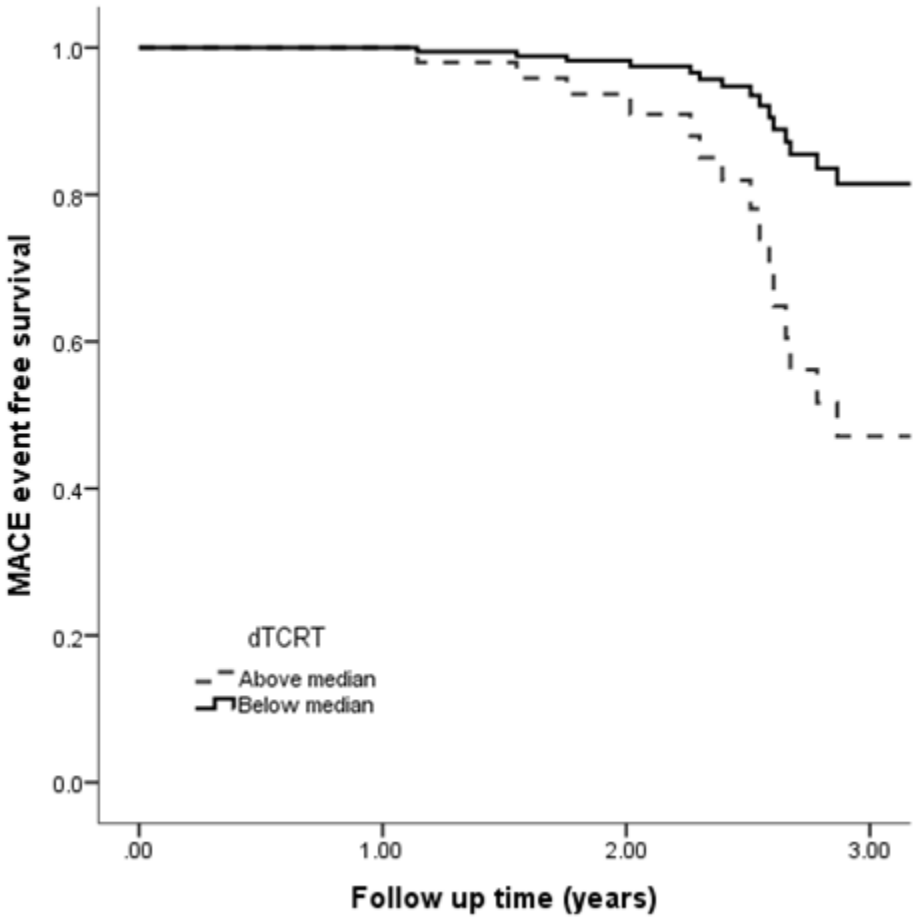

Results: There were 74 patients: mean age 62±14 years, 16% coronary artery disease, 69% male. Baseline QRS-T angle (TCRT) was 86 ± 36^{o} and median (range) annualised change was 5 (-84 to +127)^{o} and for heart rate were 72 ± 13 bpm and -1 (-19 to +40),

Over a follow up of 2.3±0.7 years there were 17 MACE end points. The hazard ratio for MACE in above versus below median change in TCRT (dTCRT) was 3.67 (1.27 – 10.60, p = 0.036)

Conclusion: Longitudinal changes in QRS-T angle (dTCRT) correlate with adverse cardiac outcomes and may improve risk prediction models in haemodialysis patients.

References: 1.Poulikakos et al. Physiol Res. 2015; 64(4): 487-93.

2. Green et al. J Nephrol. 2014; 27(1):81-6.

3. Chua et al. J Cardiovasc Electrophysiol. 2016; 27(7): 833 -9.

Disclosure of Interest: None Declared

Keywords: None

Cardiovascular Disease

PO-078

The Role of Renal Biopsy in Managing Complete Renal Artery Occlusion

J. Littlewood [1,*], A. Mohiuddin [1], N. Naz [1], T. Ledson [1], S. Lea [2], R. Seneviratne [3], P. Kalra [4], K. Abdulnabi [1]

[1]Renal Medicine, [2]Radiology, [3]Histopathology, Arrowe Park Hospital, Wirral, [4]University of Manchester, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Atherosclerotic renal artery stenosis (ARAS) is not uncommon in the over 65 year old patients. It is associated with hypertension and low HDL. It can be complicated by pulmonary oedema, malignant hypertension, and renal dysfunction requiring dialysis. The ASTRAL trial showed renal revascularisation to be of little benefit but did not account for acute presentations.

Objectives: We report a case of a patient presenting with acute kidney injury of unknown onset date and CT Angiogram showing complete occlusion of renal artery.

Methods: A 68-year-old woman presented with a two-week history of lethargy and nausea to her general practitioner. She denied loin pain and haematuria. Her Cr has risen to 589µmol/L from a baseline of 148 µmol/L 3 months prior to her admission.

PMH: Porcine aortic valve replacement for degenerative aortic stenosis, Obstructive sleep apnoea requiring CPAP, hypertension, obesity, secondary hyperparathyroidism, migraines, Ischaemic heart disease requiring coronary artery bypass graft, gout, hyperlipidaemia and permanent pacemaker

On examination: BP was 153/57, O2 Sat 93% on room air. She was hypervolemia with evidence of pulmonary oedema and pleural effusion on CXR. Urinalysis was negative for blood and protein. USS shows atrophic right kidney (7.6 cm), left kidney of 10.6 cm with corticomedullary depth of 101mm. Urine output was 25ml/hr.

All her immunology screen and myeloma screen were negative. FBC, CK and urate were normal, PTH 24 pmol/l, LDH 559U/L, Chol 4.9, HDL 0.90, TG 2.50 mmol/L. Cr remained static with no improvement for10 days despite medical treatment. CT renal angiogram was performed which shows complete occlusion of the left renal artery to the normal kidney in addition to an atherosclerotic aorta and pre-existing significant right renal artery stenosis.

As her renal function was normal three months prior to this presentation and her kidney function did not improve, a literature review and further consultation with the national expert group were taken place. This raised the question whether the kidney was still viable; hence a kidney biopsy was performed to show 50% of Glomeruli viable with mild glomerular ischaemia and acute tubular necrosis.

The patient attended interventional radiology for angioplasty and stenting of the left renal artery with 6 x 40mm stents via right common femoral approach. This was complicated by a pseudo-aneurysm and massive haematoma at the puncture site which was treated with thrombin and surgical repair. Kidney function recovered completely within a week despite of the above complications and exposure to contrast.

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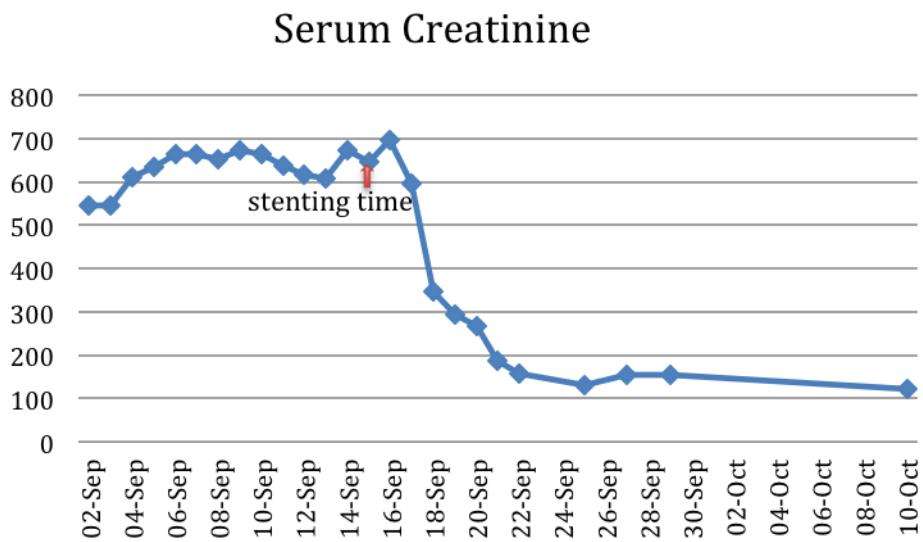

Results: Rapid reduction in creatinine from 700 to baseline level of 110 over 8 days (see graph).
Conclusion: Diagnosis of acute renal artery occlusion should be always considered and investigated in arteriopath patients with unexplained acute kidney injury. MDT discussion, in our case between Interventional Radiologists, Histopathologist, Nephrologists including the national expert team, has led to a very successful outcome. Renal biopsy can play very important role in proceeding into angioplasty in selected cases.

Disclosure of Interest: None Declared

Keywords: Renovascular disease

CKD: Fibrosis and Extracellular Matrix CKD

PO-079

Evaluation of Renal Response and Survival in Pre-dialysis Patients with Multiple Myeloma in Two Different Decades: A Single Centre Study

H. Ali [1,*], B. Kishore [2], J. BAHARANI [1]

[1]Department of Renal Medicine, [2]Department of Haematology, Heart of England Teaching Hospitals NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: 20-40% of multiple myeloma patients present with moderate to severe renal impairment. Intense supportive treatment and the rapid initiation of chemotherapy remain the cornerstone of treatment. The introduction of novel drugs has led to significant improvement in the survival of myeloma patients. However, the effect of these novel medications on the survival of pre-dialysis patients with multiple myeloma has not been widely evaluated.

Objectives:

The aim of this study is to assess the predictors of survival and improved renal response in this population.

Methods: A retrospective study of 97 patients who had bone marrow biopsy proven multiple myeloma with an eGFR of 30ml or less between April 2004 and August 2015 were reviewed. Follow up period was till December 2016.Thalidomide was standard treatment at our centre from April 2004 till December 2009 while Bortezomib became standard treatment from January 2010 onwards. Data including age, sex, EF%, haemoglobin, CRP, renal function, calcium, B2microglobulin, ISS score, total protein, albumin, baseline FLC, immunoglobulins, uric acid, LDH and urine PCR was collected. Renal response was categorised as complete (eGFR improved to>60ml), partial (baseline eGFR <15ml improved to 30-59ml) or minimal (baseline eGFR <15 ml improved to 15 to 29 mL and baseline eGFR 15 to 29 ml improved to 30 to 59 ml). Endpoints were death or start of dialysis. Kaplan-Meier test and cox hazard regression analysis were used to assess survival. Univariate and multivariate logistic regression analysis was used to assess factors affecting renal response.

Table:

Results: Patients were divided into 2 treatment cohorts; Thalidomide treated (n=44, m=21, f=23) or Bortezomib treated (n=53, m=25, f=28).There was no significant difference between both groups in terms of baseline characteristics. Survival was significantly better in Bortezomib group compared to thalidomide group with median overall survival time of 33.6 and 8.3 months respectively (P=0.008). Subgroup analysis showed CKD4 patients in the Bortezomib cohort had better survival rate compared to CKD5 patients in same cohort, CKD4 and CKD 5 patients in the thalidomide cohort had a median survival time of 62.2, 27.2, 8.3, 6.9 months respectively (P=0.05). Multivariate Cox hazard regression analysis showed that age and paraprotein gap were strong predictors of survival with hazard ratio of 1.04 and 1.03 respectively. In both cohorts, 50 patients had no renal response, 25 showed minimal response, 5 patients showed partial response and 16 had a complete response to treatment. Multivariate logistic regression analysis showed that b2microglobulin is a strong predictor of renal response with odds ratio of 0.95. A cut-off point of 30 mg showed 80% specificity of predicting response. 23 patients in our cohorts required dialysis, 2 of which became off dialysis during period of treatment.

Conclusion: Survival in pre-dialysis patients with multiple myeloma is significantly better in Bortezomib based era compared to thalidomide based era. CKD4 patients in both Bortezomib and Thalidomide treated cohorts have better survival compared to CKD5 patients. Age and paraprotein gap are strong predictors of survival in this population. B2microglobulin may be used as a predictor of renal response in patients who have not reached end stage renal disease.

Disclosure of Interest: None Declared

Keywords: CKD, Myeloma, Survival

CKD: Fibrosis and Extracellular Matrix CKD

PO-080

Antifibrotic Activities and Mechanisms of Scutellariae Radix and Baicalein: Towards a Proteomic View

S. Zhou [1,*], J. Yuan [2], Z. Liang [2], Y. Li [3], C. Peng [3], J. Song [4], X. Yin [5], P. Hylands [6], M. Mayr [5], Z. Zhao [2], Q. Xu [1]

[1]Department of Renal Sciences & Centre for Integrative Chinese Medicine, King's College London, London, United Kingdom, [2]School of Chinese Medicine, Hong Kong Baptist University, Hong Kong, China, [3]Pharmacy College, Chengdu University of Traditional Chinese Medicine, Chengdu, China, [4]PuraPharm International Limited, Nanning, China, [5]Cardiovascular Division, King's College London, London, United Kindom, [6]Institute of Pharmaceutical Science & Centre for Integrative Chinese Medicine, King's College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Scutellariae Radix (SR), a herb commonly used in traditional Chinese medicine, and SR-derived flavonoids had antifibrotic activities.

Objectives: This project aims to compare *in-vitro* antifibrotic activities of two different SR extracts and five SR flavonoids and to explore mechanisms of the most potent ones via a proteomic approach.

Methods: The NRK-49F fibroblast cell line (ATCC) was authenticated and quality-assured and used to establish *in-vitro* models of transforming growth factor (TGF)-β1-induced fibrosis. SR was authenticated as roots of *Scutellaria baicalensis* Georgi that meet all pharmacopoeial requirements. Aqueous and methanolic SR extracts were prepared and characterised and the five major SR flavonoids (F5, i.e. baicalin, baicalein, wogonoside, wogonin and oroxylin A) were procured and their molecular weights were confirmed as expected by high resolution mass spectrometry (MS). Antifibrotic activities were examined in TGF-β1-induced *in-vitro* models of fibrosis by quantitative analysis of collagens by picro-Sirius red staining and hydroxyproline assays, and by quantitative analysis of immunofluorescence staining of fibrogenic molecular markers. High-throughput, labelling-free and tandem mass tag (TMT)-labelling proteomic analyses of cell lysates and conditioned media of control and TGF-β1-treated cells, with and without different treatments, were performed to establish a proteomic view of TGF-β1-induced fibrogenesis and to explore mechanisms of the most promising antifibrotic SR extract and flavonoid.

Results: The methanolic extract of SR was 8-fold more enriched in the F5 than the SR aqueous extract (22.7% vs 2.8%) and had a 4-fold higher antifibrotic activity (IC50 155.6±10.3 vs 39.6±4.1 μg/ml). SR methanolic extract was more effective than aqueous extract in down-regulating collagens types I & III, α-smooth muscle actin and fibronectin. The F5 each showed significant antifibrotic activity, with IC50 ranging from 38.2±4.7 μM (baicalein) to 190.0±11.2 μM (oroxylin A), $P<0.05$. Hydroxyproline assay confirmed that, among the F5, baicalein had the strongest antifibrotic activity ($p<0.001$). Cell lysates and conditioned media of four sets of independent biological studies were harvested and subjected to MS analysis to compare the antifibrotic mechanisms of SR methanolic extract and baicalein, in comparison with IN1130, an inhibitor of type I TGF-β receptor. Gene Ontology and KEGG Pathway Enrichment Analyses of the acquired dada are under way.

Conclusion: SR methanolic extract and baicalein showed the most potent *in-vitro* antifibrotic activities. Their molecular mechanisms are being intensively investigated via a proteomic approach and will be validated and reported at the UKKW 2017.

References: Hu Q, Noor M, Wong YF, Hylands PJ, Simmonds MS, Xu Q, Jiang D, Hendry BM, Xu Q. *In vitro* anti-fibrotic activities of herbal compounds and herbs. Nephrol Dial Transplant. 2009;24:3033-41

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Keywords: Fibroblast, Fibrosis, Proteomics

CKD: Fibrosis and Extracellular Matrix CKD

PO-081

Identification Of Novel Targets To Treat Chronic Kidney Disease Using Renal Fibroblasts

I. Logan [1,*], S.-W. Ng [1], V. Shuttleworth [1], N. Sheerin [1]

[1]Renal services, NEWCASTLE HOSPITALS, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Fibrosis is the histological endpoint of all forms of chronic kidney disease (CKD) including diabetic nephropathy, chronic glomerulonephritis and hypertensive nephrosclerosis. It is characterised by fibroblast proliferation, extracellular matrix (ECM) deposition, collagen contraction and capillary rarefaction, all histopathological hallmarks of CKD. TGF B-1 and PDGF cytokines are a key drivers in these processes. No drugs are currently available to treat renal fibrosis in order to retard progressive CKD.

Objectives: Our objective was to examine the feasibility of using primary renal fibroblasts (PRFs) as a disease model in which to identify new targets in the treatment of CKD. We acheived this by characterising PRFs and using them in a medium-scale drug screen.

Methods: PRFs and tubular cells were either isolated under ethical approval from nephrectomy specimens (Freeman Hospital) or obtained commercially. Cells were fixed in methanol and immunostained for markers by indirect immunofluorescence or fixed in glutaraldehyde for electron microscopy (EM). For drug screening, cells were treated with an epigenetics library containing 150 small molecule inhibitors, and TGF B-1 or PDGF cytokines prior to WST-1 proliferation assays. To assess apoptosis by flow cytometry, live cells were stained with propidium iodide and Annexin V.

Results: 1. Our PRFs express mesenchymal markers, alpha-SMA and ECM proteins, in keeping with fibroblast identity, but do not express tubular cell markers. EM confirms fibroblastic morphology. Our PRFs proliferate in response to exogenous cytokines as they would during fibrogenesis.

2. Drug screening identifies 6 individual Aurora kinase inhibitors as having anti-proliferative effects in PRFs but no such effect on tubular cells.

3. Aurora kinase inhibitors cause profound apoptosis in PRFs but not primary tubular cells.

Conclusion: 1. PRFs express fibroblast markers and respond to cytokines in a manner in keeping with their use as a model of renal fibrosis. We will now expand our drug screening programme using these cells.

2. Aurora kinases represent new targets to explore in the treatment of CKD. These will now be tested in whole organism models of CKD.

Disclosure of Interest: None Declared

Keywords: Apoptosis, CKD, Fibroblast

CKD: Fibrosis and Extracellular Matrix CKD

PO-082

The UK Calciphylaxis study; an interim analysis

A. Huckle [1,*], J. Ritchie [2], H. Alderson [2], D. Green [2], S. Sinha [2]

[1]student, UNIVERISTY OF MANCHESTER, [2]Renal Medicine, Salford royal NHS trust, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Calcific uraemic arteriopathy (CUA or calciphylaxis) is a rare condition associated with a high mortality. It predominantly affects dialysis patients and is characterised by debilitating skin ulceration and calci cation of cutaneous arterioles.

Objectives: To collect data in order to contribute towards the identification of aetiological factord and to copare patients based on outcome to try and identifiy prognostic factors.

Methods: The UK calciphylaxis Study is a UK wide prospective observational internet- based study of CKD associated calciphylaxis. Data including demographics, laboratory results, medication use and therapeutic interventions are collected from enrolled patients on a 4 monthly basis.

Results: Data was available for 63 patients enrolled between 2012 and 2016. 76.2% were on renal replacement therapy (peritoneal or haemodialysis). 52.4% were female, median age was 57.5 years (IQR 52-66). 58.2% had a BMI >30 and 80.8% a BMI of >25. Prior to lesion development 66.7% (n=42) were prescribed a phosphate binder, 36.5% (n=23) a vitamin K antagonist. Baseline mean corrected calcium was 2.41 (SD±0.209) mmol/l, phosphate 1.68 mmol/l (SD±0.58) and iPTH median was 91.1 (IQR=29.6-189.8) mmol/l. The majority of lesions were on the lower extremities (57.1%), followed by the thighs (28.6%) and abdomen (15.9%). The treatment used varied considerably between patients.

Conclusion: 80.8% of patients in this study were overweight in comparison to the average dialysis population. Vitamin K antagonist use was highly prevalent in keeping with the literature; both may be important risk factors for the development of CUA. Therapeutic strategies varied greatly identifying a need for more research and consensus on the management of this condition.

Disclosure of Interest: None Declared

Keywords: Calcium, CKD, CKD-MBD

CKD: Fibrosis and Extracellular Matrix CKD

PO-083

Serum endotrophin, a marker of type VI collagen expression, is associated with increased mortality in chronic kidney disease

A. Fenton [1,*], M. Jesky [1], C. Ferro [1], J. Sørensen [2], M. Karsdal [2], P. Cockwell [1], F. Genovese [2]

[1]Department of Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, Birmingham, United Kingdom, [2]Nordic Bioscience A/S, Herlev, Denmark

Preferred Presentation Method: Oral or Poster

Introduction: Patients with chronic kidney disease (CKD) are at increased risk of end-stage renal disease (ESRD) and early mortality. The underlying pathophysiological processes are not entirely understood but may include dysregulation of extracellular matrix formation with accelerated systemic and renal fibrosis.

Objectives: We assessed the relationship between endotrophin (ETP), a marker of collagen type VI formation, and adverse outcomes in a cohort of patients with CKD.

Methods: We measured serum ETP levels in 500 patients from the Renal Impairment in Secondary Care (RIISC) study, a prospective observational study of patients with high-risk CKD. Patients were followed up until death or progression to ESRD. Cox regression analysis was used to assess the relationship between ETP and risk of adverse outcomes.

Results: During a median follow-up time of 37 months, 104 participants progressed to ESRD and 66 died. ETP level was significantly associated with progression to ESRD (HR 1.79 [95% CI 1.59-2.02] per 10 ng/mL increase, $P<0.0001$) and mortality (HR 1.60 [1.35-1.89] per 10 ng/mL increase, $P<0.0001$). After adjustment for confounding variables, ETP was no longer significantly associated with progression to ESRD but remained independently associated with mortality (HR 1.51 [1.07-2.12] per 10 ng/mL increase, $P=0.019$).

Conclusion: Serum ETP level is independently associated with mortality in CKD. This study provides the basis for further exploratory work to establish whether collagen type VI formation is mechanistically involved in the increased mortality risk associated with CKD.

Disclosure of Interest: None Declared

Keywords: CKD, Extracellular matrix, Survival

CKD: Fibrosis and Extracellular Matrix CKD

PO-084

Extra Domain A Fibronectin is a target for Antisense Oligonucleotides in Murine models of Acute and Chronic Kidney disease

P. Virdee [1,*], S. Saha [2], S. Somalanka [1], C. Sharpe [3], M. Dockrell [1], M. Phanish [1]

[1]Renal, South West Thames Institute For Renal Research, Carshalton, United Kingdom, [2]Renal, Kings College Hospital, London, American Samoa, [3]Division Of Transplantation Immunology and Mucosal Biology, Kings College , London, United Kingdom

Preferred Presentation Method: Poster

Introduction: In models of tissue injury in animals and in vitro in human cells, production of Extra Domain A fibronectin (EDA + FN) is preferentially directed by alternative splicing. EDA + FN has an interaction with TGFβ1 complexed to Latency associated peptide (LAP) and LTBP1 and potentially facilitates release of TGFβ1 from its inactive state.

Objectives: We explored the potential of EDA + FN as a target for RNAse H Independent antisense oligonucleotide(ASO) therapy with a view to attenuating fibrosis in a murine model of acute kidney injury induced by aristolochic acid (AA). We have previously shown effective knockdown of EDA + FN in human proximal tubule cells.

Methods: We compared expression of EDA + FN in 2 murine models. CD1 mice were injected with Intraperitoneal AA at 3.5mg/kg at D1 and 5, RNA from whole kidney lysate was extracted at D0, 12, 20 and 100 and qPCR performed using primers targeted to EDA + FN, EDA – FN, CTGF, TGFβ and LTBP1. Folic acid model (FA) model involved IV injection of Folic acid at D0 and D21 at 125mg/kg and whole kidney lysate retrieval at D0 and D84.

Results: In the AA model of kidney injury at D0 there was negligible detection of EDA + FN RNA by qPCR, at D12 there was a >2500 fold increase in its expression compared to its normal saline control ($p<0.005$), at D20 there was >900 fold ($p<0.005$) which was reduced to 13 fold ($p<0.05$) at D100 compared to control. EDA - FN RNA expression was also increased at D12, 20 and 100 ($p<0.005$) but to a lesser degree (40-70 fold increase) compared to normal saline control. CTGF expression followed a similar pattern with peak at D12 and subsequent fall. By comparison in FA model there was a 15 fold ($p<0.005$) increase in EDA + FN RNA expression at D84.

Conclusion: EDA+FN expression is significantly increased in the acute phase of kidney injury by AA. This isoform appears to be preferentially expressed by alternative splicing in response to insult. RNAse H independent ASOs can modulate splicing to prevent formation of EDA + FN and attenuate fibrosis potentially by modulating TGFβ activity through the interaction with LAP and LTBP1. Testing this in murine models of fibrosis will be the next step towards a therapeutic option for AKI and CKD following AKI.

Disclosure of Interest: None Declared

Keywords: Animal model, Fibrosis, Tubular epithelial cell

CKD: Fibrosis and Extracellular Matrix CKD
PO-085

Regulation of VEGFR3 in a murine model of progression and regression of renal fibrosis

M.-L. Monaghan [1,*], L. Denby [1], C. Cairns [1], G. Borthwick [2], J. Hughes [2], B. Conway [1]
[1]Cardiovascular Science, [2]MRC Centre for Inflammation Research, UNIVERSITY OF EDINBURGH, Edinburgh, United Kingdom

Preferred Presentation Method: Oral or Poster
Introduction: Chronic kidney disease (CKD) affects 5% of the population and is a risk factor for end-stage kidney disease and cardiovascular disease. CKD has a diverse range of aetiologies with most culminating in renal fibrosis. A key mechanism in tubulointerstitial fibrosis results from endothelial cell death and a decrease in peritubular capillaries. It is proposed that the resultant reduction in blood supply may lead to hypoxia promoting further renal injury or preventing tubular regeneration. Vascular endothelial growth factor receptor 3 (VEGFR3) is highly expressed in lymphatic endothelial cells, however recent work suggests that it may also be expressed by vascular endothelial cells in the kidney[1].
Objectives: We sought to characterize the expression of VEGFR3 in a murine model of progression and regression of renal fibrosis.
Methods: C57Bl/6 mice underwent unilateral ureteric obstruction (UUO) or sham surgery. 7 days after UUO, 8 mice were culled and tissue harvested, while in the remaining mice, the ureter was re-implanted into the bladder to relieve obstruction (R-UUO) for 1, 2 and 4 weeks (n=6-8 at each time-point). Harvested kidneys were analysed by immunofluorescence, with dual stains performed for VEGFR3 with the lymphatic endothelial cell marker Lyve-1 or the vascular endothelial marker CD31. Renal cortical gene expression levels of VEGFR1, 2 and 3, VEGFA and VEGFC were examined by qPCR.
Results: In control tissue, immunofluorescence (IF) analysis determined that VEGFR3 was observed in perivascular lymphatic vessels, while CD31 was expressed in the vascular endothelium of larger blood vessels, glomerular and peritubular capillaries and some perivascular structures, most likely lymphatics. VEGFR3 staining increased in the peritubular microvasculature following UUO specifically in CD31+/Lyve1- vessels, most likely peritubular capillaries. qPCR data indicated that gene expression of VEGF-A decreased by 38% in the renal cortex after 7 days of UUO ($p=0.001$) and this partially resolved following RUUO suggesting a potential for vascular regeneration. Expression of the VEGF-C gene did not significantly change following 7 days of UUO, but significantly increased in the later stages following R-UUO when compared with control ($p=0.01$). Gene expression of VEGFR3 increases 2 fold following UUO ($p=0.001$) and remains significantly up regulated at all time-points following R-UUO.
Conclusion: VEGFR3 expression was increased in peritubular capillary network following UUO suggesting that, following injury the renal vascular endothelial cells could express VEGFR3 in addition to the lymphatic endothelium. Similar findings have been reported in Polycystic Kidney Disease[1]. Whether this VEGFR3 upregulation mediates further damage or attempts at repair warrants further investigation.
References: 1. Huang et al. JASN 2016;27:69-77

Disclosure of Interest: M.-L. Monaghan: None Declared, L. Denby Conflict with: Medical Research Scotland PhD part funded by Regulus Therapeutics, C. Cairns: None Declared, G. Borthwick: None Declared, J. Hughes: None Declared, B. Conway: None Declared

Keywords: Animal model, CKD Progression, Fibrosis

CKD: Fibrosis and Extracellular Matrix CKD

PO-086

The Lysine Methyltransferase SETD7 As A New Target In Renal Fibrosis

I. Logan [1,*], V. Shuttleworth [1], L. Nawafa [1], L. Gaughan [1], N. Sheerin [1]

[1]Renal services, NEWCASTLE HOSPITALS, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: TGF B-1 co-ordinates numerous processes that are central to fibroblast activities including extracellular matrix (ECM) deposition, collagen contraction, cell motility, and proliferation and differentiation. TGF B-1 signals through the SMAD3 transcription factor to control these key processes in the development of renal fibrosis, the pathological equivalent of chronic kidney disease (CKD).

SETD7 belongs to the evolutionarily conserved lysine methyltransferases and recent work has demonstrated that it is involved in TGF B-1 mediated ECM production in pulmonary fibrosis. Other complimentary work has shown that SETD7 regulates ECM gene expression in rat mesangial cells.

Objectives: Here we wanted to evaluate SETD7 as a potential target for the treatment of renal fibrosis and CKD.

We firstly examine the molecular relationship of SETD7 to SMAD3. We go on to use diseased primary human renal fibroblasts and SETD7-deficient mouse embryonic fibroblasts in functional assays to assess key fibrotic activities including global gene expression signatures, collagen contraction and cell motility and ECM deposition.

Methods: Global gene expression data was obtained using WG6 Illumina microarrays, hybridised with total cRNA, in the presence or absence of TGF B-1. SETD7 was co-immunoprecipitated from HK C-8 cells using specific antibodies to either SMAD3 or SETD7, crosslinked to dynabeads. PAI-1 or CAGA cis-acting elements upstream from luciferase were used in reporter gene assays in transiently-transfected HK C-8 cells. Motility was assessed in wound healing assays using Ibidi wounding chambers in renal fibroblasts, treated with TGF B-1. Collagen contractility was examined after suspension of renal fibroblasts in Collagen 1 matrices which were measured and weighed after exposure to TGF B-1. ECM deposition was examined by immunofluorescence, and data analysed using ImageJ software. Statistical analysis is performed as shown. R-PFI-2, specific inhibitor of SETD7 was used as shown. Human renal fibroblasts were isolated under ethical approval from nephrectomy samples.

Results: 1) The global gene expression signature in response to TGF B-1 relies upon the presence of SETD7.

2) SETD7 interacts directly with, and is a co-activator for, the SMAD3 transcription factor, in the presence of TGF B-1.

3) SMAD3 nuclear import, protein stability and ubiquitination is dependent upon SETD7

4) Pharmacological inhibition of SETD7 using a small-molecular inhibitor results in impaired motility, collagen contractility and expression of ECM proteins in diseased primary renal fibroblasts.

Conclusion: We conclude that pharmacological inhibition of SETD7 results in inhibition of key fibroblasts activities in diseased primary human renal fibroblasts. SETD7 inhibition is therefore attractive in renal fibrosis and treatment of CKD, the key driver of which is TGF B-1. We will now examine other methyltransferases and SETD7 in whole organism models of CKD.

Disclosure of Interest: None Declared

Keywords: CKD, Fibrosis, Renal scarring

CKD: Fibrosis and Extracellular Matrix CKD

PO-087

The role of cellular metabolism driving fibrosis in pre-clinical models of renal fibrosis.

S. Finnie [1,*], J. O'Sullivan [1], C. Cairns [1], J. Hughes [2], B. Conway [1], L. Denby [1]

[1]Centre for Cardiovascular Science, [2]MRC Centre for Inflammation Research, UNIVERSITY OF EDINBURGH, Edinburgh, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The kidney is a highly metabolic organ, rich in mitochondria which generates energy primarily by fatty acid oxidation. Chronic kidney disease (CKD) is characterised by marked renal fibrosis, the driving mechanism(s) of which have yet to be fully elucidated. CKD has recently been linked to dysregulated cellular metabolism and change in fuel source preference (1). Furthermore, treatment of kidneys undergoing unilateral ureter obstruction (UUO) with a pharmacological inhibitor of the pro-fibrotic miR-214 resulted in de-repression of metabolism linked genes (2). Therefore, further investigation into the role of dysregulated metabolism driving fibrosis is necessary.

Objectives: Interrogate metabolism linked genes in preclinical models of renal fibrosis.

Methods: C57Bl/6 mice (8-10 weeks) were subjected to UUO or sham surgery. RNA-seq (Genewiz UK, 2x100bp, paired end reads, n=4/gp) was performed on total RNA extracted from whole kidney from UUO mice (n=4) and sham mice (n=4) culled 7 days post-surgery. Differential gene expression analysis was carried out which determined metabolic pathways that were dysregulated during fibrosis. Candidate metabolism linked genes were selected and validated by qRT-PCR (n=6/gp). Expression of these genes was also investigated in a second mouse model of progressive CKD, the subtotal nephrectomy model (STNx) and compared to sham animals 6 weeks (n=5 STNx; n=3 sham) or 10 weeks (n=5 STNx; n=4 sham) after surgery.

Total RNA was extracted from snap frozen tissue (miRNeasy RNA extraction kit, Qiagen) and reverse transcribed using the Quantitect RT kit (Qiagen). qRT-PCR was carried out on cDNA using specific Taqman probes and normalised to *Hprt/18S* housekeepers.

Results: RNA-Seq analysis revealed that genes involved in fatty acid and amino acid metabolism (FAM and AAM) were down-regulated in UUO. qRT-PCR validated genes involved in these metabolic pathways as down-regulated in UUO kidneys compared to sham (n=6, $p<0.05$). Decreases in expression were seen in FAM related genes *Acaa2* (-71.23%) and *Gcdh* (-80.01%) as well as AAM related genes *Ass1* (-89.9%), *Gatm* (-84.45%) and *Ido2* (-88.42%). Significant decreases in expression of FAM genes (*Acaa2* and *Gcdh*) were also observed in the STNx model after 10 weeks within the heart and the kidney (-55.2% and -66.5% respectively). However, at 6 weeks after STNx *Acaa2* and *Gcdh* exhibited 2 fold increases in expression while genes involved in AAM demonstrated a significant 50% decrease in expression.

Conclusion: Fatty acid and amino acid metabolism exhibit downregulation in 2 models of established renal fibrosis. However, at earlier time points during the progression of CKD FAM related gene expression exhibits upregulation while AAM related gene expression reduces. Therefore defective AAM may act as a potential driver of fibrosis within the kidney while defective FAM may occur once fibrosis has already been established. These initial findings warrant further investigation.

References: 1. Kang, H. M., et al. 2015. *Nature medicine* **21**, 37-46

2. Denby, L. et al., 2014. J Am Soc Nephrol **25**:65-80

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Keywords: Animal model, CKD Progression, Fibrosis

Cognitive Disorders

PO-088

Is Cognitive Impairment Associated with the Stage of Chronic Kidney Disease?

P. Hobson [1,*], M. Kumwenda [2]

[1]Academic Unit, Care of the Elderly, [2]Department of Nephrology, BETSI CADWALADR UNIVERSITY HEALTH BORAD, Bodelwyddan, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The prevalence of cognitive impairment among patients with chronic kidney disease (CKD) and diabetes is common. However, the association with cognitive impairment and the stage of CKD is unclear. Some investigations have suggested that as CKD progresses cognitive impairment declines, whereas some have found no relationship with the stage of CKD and cognitive function.

Objectives: The aim of this study was to determine if there was an independent relationship between cognitive impairment and the stage of CKD in a prospective cohort of patients attending an outpatient clinic.

Methods: Cognitive function was assessed in patients attending an outpatient renal and diabetes clinic aged over 55 years with an estimated glomerular filtration rate (eGFR) < 45ml/min/1.73m ^{2}. A diagnosis of cognitive impairment or dementia was based upon patient and informant interview, case note review, neuropsychological assessment and application of Diagnostic and Statistical Manual of Mental disorders version 5 and Petersen's criteria for mild cognitive impairment (MCI). Demographics, comorbid conditions, medications and kidney function were entered into the analysis as covariates. Patients with end stage renal disease (eGFR <15) were not included in this cohort.

Results: The cohort comprised of 143 CKD and diabetic patients (mean age 77 $\pm$ 7 years). The outcome of their cognitive assessment revealed that 50.5% of the cohort had a cognitive impairment (MCI =40; Dementia = 32). The association between cognitive function and the stage of CKD did not reach significance (HR 10.3; 95% CI 0.89 – 1.27. In addition we did not find any associations within the specific neuropsychological assessment cognitive domains and CKD stage (HR 1.05; 95% CI 0.87 – 1.28).

Conclusion: In the current investigation of patients with mild to moderate CKD, cognitive impairment was not found to be associated with the stage of the disease after controlling for traditional risk factors of demographics, commodity, renal function and medication. This is most likely due to several processes involved in the pathogenesis of cognitive impairment in CKD such as vascular disease, aging or acute illness.

Disclosure of Interest: None Declared

Keywords: Cognitive function

Conservative/End of Life Care

PO-089

PRIORITIES MDT: A SINGLE CENTRE EXPERIENCE OF COMPLEX DECISION-MAKING IN RENAL PATIENTS APPROACHING END OF LIFE

E. Mumford [1,*], J. Wilson [2], A. Burns [1]

[1]Renal, [2]Palliative Care, ROYAL FREE HOSPITAL, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: 5-year survival for elderly patients on RRT remains poor and they face a significant symptom burden[1]. The interwoven challenges of recognising frailty, poor prognostic outcome and advance care planning are often brought to light following repeat or lengthy admissions.

Objectives: Working in a tertiary centre we have considered ways to address these concerns in our patient population. We were keen to reduce burdensome yet futile investigations, prevent medicalisation of death, and to identify any inequalities in care.

Methods: A weekly 'Priorities' meeting was formed between palliative care and renal teams to discuss patients who meet one of the following criteria: 1) Recurrent admissions; 2) Lack of mental capacity for decision-making; 3) Long in-patient stay; 4) multiple co-morbidities; and 5) imminent end of life. Participants in the Priorities MDT include, the renal consultant, palliative care specialist, ward sister, occupational therapist and dietician. GPs and community care teams are virtually consulted. Discussion topics include consideration of mental capacity and best interest decisions, ascertaining patients' preference for care, ceilings of care and end-of-life care. The MDT is underpinned by administrative support and a clinical database that allows service evaluation.

Results: During the first 6 months of the meeting 54 patients were discussed a total of 78 times. 65% patients were deemed to have palliative care needs with 24% patients going on to die during that admission. We found baseline frailty scoring, developed from the Rockwood clinical frailty scale, to be a useful tool in separating intercurrent illness from background function[2]. 22 patients came from the poorest 10% of postcodes, while only 2 came from the richest. During the conference we will present two in-depth case studies illustrating the role the MDT meeting has played.

Conclusion: Based on preliminary data, establishing a Priorities MDT is an effective way to prompt professionals to establish the preferred priorities of care for renal patients and their families. The meeting has proved invaluable in complex decision making. At present data is insufficient to conclude whether the meeting reduced rates of readmission. Future work will include considering how to more formally involve patients in the project.

This study would be relevant to any clinicians working with a frail population, both in hospital and in the community, such as is seen in (but not limited to) the UK.

References: 1. Kwok, A. O. *et al.* The Symptoms Prevalence, Medical Interventions, and Health Care Service Needs for Patients With End-Stage Renal Disease in a Renal Palliative Care Program. *Am. J. Hosp. Palliat. Med.* **33,** 952–958 (2016).

2. Rockwood, K. *et al.* A global clinical measure of fitness and frailty in elderly people. *C. Can. Med. Assoc. J.* **173,** 489–495 (2005).

Disclosure of Interest: None Declared

Keywords: End of life care, Older people, Symptoms

Conservative/End of Life Care

PO-090

Parallel palliative care in management of paediatric end stage renal failure

L. Pittendrigh [1,*], P. Boutcher [2], D. McIntosh [3], D. Athavale [1]

[1]Paediatric Nephrology, Royal Children's Hospital, [2]Children's Hospice Association Scotland, [3]Paediatric Oncology, Royal Children's Hospital, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Engagement with palliative care services in the management of paediatric end stage renal failure (ESRF) is generally limited to end of life care in a small number of cases.

Objectives: To highlight the successful delivery of palliative care alongside active treatment of paediatric ESRF.

Methods: We present three cases where ESRF management occurred in parallel with palliative care.

Results: Case 1: A 9 year old male with Joubert's Syndrome presented with deteriorating renal function. During active management invasive procedures were progressively more stressful. The benefits of invasive treatment versus his distress were considered. Ultimately an integrated conservative approach with nephrology and palliative care was adopted featuring home reviews, planned breaks with quality family time and ongoing school. Eighteen months following presentation he died peacefully.

Case 2: A 10 day old baby presented with renal failure secondary to congenital nephrotic syndrome. Peritoneal dialysis was commenced early as he remained anuric. Dialysis was challenging with poor cardiac function, episodes of fluid overload and peritonitis. After four months, further peritonitis resulted in ventilation and haemofiltration with limited vascular access. After multi-professional deliberation, active management was re-orientated to end of life care with hospice transfer and compassionate extubation, where he died nine days later.

Case 3: A 14 year old with restrictive cardiomyopathy, second cardiac transplant and significant kidney injury resulting in ESRF was transferred to our unit for ongoing care. Severe myopathy, feed intolerance, poor wound healing and labile blood pressure posed challenges to long-term dialysis. Active treatment continued with early input from palliative care, who initiated a parallel pathway involving hospice supports with focus on quality of life. After a prolonged admission with discharge imminent, focus on management remains integrated with renal replacement therapy (RRT) and palliative care.

Conclusion: Involvement of palliative services in paediatric ESRF is generally limited to infants who are not treated. However, with increasing complex co-morbidities, ESRF management remains challenging and can pose a significant quality of life burden. We have demonstrated an integrated management approach in 3 cases with early referral to palliative care allowing holistic care to be delivered alongside active treatment. We propose that parallel palliative care collaboration be considered in active management of all children with ESRF, particularly those with co-morbidities.

Disclosure of Interest: None Declared

Keywords: None

Conservative/End of Life Care

PO-091

Chronic kidney disease stage 5 : A comparison of those patients who had started dialysis versus those not

C. Wong [1,*], G. Jones [1], M. Edwards [1], E. Davies [1]

[1]Renal Medicine , AINTREE UNIVERSITY HOSPITAL, Liverpool , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Management of Chronic Kidney Disease (CKD) stage G5 remains a challenge as it is associated with increasing risk of death, ESRD or both. Renal replacement therapy (RRT) remains the mainstay of treatment if patients are suitable.

Objectives: To compare the survival of CKD G% patients that are already on renal replacement therapy to those that have not started or chose not to. To identify factors that may affect the survival of these RRT patients as compared to those that are still not on RRT or preferred not to.

Methods: We look at a 2 year cohort of CKD G5 patients in Aintree University hospital to compare the survival of those that were already on renal replacement therapy as compared to those that were not. Patients were identified from the hospital Sigma IT system. We collected demographics and comorbidities were stratify according to the Stoke Comorbidity Grade. We aim to analyse the data with Cox Regression to identify the prognosticators and compare the survival with Kaplan Meier Survival analysis.

Table:

Percentage of patients	RRT group	CKD G5 not on RRT
Diabetes	20%	14%
Malignancy	14%	19%
Ischaemic Heart Disease	10%	16%
Heart Failure	30%	31%

Results: Over the two year period there were 470 patients with CKD G5 stage. Fifty four percent were male. In the RRT group there were 140 patients on haemodialysis (HD), 27 on peritoneal dialysis (PD), 11 on home haemodialysis (HHD) and 9 transplanted. There were 283 patients with CKD G% that were not on RRT> Their Stoke comorbid grade for HD was 1, PD was 0, HD was 1, Renal transplant was 1 and CKD G5 not on RRT was 1. Heart failure was the most common comorbidity in our CKD G5 population see Table. Their mean ages were quite similar 68.2 years for HD, 68.8 years for PD, 68.1 years for HHD, 62.7 years for renal transplant and 68.2 years for those not on RRT. The highest mortality was in the group that was nor on RRT with 29% mortality and if the eGFR was less or equal to 10ml/min the mortality was 32%. Only 3 out of 8 of these deaths were at home. Nine of these patients had no admissions and were managed in the clinics. Sixteen of these patients that were not on RRT had admissions either as an inpatient or day case review (a total of 1519 days). The mortality for the RRT group were as follows:- HD 23%, PD 26%, HHD 0% and renal transplant 22%.

Conclusion: Our study demonstrated a higher mortality rate in CKD G5 patients who are not yet on RRT or chose not to when compare to those that have started RRT. It also highlighted 100 percent survival in the home haemodialysis group in the period studied. Stoke comorbidity grade was similar in all groups apart from PD which has the best comorbidity grade 0. The mortality rate worsened as the eGFR dropeed to 10 ml/min or below for those not on RRT. This study suggest earlier RRT may be better before the eGFR reaches 10ml/min or below.

Disclosure of Interest: None Declared

Keywords: None

Cystic Diseases

PO-092

Autosomal Recessive Polycystic Kidney Disease (ARPKD) in the UK National Registry of Rare Kidney Diseases (RaDaR)

M. Kokocinska [1,*], L. Kerecuk [1], M. Dillon [2], T. Harris [3]

[1]Nephrology, Birmingham Children's Hospital, [2]Programme Development Officer for RaDaR and Think Kidneys UK Renal Registry, RaDaR and Think Kidneys UK Renal Registry, Birmingham, [3]Polycystic Kidney Disease Charity, Polycystic Kidney Disease Charity, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Autosomal recessive polycystic kidney disease (ARPKD) is a rare genetic condition that causes cysts to develop in the liver and kidneys. It is usually first diagnosed in infancy and affects approximately 1 in 20,000 live births. It is distributed amongst boys and girls and can cause death in the first month of life. As the condition has multisystem effects, a comprehensive care strategy requires a multidisciplinary team and detailed data collection. This abstract describes data collected by the ARPKD Rare Disease Group via the National Registry of Rare Kidney Diseases (RaDaR) in the UK.

Objectives: The ARPKD rare disease group (RDG) use RaDaR to provide patients with information and to build a communication network for those affected by the condition. This is done via the patient-focused website RareRenal.org, in partnership with the PKD Charity. The RDG supports patients by organising family information days where the latest advancements in treatment are discussed and patients can meet with others affected by ARPKD. The RDG use the RaDaR data to study the progression of ARPKD in collaboration with international groups such as US-based Hepato/Renal Fibrocystic Diseases Core Center (UAB HRFDCC) and European web-based ARPKD Registry ARegPKD. RaDaR provides a ready cohort of ARPKD patients who can be approached for future research into this condition: from observational to interventional studies.

Methods: Data is entered retrospectively from the patient's medical records following consent. The dataset is defined by the UK Renal Registry in association with over 25 Rare Disease Groups, made up of experts in each eligible condition. Data fields include demographics, blood and urine results, medications, transplant and dialysis history, genetics and co-morbidities. ARPKD-specific data fields were designed in conjunction with the PKD Charity who is a key supporter of RaDaR. This includes data fields for liver transplants as a joint kidney-liver transplant is sometimes required for ARPKD patients. The inclusion criteria cover all ARPKD patients including those with Congenital Hepatic Fibrosis and Caroli Syndrome with kidney malformation or cysts, allowing for comparisons between a long-term survivor subset and a cohort that includes neonatal survivors.

Results: 108 ARPKD patients from 31 UK renal units have been consented to date, with an age range of 1 week to 65 years. There are 54 (50%) paediatric (under 16) patients with an average age of 8 years and 54 (50%) adult patients with an average age of 39 years. There are 50 females (46%) and 58 males (54%) males. The first paediatric patient was recruited in October 2012 and the first adult patient in August 2013.

Conclusion: RaDaR holds the largest single cohort of ARPKD patients collected to date in the UK. It provides important epidemiology data on ARPKD patients which is shared amongst the members of the Rare Disease Group to progress further research into this rare disorder, develop best practice treatment guidelines and improve the quality of care for these patients.

Disclosure of Interest: None Declared

Keywords: ARPKD, Patient/carer involvement

Cystic Diseases

PO-093

Biliary tract and liver complications in patients with polycystic kidney disease: a 1000 patient case series and 23,000 patient disease-association study

C. H. Harper [1,*], P. K. Judge [1], B. C. Storey [1], R. Haynes [1], M. J. Wilcock [2], N. Staplin [3], R. Goldacre [4], C. Baigent [1], J. Collier [5], M. Goldacre [4], M. J. Landray [4], C. G. Winearls [2], W. G. Herrington [3]

[1]Medical Research Council-Population Health Research Unit (MRC-PHRU), Nuffield Department of Population Health (NDPH), University of Oxford, [2]Oxford Kidney Unit, Oxford University Hospitals NHS Foundation Trust, [3]Clinical Trial Service Unit and Epidemiological Studies Unit (CTSU), NDPH, [4]Big Data Institute, NDPH, University of Oxford, [5]Department of Gastroenterology, Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Unlike polycystic liver disease, biliary tract disease is not a well-recognised manifestation of autosomal dominant polycystic kidney disease (PKD). At our tertiary centre 35 patients with autosomal dominant PKD had repeated hospitalisations for biliary tract disease.

Objectives: We reviewed our single-centre experience of such complications and then tested the hypothesis that biliary tract disease is more common in PKD using anonymised linked all-England Hospital Episode Statistics (1998-2012).

Methods: *Case series*

Medical records of all patients with autosomal dominant PKD treated at Oxford Kidney Unit (1967-2015) were reviewed. Information on all biliary tract or serious liver complications was collected.

Disease-association study

Comparisons of hospitalisation rates among people with presumed autosomal dominant PKD versus those without (general population hospital controls, and patients receiving maintenance renal replacement therapy [RRT]) were made for biliary tract disease, serious liver complications and a range of other known PKD manifestations (after adjustment for potential confounders).

Results: *Case series*

35/1,007 patients with autosomal dominant PKD developed biliary tract disease (mostly cholecystitis and recurrent cholangitis) and/or a serious liver complication (mostly liver cyst infections). Women appeared more likely to develop serious liver complications (women 10/522 versus men 1/485; p=0.009).

Disease-association study

23,454 subjects with presumed autosomal dominant PKD and 6,412,754 hospital controls were identified. Compared to non-PKD hospital controls, increased rates of admission for known PKD manifestations were confirmed. Rates in those with PKD were also 2.2-times higher for biliary tract disease (PKD vs non-PKD 2,617 [1.31%/yr] vs 319,621 [0.59%/yr], rate ratio [RR] 2.24, 95% confidence interval 2.16-2.33) and 4.7-times higher for serious liver complications (PKD vs non-PKD 767 [0.31%/yr] vs 37,232 [0.07%], RR 4.67, 4.35-5.02). When analyses were restricted to those receiving maintenance RRT, although RRs attenuated, PKD remained positively associated with biliary tract disease (PKD vs non-PKD 494 [1.92%/yr] vs 4,014 [1.61%/yr], RR 1.19, 1.08-1.31) and serious liver complications (PKD vs non-PKD 197 [0.70%/yr] vs 1,561 [0.62%/yr], RR 1.15, 0.98-1.33). PKD versus non-PKD RRs for biliary tract disease were similar in both sexes (heterogeneity p=0.22), but RRs for serious liver complications were higher in women (109 [0.85%/yr] vs 539 [0.55%/yr], RR 1.55, 1.25-1.91) than in men (88 [0.58%/yr] vs 1,022 [0.66%/yr], RR 0.88, 0.70-1.09; heterogeneity p<0.001).

Conclusion: Biliary tract disease appears to be an important and distinct extra-renal complication of PKD that is presently under-recognised.

Disclosure of Interest: None Declared

Keywords: ADPKD, Epidemiology

Cystic Diseases

PO-094

Delivery of Tolvaptan to an Autosomal Polycystic Kidney Disease Population: Identification of Eligible Patients and Initiation of Therapy at a Tertiary Renal Centre

S. McPhail [1,*], P. Abernethy [2], A. Connor [1]

[1]Renal, [2]Radiology, PLYMOUTH HOSPITALS NHS TRUST, Plymouth, United Kingdom

Preferred Presentation Method: Poster

Introduction: Tolvaptan was approved by the National Institute for Health and Care Excellence (NICE) for the treatment of selected patients with Autosomal Dominant Polycystic Kidney Disease (ADPKD) in 2015. Practical guidance to facilitate identification of eligible patients followed from the Renal Association (RA) in 2016. We report our experience of applying the RA guidance[1] to our local ADPKD population.

Objectives: Identification of all ADPKD patients eligible, or potentially eligible, for tolvaptan therapy according to RA guidance[1] through assessment of existing eGFR and imaging data.

Methods: The electronic patient records system (VitalData) was searched for living ADPKD patients previously or presently under the care of the renal service. Dialysis and transplanted patients were excluded. The following data was collected for each patient: age; under active follow up or discharged; named consultant; serial eGFR results (or lack of availability); and, existing renal imaging (which was retrospectively reviewed by a radiologist to provide renal length data (rather than volume)). Potential eligibility of individual patients was then determined against the criteria proposed by the RA[1].

Results: We identified 94 living ADPKD patients with native renal function. A total of 62/94 (66%) had sufficient biochemical and/or radiological results to enable assessment of suitability for Tolvaptan, of which 35/62 (56%) were considered eligible. Ten of the 35 eligible patients (29%) were already on treatment; of the remaining 25 potentially eligible patients, 17 (68%) remained under follow up (often annual, sometimes even less frequent) whilst 8 (32%) had been discharged from the service.

Conclusion: The RA guidance proved practical and easy to apply in the 'real life' setting. Consultant review of those patients under follow up but not on treatment will now be expedited. We plan to write to the General Practitioners of those eligible patients not under active follow up to suggest re-referral and to those with insufficient biochemistry to suggest repeat testing to assess eligibility (existing data suggests approximately 20% of these will be eligible).

The data was presented locally to inform discussion around service development. The identification of a significant number of eligible patients and the need for close follow up suggests a specialist clinic, possibly run by nursing staff, may be appropriate for monitoring of therapy.

Finally, we plan to use this data to highlight the emergence of Tolvaptan to General Practitioners and encourage referral of all ADPKD patients.

References: 1. Ong, A., Ashley, C., Sandford, R., Sayer, J., Simms, R. and Wood, G. (2016). *Tolvaptan for ADPKD: Interpreting the NICE Decision*. Renal Association Working Group on Tolvaptan in ADPKD. Available at: http://www.renal.org/docs/default-source/guidelines-resources/other-guidlines/tolvaptan_in_adpkd-rawg2015_commentary-060516clean.pdf?sfvrsn=0 [Accessed 11 Jan. 2017].

Disclosure of Interest: None Declared

Keywords: ADPKD, Cystic kidney disease, eGFR

Cystic Diseases

PO-095

One year experience of prescribing Tolvaptan for Autosomal Dominant Polycystic Kidney Disease

M. Vernon [1,*], S. Arshad [1], C. Dunnigan [2], N. Turner [2]

[1]Renal Medicine, NHS Lothian, [2]Renal Medicine, University of Edinburgh, Edinburgh, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Tolvaptan is now licensed for treatment of PKD with 'high risk' of progression. Providing it requires identification of patients, advice, prescribing, and monthly test monitoring for a growing patient group.

Objectives: Identify eligible patients and establish a sustainable service for counselling, prescribing and monitoring Tolvaptan.

Methods: We made assumptions from incidence of ESRF caused by PKD, and reviewed our own database to determine possible eligibility, or need for further investigations. We used this to derive a protocol for identification of eligible patients (**bit.ly/pkdedren**), and estimated workforce and capacity resources required. A multidisciplinary 'high risk' ADPKD clinic commenced March 2016.

Image:

Results: We send out advance information then review an average of 6 new patients each month. Drugs (starting dose and first increment) are dispensed at the same visit. Review at 4 weeks is followed by nurse practitioner and pharmacist oversight of dose increments, LFT monitoring, and long term prescribing. Medical review is carried out 6 monthly and as needed. When stable, patients are referred back to their usual consultant.

By Jan 2017, 49 patients had been reviewed. 3 elected not to commence treatment and 2 deferred. Polyuria and thirst, initially often dramatic, were universal, but usually found tolerable with time. 8 have stopped treatment, 7 because of polyuria, one because of abnormal LFTs at week 6. Almost all those prescribed the drug in the PKD clinic were tolerating the top dose (90/30). 11 additional patients were receiving the drug in research studies, bringing the current prevalence of prescribing to approx 45 per million pop (pmp).

Estimates of numbers of patients, staff resources and imaging required proved reasonably accurate.

Conclusion: Tolvaptan is being accepted and tolerated by the majority of patients to whom it is offered. Numbers could rise towards 80-100 pmp in Scotland, where CKD1 is included. In most UK centres, initiation, early prescription, and oversight of long-term monitoring is likely to be most effectively undertaken through a specialist clinic.

Disclosure of Interest: M. Vernon Conflict with: Otsuka Pharmaceuticals, S. Arshad: None Declared, C. Dunnigan: None Declared, N. Turner Conflict with: Otsuka Pharmaceuticals

Keywords: ADPKD, Clinical quality improvement

Cystic Diseases

PO-096

A Single centre experience of initiating Tolvaptan to slow progression in Autosomal Dominant Polycystic Kidney Disease (ADPKD). Developing a pharmacist led drug education clinic.

G. Wood [1,*], E. Lamerton [1], J. Allen [1]

[1]Renal Unit, SALFORD ROYAL HOSPITAL, Manchester, United Kingdom

Preferred Presentation Method: Oral

Introduction: ADPKD is a common cause of ESRD and need for renal transplantation or dialysis.
Tolvapatan is not a new drug, however in May 2015 JINARC® (tolvaptan) became the first approved pharmaceutical therapy available in Europe for patients with autosomal dominant polycystic kidney disease (ADPKD) that targets underlying pathophysiology of the disease. In Oct 2015 NICE approved Tolvaptan for prevention of progression in CKD 2-3 with rapid progression. In 2016 UK Renal Association (RA) issued guidelines defining rapid progression.

Objectives: UK Tolvaptan uptake has been variable. Use, tolerance of side effects and short term outcomes in routine clinical setting may vary compared to experience in clinical trials. Drug education, dose titration and increased monitoring for risk management are all significant challenges. This paper is to document early experience of applying an new innovative treatment in the clinical setting.

Methods: We have developed a pharmacy led multidisciplinary service embedded within our existing dedicated ADPKD clinic. We present initial experience of identifying eligible patients, uptake of therapy, dose titration, patient tolerance and outcomes.

Results: Annually 250 patients (with eGFR >20) attend the ADPKD clinic. Modelling suggested 80-90 patients would fit RA guidelines for tolvaptan eligibility. Patient eligibility was identified in the post clinic MDT. Patients with GFR trending to stage 4 were prioritised. Patients were invited by post and given printed tolvaptan information. Patients were invited to phone and book into a dedicated drug education session with the renal pharmacist.
Not all eligible patients were suitable for treatment because of medical contraindications. 32 Eligible patients have been invited so far. Most patients chose to receive drug education before their next routine clinic appointment. >90% patients chose to start treatment at the initial drug education meeting. Patients were dose titrated and monitored by the pharmacy team. Once dosing was stabilised patients were followed in the clinic monthly for clinical and liver function monitoring.
Patient Outcomes
5 Did not respond to invitation but have clinic appointments pending.
2 Received information and declined treatment.
2 Did not wish to start because of current lifestyle but would consider later on in disease process.
23 patients have commenced treatment.
2 commenced treatment and have discontinued (menorrhagia, exacerbation of medical condition). Dropout rate 13% vs 21% in Tempo trial.
Many patients have had significant improvements in renal pain. Some had not noticed how severe symptoms had been until being on treatment.

Conclusion: A multidisciplinary forum is a key to reviewing patient suitability and eligibility. Invitation for drug education by post has led to high patient uptake. A pharmacy led model of drug education and initiation has led to a lower drop-out rate compared to trail data. Tolvaptan treatment appears well tolerated in the majority of patients. Early improvement in pain symptoms is a notable feature and requires further evaluation.

References: 1. Otsuka Pharmaceuticals UK. Jinarc Summary of Product Characteristics. 2015.
2. Torres VE, Chapman AB, Devuyst O, et al Tolvaptan in patients with ADPKD. N Engl J Med 2012; 367: 2407-2418.

Disclosure of Interest: None Declared

Keywords: ADPKD, CKD Progression, Qualitative study

Cystic Diseases
PO-097
Autosomal Dominant Polycystic Kidney Disease (ADPKD) in the UK National Registry of Rare Kidney Diseases (RaDaR)

R. Sandford [1,*], A. Ong [2], M. Dillon [3], T. Harris [4] and UK ADPKD Clinical Study Group
[1]Academic Department of Medical Genetics, Cambridge University, Cambridge, [2]Department of Infection Immunity & Cardiovascular Disease, University of Sheffield, Sheffield, [3]The National Registry of Rare Kidney Disease (RaDaR), UK Renal Registry, Birmingham, [4]PKD Charity, London, United Kingdom

Preferred Presentation Method: Poster
Introduction: The UK National Registry of Rare Kidney Diseases (RaDaR) is an initiative established by the Renal Association to improve our understanding of how these conditions affect individuals and facilitate research. Whilst controversy exists about the population prevalence of ADPKD recent figures suggest <5 in 10,000, below the threshold for a rare disease in the EU. Worldwide, registry data is largely confined to the ADPKD population that has developed end-stage renal disease where is accounts for ~10% of individuals receiving renal replacement therapy including transplantation. As the condition is multisystem and affects all ages, a comprehensive description of the natural history of the disease whilst renal function is preserved, from an early age, is required to guide clinical management, research and the development of novel therapies. This abstract describes the data collected by the ADPKD group of RaDaR in its first year of patient recruitment
Objectives: The ADPKD clinical study group are using RaDaR to comprehensively define the natural history of ADPKD and facilitate research and clinical trials recruitment. Using UK wide data collection via RaDaR and strategic interaction with the PKD Charity a large prospective cohort of patients is being developed that may also be approached for future research. The main objectives are to develop best practice guidelines, to provide better evidence-based patient information and support and to support research, in collaboration with international groups, into basic science, disease progression models and clinical trials.
Methods: Patients are recruited to RaDaR according to existing study protocols employed for over 30 rare renal diseases (www.RareRenal.org). Inclusion criteria for ADPKD include a clinical or molecular diagnosis according to established criteria. A predefined and comprehensive dataset developed with the UK Renal Registry and disease experts is employed including demographics, routine laboratory measurements, imaging, family history, genetics and co-morbidities.
Results: 2026 ADPKD patients from 53 UK hospitals have been recruited to date. The male to female ratio is 0.92:1. The average age is 52 years for both men and women with a range from 1 year to 90 years. 50 patients are under the age of 18 years with a male to female ratio of 1.43:1. Recruitment started in 2016. Additional analyses are in progress.
Conclusion: The ADPKD RaDaR registry is rapidly becoming one of the largest observational studies of ADPKD. It will serve as a platform to guide further epidemiological, clinical, genetic and laboratory studies and to rapidly identify individuals suitable for interventional studies. Using the resources of the NHS it will be able to accurately define the natural history of ADPKD and allow the development of best practice guidelines for care and treatment. Initial priorities will be to ensure data completeness and the recruitment of a representative cohort of patients at all stages of disease. Longer term goals will include the establishment of a disease specific biobank.

Disclosure of Interest: None Declared

Keywords: ADPKD

Cystic Diseases

PO-098

Retrospective Analysis of Urine Specific Gravity as a measure of vasopressin suppression in ADPKD Patients at a specialist Renal Genetics Clinic

R. El-Damanawi [1,*], A. Sarker [1], C. Robinson [1], R. Sandford [1], T. Hiemstra [1], F. Karet Frankl [1]

[1]Renal Medicine, UNIVERSITY OF CAMBRIDGE, Cambridge, United Kingdom

Preferred Presentation Method: Oral

Introduction: Kidney function decline in Autosomal Dominant Polycystic Kidney Disease (ADPKD) is promoted by vasopressin and attenuated by vasopressin receptor blockade (VRB). High water intake presents a viable alternative to VRB by suppressing vasopressin release. Animal studies support this hypothesis but human data are lacking. Yet, most patients are advised to maintain high water intake. We performed a cohort study to determine the effect of high water intake advice on urine specific gravity (uSG), a surrogate for vasopressin suppression. ≤1.010.

Objectives: To assess patient adherence to high water intake advice

Methods: We performed a single-centre retrospective analysis of all ADPKD patients referred to our specialist renal genetics clinic between 2013-2015. We collected data on baseline characteristics from electronic healthcare records and patient notes. High water intake advice was introduced at our centre in 2013. We assessed the impact of this advice by comparing uSG results between the first visit and follow-up visit.

Image:

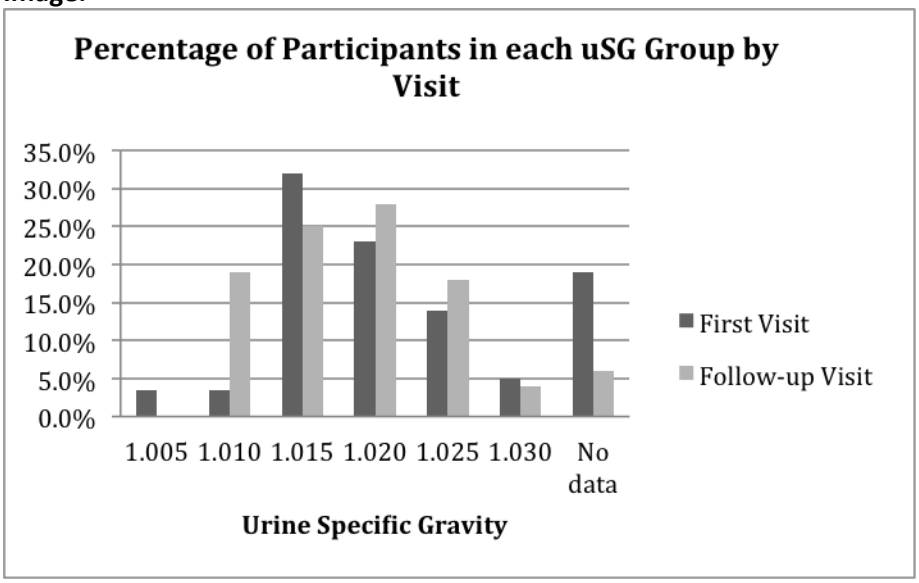


Table:

	First Visit (n=56)	**Follow-up Visit (n=28)**	**P value**
Blood Pressure (BP) -Mean systolic BP (SD) -Mean diastolic BP (SD)	 132.4±17.6 75.1±11.1	 135.2±16.8 79.8±9.5	 *0.521 3* *0.070 7*
Mean eGFR (SD)	73.7±25.2	72.0±27.8	*0.914*
Mean Creatinine	100.8±58.7	111.3±73.9	*0.673*

			6

Table: Difference between the first visit and follow-up visit in blood pressure, renal function and presence of haematuria.

Results: Data were available for 56 patients (39 (70%) *PKD1*; 7 (13%) *PKD2*; 10 (17%) mutation unknown). Age at referral was 40±14 years, and mean age at diagnosis was 31±15 years. Most (40/56, 71%) were White British, 27/56 (48%) were female, and 43 (77%) had a positive family history of ADPKD. At first visit, the mean blood pressure was 132±18/75±11 mmHg, and 19 (34%) were on renin-angiotensin blockade. The mean eGFR at baseline was 74±25 ml/min/1.73m^2.
Follow up visit data were only available for 28/56 patients. At the first visit, only 4 patients (7%) had an uSG below the target threshold for vasopressin suppression (≤1.010); despite receiving fluid intake advice, this did not change significantly at the follow-up visit (5 (9%), p=0.269).The figure shows the distribution of uSG by visit. Blood pressure and kidney function did not change over time (Table).

Conclusion: We did not identify a significant reduction in uSG after hydration advice in a cohort of patients with ADPKD. For high water intake to be considered a viable alternative to VRB, sufficient adherence to water intake advise must be demonstrated. There is a need for additional measures to improve adherence to fluid intake advice.

Disclosure of Interest: None Declared

Keywords: ADPKD, CKD Progression, Clinical trial

Cystic Diseases

PO-099

Determining Feasibility of Randomisation to high versus ad libitum water intake in Polycystic Kidney Disease: The DRINK Feasibility Trial

R. El-Damanawi [1,*], T. Harris [2], F. Karet Frankl [1], R. Sandford [1], M. Lee [3], S. Klager [4], S. Bond [4], I. Wilkinson [5], T. Hiemstra [1]
[1]Renal Medicine, UNIVERSITY OF CAMBRIDGE, Cambridge, [2]PKD Charity, PKD Charity, London, [3]Division of Anaesthesia, UNIVERSITY OF CAMBRIDGE, [4]Cambridge Clinical Trials Unit, CCTU, [5]Department of Experimental Medicine and Immunotherapeutics, UNIVERSITY OF CAMBRIDGE, Cambridge, United Kingdom

Preferred Presentation Method: Oral or Poster

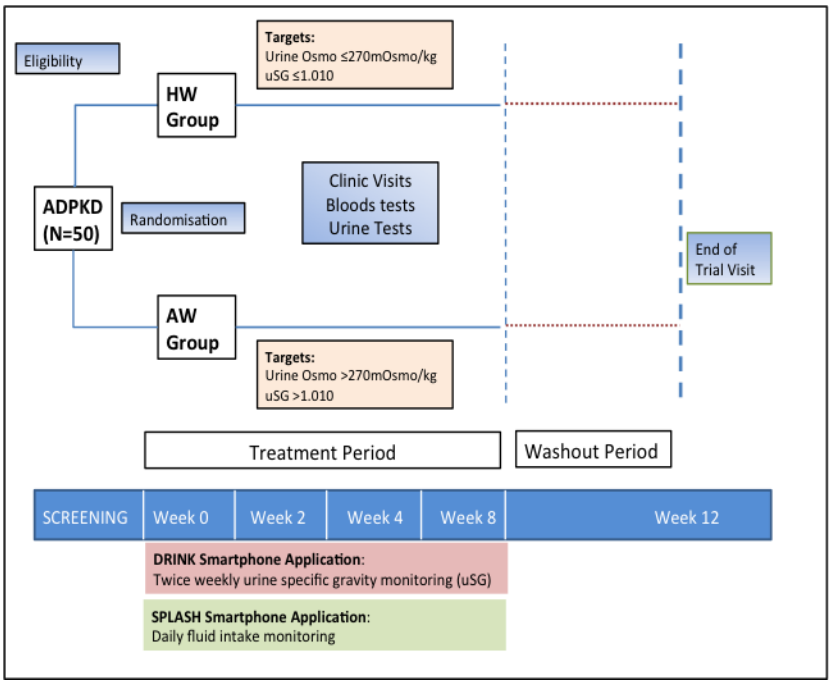
Introduction: Autosomal Dominant Polycystic Kidney Disease (ADPKD) is the fourth commonest global cause of dialysis-dependent renal failure. Despite early patient engagement with renal services the disease course has remained largely unchanged. Tolvaptan is the only approved disease-modifying drug for PKD. However its effect is modest and associated with a high patient discontinuation rate. *High water intake* also suppresses vasopressin and has been shown in animal studies to slow disease progression. A trial evaluating the effect on kidney function of high water intake is urgently needed. However, it is unclear whether a randomised trial of high water intake in ADPKD is feasible.

Objectives: To determine the feasibility of a randomised high water intake trial in patients with ADPKD.

Methods: DRINK is a single centre, open-label, parallel group randomised controlled feasibility trial. 50 participants will be randomised to high (HW group) or ad libitum (AW group) water intake. The HW group will receive a personalised daily water prescription sufficient to achieve vasopressin suppression (evidenced by a urine osmolality ≤270mOsmo/kg or specific gravity ≤1.010). Fluid consumption in the AW group will be guided by thirst alone. The duration of participation will be 12 weeks. The trial will answer the following feasibility questions: 1) recruitment rate, 2) adherence (achievement of urine dilution targets), 3) evidence of contamination between arms (clustering), 4) safety and tolerability, and 5) health-related quality of life.

DRINK will use smartphone applications to allow patients to input home-monitored urine specific gravity (measured twice weekly), and (using near-field communication) to automate fluid intake monitoring. The impact of app-based data capture and intake guidance will be evaluated.

Image:



Results: DRINK is actively recruiting and we hope to complete the trial by September 2017.

Conclusion: A trial of high water intake in ADPKD presents several challenges, including adherence, and the risk of contamination between trial arms. Contamination is a concern given interaction between affected members of the same family participating in ADPKD trials. Within-family randomisation may lead to contamination. Cluster randomisation may prevent this but at the cost of decreased power. The DRINK feasibility trial will address these concerns, and will also explore the use of smartphone applications to facilitate data capture and adherence.

Disclosure of Interest: None Declared

Keywords: ADPKD, Clinical trial, Nutrition

Diabetic Nephropathy

PO-100

Measuring and improving insulin sensitivity in the podocyte

M. Graham [1,*], K. Garner [1], V. Betin [1], V. Pinto [1], F. Barrington [1], J. Hurcombe [1], A. Lay [1], K. Heesom [2], G. Welsh [1], C. McArdle [3], R. Coward [1]

[1]Bristol Renal, [2]Proteomics Facility, [3]Laboratories for Integrative Neuroscience and Endocrinology , University of Bristol, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The podocyte is an insulin-responsive cell and when its sensitivity is lost this results in kidney disease that mimics features of diabetic nephropathy (DN). High-throughput in vitro measures of insulin sensitivity of the podocyte would allow for efficient screening of insulin-sensitizing drugs which might protect against DN.

Objectives: This project seeks to establish in-vitro high-throughput measures of insulin sensitivity to predict insulin sensitivity of these cells and to compound screen insulin-sensitizing drugs. Using these techniques, we sort to explore the effect of knocking down negative regulators of the insulin signalling pathway, the effect of overexpressing the insulin receptor and how podocytes exposed to diabetic cell culture media respond within these assays.

Methods: Using short hairpin RNA two independent podocyte knockdown cell lines of negative regulators of insulin sensitivity were generated, one which had reduced levels of PTP1B and the other with reduced levels of PTEN. An additional stable cell line of podocytes overexpressing the insulin receptor (Isoform B) was also generated. To measure the downstream phosphorylation events of the insulin signaling cascade we used the IN-Cell analyser 1000 (GE healthcare) in combination with western blotting. We initially screened these cells using phospho-proteomics to identify key molecular changes associated with insulin signalling.

Results: Phosphoproteomics revealed pAS160 [S588] and pAKT[473] as robust molecular events in insulin signalling in the podocyte. Encouragingly these phosphorylation events could be easily detected using the IN-Cell analyser. We have shown that cells overexpressing the insulin receptor require less insulin to elicit an increase in these phospho-protein readouts.

We observed an increase in the level of AS160 phosphorylation [S588] in response to 100nM of insulin for 15 minutes. This response was increased with PTP1B knockdown, with a trend towards an increase with PTEN knockdown. This response was lost when podocytes were exposed to diabetic cell culture media conditions.

Conclusion: Within the podocyte, AS160 and AKT phosphorylation are good molecular markers of insulin sensitivity. These are easy to assay in the podocyte using in the IN Cell analyser and will be helpful in compound screening to identify podocyte insulin sensitising compounds in the future.

Disclosure of Interest: None Declared

Keywords: Diabetic nephropathy, Podocyte, Proteomics

Diabetic Nephropathy

PO-101

Mucuna pruriens Leaf Extracts Mediate Antidiabetic Properties via Multiple Mechanisms

O.-O. Akpoveso [1], G. Olivier [1], P. Chatterjee [1,*]

[1]School of Pharmacy & Biomolecular Sciences, Huxley Building, UNIVERSITY OF BRIGHTON, Brighton, United Kingdom

Preferred Presentation Method: Poster

Introduction: *Mucuna pruriens* leaf and seed extracts are often used as herbal remedies for local treatment of diabetes and some other conditions in Asia and Africa where aqueous *Mucuna pruriens* leaf extract (MPLE) is often drunk as a tea preparation (Lampariello *et al.*, 2012). The exact mechanisms by which these extracts produce their antidiabetic actions (e.g. hypoglycaemic effects) remain to be fully elucidated.

Objectives: The aim of this study was to investigate potential mechanisms by which an aqueous MPLE may be beneficial for the treatment of diabetes and its complications, e.g. diabetic kidney disease.

Methods: *Mucuna pruriens* leaves were collected from Anambra state in eastern Nigeria and characterised (specimen ID InterCEDD-16018). MPLE was prepared by boiling the leaves for 15 min in distilled water followed by freeze drying. For experiments, solid extracts were solubilised as required and tested on two different physiological systems relevant to diabetes. Specifically, (i) the reactive oxygen species (ROS)-scavenging effect of MPLE (0-300 mcg/mL) was investigated in a cell-free xanthine/xanthine oxidase (X/XO) superoxide anion generating system and compared with the antioxidant tempol (80 mcg/mL, 0.5 mM) and (ii) the effects of MPLE (0-100 mcg/mL) on glucose uptake into the rat renal proximal tubular NRK-52E cell-line was also investigated. Glucose uptake into confluent NRK-52E cells was measured using the fluorescent glucose analogue 2-(*N*-(7-Nitrobenz-2-oxa-1,3-diazol-4-yl)Amino)-2-Deoxyglucose) (2-NBDG, 0.4mM). The effects of MPLE were compared to that produced by glucose transport inhibitor phloridzin (PDZ, 500 mcg/mL, 1 mM).

Table: Effects of MPLE on ROS-scavenging activity using a X/XO superoxide anion generating system (Table 1A) and on 2-NBDG uptake into NRK-52E cells (Table 1B).

A. X/XO assay	**% Superoxide scavenging activity**	**B. 2-NBDG uptake into NRK-52E cells**	**Fluorescence (arbitrary units)**
20 mcg/mL MPLE	20.3 ± 4.06	Blank (0 mM 2-NBDG)	216 ± 28 #
60 mcg/mL MPLE	86.6 ± 1.25 «	0.4 mM 2-NBDG only	3936 ± 707 $
300 mcg/mL MPLE	96.7 ± 2.86 «	+ 100 mcg/mL MPLE	2503 ± 273 # $
80 mcg/mL Tempol	95.5 ± 1.65 «	+ 500 mcg/mL PDZ	2235 ± 499 # $

Table 1: Data shown as mean ± SD, «*P*<0.05 *vs.* 20 mcg/mL MPLE, N=8, #*P*<0.05 *vs.* 2-NBDG only, N=8, $*P*<0.05 *vs.* Blank (0 mM 2-NBDG), N=8, analysed using one-way ANOVA followed by a Bonferroni's post-test.

Results: Aqueous MPLE at a concentration of 300 mcg/mL demonstrated significant ROS-scavenging activity in the X/XO superoxide anion generating system, with the net scavenging activity after 20 minutes of 96.7 ± 2.86% (Table 1A). This was comparable to the ROS-scavenging effects of Tempol at 80 mcg/mL (0.5 mM) (95.5 ± 1.65%). In renal NRK-52E cells, 100 mcg/mL MPLE produced a significant reduction in 2-NBDG uptake from 3936 ± 707 to 2503 ± 273 arbitrary units (AU) (Table 1B) which was comparable to that obtained using the glucose transport inhibitor PDZ (500mcg/mL, 1 mM) (2235 ± 499 AU).

Conclusion: These results demonstrate, for the first time, that aqueous extracts of *Mucuna pruriens* may produce their antidiabetic effects via two distinct mechanisms, specifically, via ROS-scavenging and by reduction of glucose uptake into renal cells. Both mechanisms suggest a potential beneficial effect of MPLE against diabetic kidney disease. Further studies are continuing to identify the active components of MPLE which may mediate these effects.

References: Lampariello LR, Cortelazzo A, Guerranti R, Sticozzi C, Valacchi G. The Magic Velvet Bean of Mucuna pruriens. *J Tradit Complement Med.* 2012 2:331-339

Disclosure of Interest: None Declared

Keywords: Diabetes, Diabetic nephropathy, Tubular epithelial cell

Diabetic Nephropathy

PO-102

Strong Association of Non-Alcoholic Fatty Liver Disease with Cardiovascular outcomes in Diabetic Nephropathy

R. Chinnadurai [1,*], D. Green [1], J. Ritchie [1], P. Kalra [1]

[1]Department of Renal Medicine, Salford Royal NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Non-Alcoholic Fatty Liver Disease(NAFLD) is extremely common in people with type 2 diabetes and is associated with a higher prevalence of Cardiovascular Disease(CVD)[1]. The association between NAFLD and CVD appears to be independent of classical risk factors, glycaemic control, medications, and presence of the metabolic syndrome. The strength of this association in CKD has not been examined.

Objectives: To study the association of NAFLD on Cardiovascular Outcomes in a cohort of patients with Diabetic Nephropathy.

Methods: All patients recruited in the Salford Kidney Study (SKS) who had an Ultrasound (US) of the liver performed between January 2000 to December 2014 were sampled in this retrospective observational study. Follow up data on Major Cardiovascular Events (MACE) (Non-Fatal Myocardial Infarction, Acute Coronary Syndrome, Congestive Cardiac Failure, Cerebrovascular Accidents, Peripheral Vascular Disease) was collected for all patients from the date of Ultrasound (study start date), until the study end which included commencing Renal Replacement Therapy (RRT), reaching eGFR < 10 ml/min in conservatively managed patients, loss to follow up or Death. Data was obtained from electronic patient records including baseline patient characteristics and blood results. A subgroup analysis was undertaken, involving patients with a primary diagnosis code of Diabetic Nephropathy using SPSS software.

Image:

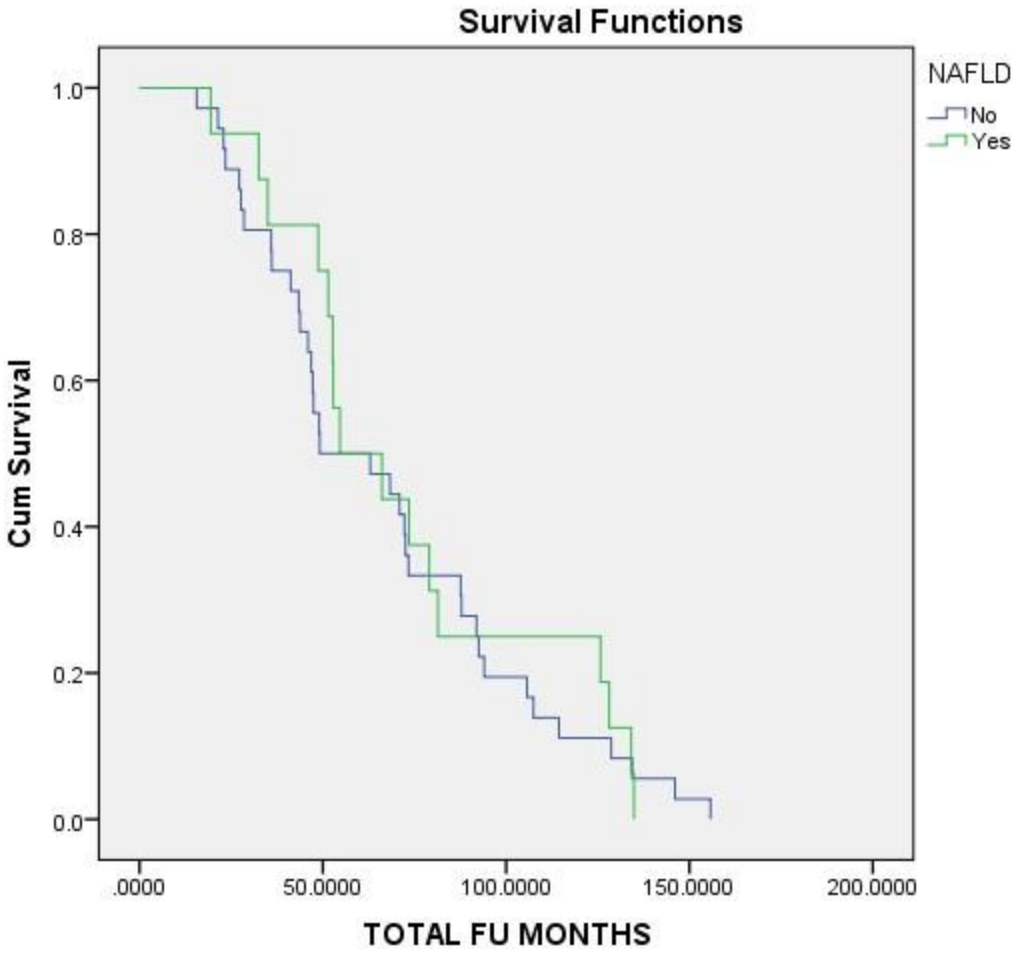


Table:

Cox-Regression Multivariate Model	p-Value	HR (95% CI)
NAFLD	0.03	2.97(1.16-7.89)
H/o HT at Baseline	0.76	1.32(0.23-7.71)
H/o HC at Baseline	0.23	0.52(0.18-1.50)
H/o IHD at baseline	0.02	3.18(1.21-8.38)

Results: Of the 3061 patients registered in the SKS, 1419 patients had a liver US during the study period. After screening for exclusion criteria (eg liver disease from other cause), 852 patients (183-NAFLD, 669-Normal US) were available with complete datasets, of which 149 (17.5%) had diabetic nephropathy. At baseline, median eGFR (CKD-EPI) was 31.6ml/min/1.73m^2, Urine Protein creatinine ratio 30 g/mol and HBA1C was 57.3 mmol/mol.

Of the 149 patients, 48 (32%) had NAFLD and 101 (68%) a normal ultrasound. The groups were similar in terms of age and sex distribution. Patients with NAFLD were more likely to have higher BMI, hypertension(HT), hypercholesterolemia(HC) and Ischemic Heart Disease(IHD)($p<0.05$). Median Follow up time was 69 months, similar in both groups ($p=0.09$). A total of 20 (41.7%) MACE were recorded in the NAFLD group compared to 14(13.9%) in the normal US group.

Multivariate Cox-Regression Models showed NAFLD as an independent risk factor (HR 2.97, $p<0.05$) for MACE even after including all components of the Metabolic Syndrome and Cardiovascular risks parameters in the model (Table).There was no significant difference in survival between the two groups over the follow-up period ($p>0.05$) as shown in Kaplan-Meyer Survival Curve.(Image).

Conclusion: In our cohort of advanced CKD, NAFLD showed a strong independent association with CVD in patients with Diabetic Nephropathy, although it was not significantly associated with all-cause mortality. Further analysis will study the association of NAFLD with CKD progression.

References: 1.Targher, G, Bertolini, L, Padovani, R et al. Prevalence of Nonalcoholic Fatty Liver Disease and Its Association With Cardiovascular Disease Among Type 2 Diabetic Patients.Diabetes Care 30:1212–1218, 2007

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Diabetes

Diabetic Nephropathy

PO-103

Mechanisms of renal proximal tubular cell injury and tubulointerstitial fibrosis induced by hyperglycaemia

F. Alsehli [1,*], N. Ahmed [1], L. Shalamanova [1]

[1]School of Healthcare Science, MANCHESTER METROPOLITAN UNIVERSITY, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Renal tubulointerstitial fibrosis (TIF) is the hallmark of chronic kidney disease and results in end-stage renal disease (ESRD) that requires costly dialysis and transplantation. The excessive deposition of extracellular matrix (ECM) in TIF causes thickening of basement membranes, disruption of normal cell-to-cell interactions and loss of tissue elasticity thus leading to the destruction of the renal tubules. Diabetes can cause diabetic nephropathy which is characterised by ECM accumulation in the glomerular mesangium and tubulointerstitium mediated by the key pro-fibrotic cytokine TGF-β1. The aim of this study was to determine the effect of hyperglycaemia on markers of renal proximal tubular epithelial cell (RPTEC) injury and metabolic activity.

Objectives: The aim of this study was to determine the effect of hyperglycaemia on markers of renal proximal tubular epithelial cell (RPTEC) injury and metabolic activity

Methods: Immortalised human RPTEC lines (HK-2 cells) were exposed to different concentrations of glucose (5, 25, 30mM D-glucose and 5mM D-glucose+25mM L-glucose) for up to 48h. Glucose consumption, scratch wound healing, and TGF-β1, endostatin and KIM-1/TIM-1 ELISA tests were carried out

Results: Reduced glucose consumption was observed at 30mM D-glucose together with a significant inhibition of wound healing. In contrast, the wound healing was accelerated at 25mM D-Glucose as compared to 5mM D-glucose. Although TGF-β1 levels were significantly increased by 30mM D-glucose and the osmotic control 5mM D-glucose+25mM L-glucose, TGF-β1 was reduced by 25mM D-glucose. Furthermore, hyperglycaemia had no effect on endostatin and KIM-1/TIM-1 levels.

Conclusion: The levels of the marker of kidney injury KIM-1/TIM-1 are not influenced by hyperglycaemia in this *in vitro* model. The data demonstrate a critical concentration threshold of hyperglycaemia (between 25mM and 30mM glucose), which triggers the release of TGF-β1 and potentially the promotion of TIF in hRPTEC *in vitro*. Further studies are required to elucidate the detailed mechanisms of this process.

Disclosure of Interest: None Declared

Keywords: None

Diagnostic Approaches & Interventions

PO-105

Incidence of adult native renal biopsy diagnoses in East of England: Results from a single centre.

R. Varma [1,*], M. Andrews [2]

[1]Renal Medicine, Addenbrookes' Hospital, Cambridge, [2]

ANCA (Anti Neutrophil Cytoplasmic Antibody) associated vasculitis accounted for 100 biopsies with an incidence of 10.8 pmp/yr. 11 demonstrated Anti-GBM (glomerular basement membrane) disease with an incidence of 1.1 pmp/yr. Acute tubulointerstitial nephritis had a significant incidence of 6.5 pmp/yr. 42 biopsies were recorded as having insufficient tissue for diagnosis.

We compared results with the 2014 Scottish renal registry[1] which compiled data from nine renal units. The registry showed an overall higher incidence of native renal biopsy at 127.5 pmp/year. 54% were male patients. The mean age at biopsy was 57. The incidence of IgA nephropathy was significantly higher at 18.8 pmp/yr and that of minimal change disease was double at 6.5 pmp/yr. ANCA associated vasculitis occurred on biopsy at a comparable 14.7 pmp/yr.
Conclusion: We have presented data on the incidence of adult native renal biopsy diagnoses during a nine year period from a single centre in the East of England. On comparing with published registry data from Scotland we observed differences in incidence of specific renal diseases such as IgA nephropathy. We think a larger collaborative study comparing the incidence rates of native renal biopsy diagnoses between renal units in England would aid a clearer understanding of disease epidemiology in the UK.
References: 1. Scottish Renal Registry Report 2014

Disclosure of Interest: None Declared

Keywords: Glomerulonephritis, Pathology, Renal biopsy

Diagnostic Approaches & Interventions

PO-106

NSsaFe: Observational study on the incidence of Nephrogenic Systemic Fibrosis in patients with renal impairment following gadoteric acid administration.

M. Howse [1,*], R. McWilliams [2]

[1]Nephrology and Transplantation, [2]Interventional Radiology, ROYAL LIVERPOOL UNIVERSITY HOSPITAL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Nephrogenic systemic fibrosis is a serious multi-organ disorder assoicated with the administration of gadoteric acid during radiological imaging.

Objectives: To determine the incidence of Nephrogenic Systemic Fibrosis (NSF) in patients with renal impairment after gadoteric acid (DOTAREM®, Guerbet, France) administration.

Methods: The NSsaFe study is a worldwide post-marketing study including hundreds of patients with moderate, severe or end stage renal impairment, scheduled to undergo a routine contrast-enhanced Magnetic Resonance Imaging (MRI) using gadoteric acid. At inclusion visit, medical history, indications for MRI and product administration conditions were recorded for each patient. Adverse Events (AEs) occurring during MRI examination or usual follow-up period post-contrast agent administration were recorded. Patients were followed up over 2 years with 3 visits separated by at least 3 months in order to detect any signs of NSF.

Results: Data of 540 patients were analyzed (mean age: 69.6 ± 12.7 years [min-max: 21-95]; male: 58.5%; mean BMI: 26.3 ± 5.3 kg/m^2 [13.2-50.2]). Renal impairment was evaluated as moderate for 69.3% of patients, severe for 16.1% and end-stage for 12.0%; 2.6% of patients had undergone a previous kidney transplant. The mean (±SD) estimated Glomerular Filtration Rate (eGFR) was 37.6 ± 15.7 ml/min/1.73 m^2 [4.0-74.2]. Main MRI indication was to assess suspected abnormalities of the central nervous system (34.6%) and mean total volume injected was 15.8 ± 5.9 ml. As of 1st September 2016, 434 patients (97.3%) attended the first follow-up visit, 343 (76.9%) attended the second, and 247 (55.4%) attended the third. No AEs considered to be related to the administration of gadoteric acid were reported. No cases of NSF have been observed.

Conclusion: Intermediate data of the NSsaFe study show no cases of NSF after gadoteric acid administration in patients with at least moderate renal impairment. Data collected so far confirm the good safety profile of gadoteric acid in this high risk population.

Disclosure of Interest: M. Howse Conflict with: M Howse and R McWilliams are investigators of the study which received funding from Guerbet, R. McWilliams Conflict with: M Howse and R McWilliams are investigators of the study which received funding from Guerbet

Keywords: CKD, Clinical trial, Imaging

Diagnostic Approaches & Interventions

PO-107

Ferumoxytol-enhanced magnetic resonance angiography for the assessment of potential kidney transplant recipients

S. Stoumpos [1,*], M. Hennessy [2], A. Vesey [1], A. Radjenovic [3], R. Kasthuri [2], D. Kingsmore [1], G. Roditi [2], P. Mark [3]

[1]Renal and Transplant Unit, [2]Radiology Department, Queen Elizabeth University Hospital, [3]Cardiovascular Research Centre, University of Glasgow, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The traditional methods for scanning blood vessels using magnetic resonance imaging (MRI) or computed tomography carry potential risks for patients with advanced kidney disease. Ferumoxytol is a superparamagnetic iron oxide nanoparticle preparation that has potential as an MRI contrast agent in assessing the vasculature.

Objectives: To determine the utility of ferumoxytol-enhanced magnetic resonance angiography (FeMRA) use in pre-transplant assessment of patients with chronic kidney disease.

Methods: Patients with estimated glomerular filtration rate (eGFR) of <30mL/min per 1.73m^2 requiring aorto-iliac vascular imaging as part of pre-operative kidney transplant candidacy assessment underwent FeMRA between December 1, 2015 and August 1, 2016. All scans were performed for clinical indications where standard imaging techniques were deemed potentially harmful or inconclusive. Image quality was evaluated in arterial and venous compartments.

Results: First-pass and steady-state FeMRA using incremental doses of up to 4mg/kg body weight of ferumoxytol (diluted fourfold) as intravenous contrast agent for vascular enhancement were performed in 20 patients [mean eGFR 14.0 (SD 4.5) mL/min). Good arterial and venous enhancements were achieved, and FeMRA was not limited by calcification in assessing the arterial lumen. The scans were diagnostic and aided clinical decision making in all cases. A patient was found to have bilateral renal artery and infrarenal abdominal aorta stenoses/occlusions. Interesting anatomic variants were illustrated in a patient with a dual inferior vena cava and one with a retro-aortic left renal vein. Two patients were found to have incidental complex renal cysts which had enhancing components with ferumoxytol; both of these were confirmed to be renal cell carcinomas on histology. All patients completed their studies without adverse events.

Conclusion: Our preliminary experience supports the feasibility and utility of FeMRA for vascular imaging in patients with advanced kidney disease due for transplant listing, which has advantages of obtaining both arteriography and venography with a single test without nephrotoxicity.

Disclosure of Interest: None Declared

Keywords: Imaging, Renal transplant

Diagnostic Approaches & Interventions

PO-108

Assessing the reproducibility of measures of aortic stiffness, with 3-Tesla cardiac magnetic resonance imaging, in patients with end stage renal disease

S. Adenwalla [1,*], M. Graham-Brown [2], W. Hunt [1], D. Stensel [3], G. McCann [1], J. Burton [2]

[1]Department of Cardiovascular Sciences, University of Leicester and the NIHR Leicester Cardiovascular Biomedical Research Unit, Glenfield Hospital, [2]John Walls Renal Unit, University Hospitals Leicester NHS Trust, Leicester, [3]National Centre for Sport and Exercise Medicine, School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Aortic pulse wave velocity (aPWV) is an indirect measure of aortic stiffness, an independent predictor of cardiovascular morbidity and mortality in end-stage renal disease (ESRD), and measurable with cardiac magnetic resonance (CMR). Advances in CMR now allow direct assessment of aortic stiffness with measurement of aortic distensibility (AD).

Objectives: For the first time in this population we assessed the inter-study repeatability and the intra- and inter-observer variability of aPWV and AD with high resolution 3-Tesla CMR.

Methods: This reproducibility study was conducted in 10 HD patients who underwent two identical, test-retest CMR scans two weeks apart. Aortic PWV, ascending and descending AD were analysed using a semi-automated method. Inter-study repeatability was assessed by a single, blinded reader. Inter-observer variability was assessed by two blinded readers of 10 scans. Intra-observer variability, was assessed by a blinded reader of 10 scans. Intra-class correlation coefficient (ICC), coefficient of variation (CoV) and Bland-Altman analyses were used to assess reproducibility.

Table:

	aPWV (m/s)	Ascending AD ($mmHg^{-1} x10^{-3}$)	Descending AD ($mmHg^{-1}x10^{-3}$)
Inter-study repeatability	ICC: 0.511 (-0.306, -0.895)*; CoV: 14.8%*	ICC: 0.94 (0.78, 0.985); CoV: 13.3%	ICC: 0.511 (-0.131, 0.851); CoV: 33.7%
Inter-observer variability	ICC: 0.99 (0.996,1.00); CoV: 1.4%	ICC: 0.997 (0.987, 0.999); CoV: 2.7%	ICC: 0.998 (0.993, 1.00); CoV: 2.1%
Intra-observer variability	ICC: 0.997 (0.989,0.999); CoV: 1.8%	ICC: 0.968 (0.878, 0.992); CoV: 3.2%	ICC: 0.937 (0.770, 0.984); CoV: 4.1%

**Three inter-study aPWV scans were unanalyzable and excluded from analysis*

Results: All 10 patients (8 male) completed the study. Median time between inter-study scans was 7 days (5.2, 9.5). Mean age was 59 years (±15.3) and mean dialysis vintage was 26.2 months (±26.6). Mean PWV for the baseline scans was 8.2m/s (±3.48), mean ascending AD was 2.5 $mmHg^{-1} x10^{-3}$ (±1.7), mean descending AD was 3.2$mmHg^{-1} x10^{-3}$ (±2.7). The ICC and CoV for inter-study, inter-observer and intra-observer are shown (table). Bland-Altman analyses revealed no systematic bias.

Conclusion: Ascending AD is the most reproducible measure of aortic stiffness and the most clinically relevant area of the aorta with regard to aorto-ventricular coupling in ESRD patients. The inter and intra-observer variability for all measures were excellent, but the inter-study repeatability of aPWV and descending AD are sub-optimal for use as biomarkers of aortic stiffness.

Disclosure of Interest: None Declared

Keywords: CV disease, Imaging

Diagnostic Approaches & Interventions

PO-109

Predicting long-term renal and patient survival by histological diagnosis in elderly patients undergoing a renal biopsy

A. Navaratnarajah [1,*], T. Cook [1], C. Roufosse [1], M. Willicombe [1]

[1]Renal Medicine , Hammersmith Hospital, Imperial College NHS Healthcare Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Several publications have demonstrated the use of renal biopsy in elderly patients in terms of establishing a diagnosis and hence enabling directed therapy. However, evidence on the long-term outcomes following biopsies are lacking.

Objectives: The aim of this study is to describe the renal and patient outcomes in elderly patients according to the indication for the biopsy, clinical parameters and histological diagnosis.

Methods: An analysis of 445 patients over 70 years old who underwent a primary renal biopsy between 2005 and 2015 was performed. Clinical data were collected from medical records and pathology results. The median age of the patients was 75.1 (74.5-75.7), range 70.1 to 91.0 years. The median follow up was 5.76 (5.05-6.24) years.

Results: 180/445 [40.4%] of patients either progressed to ESRD or died. 83/445 [18.7%] of patients died without the need for dialysis, 97/445 [21.8%] of patients required renal replacement therapy (RRT) and 49/97 [50.5%] patients died after requiring RRT. This equates to a 1, 3 and 5-year renal survival of 86.1%, 80.1% and 76.9% and overall patient survival of 92.6%, 82.8% and 72.3% respectively. Patients who progressed to ESRD were at higher risk of dying compared with those who remained dialysis independent, HR 2.54 (1.64-3.93), p<0.0001.

The distribution of histological features seen were: glomerulonephritis excluding vasculitis (GN) in 113 [24.1%], vasculitis in 56 [11.9%], tubulointerstitial nephritis (TIN) in 53 [11.3%], monoclonal gammopathy of renal significance (MGRS) in 29 [6.2%] and tubulointerstitial scarring without a definite cause in 194 [41.4%].

On multivariate analysis, variables associated with risk of ESRD included higher serum creatinine at the time of biopsy [HR 1.005 (1.004-1.0070), p<0.0001] and undergoing a biopsy for the indication of nephrotic syndrome (NS) with renal dysfunction [3.08 (1.50-6.32), p=0.002]. Whilst having either histological features of GN [0.49 (0.26-0.95, p=0.033] or TIN [0.075 (0.01-0.55), p=0.01 were associated with dialysis independence.

Variables associated with reduced patient survival included increasing age [1.09 (1.04-1.15), p=0.0004], serum creatinine at the time of biopsy [HR 1.0018 (1.008-1.0028), p=0.0003], undergoing a biopsy for NS with renal dysfunction [2.80 (1.69-4.63), p=0.000] and a histological diagnosis of a 'MGRS' [2.81 (1.47-5.37), p=0.0017].

Finally analysing the absolute risk of ESRD during the lifetime of the patient, those with histological findings of tubulointerstitial scarring without a definite cause [HR 2.19 (1.33-3.62), p=0.0011], GN [HR 2.07 (1.16-3.70), p=0.006] and vasculitis [HR 3.56 (1.68-7.50), p<0.0001] were at risk of progressing to ESRD before dying. There was no difference in risk of ESRD or death in patients with TIN, who had a good prognosis. Patients with a MGRS also had no increased risk of ESRD over death, 1.36 (0.52-3.60), p=0.52, however the overall prognosis was poor and the median time to either death or dialysis was 0.91 (0.08-3.6) years in this group.

Conclusion: This study demonstrates that renal biopsies in the elderly not only provide a histological diagnosis but also prognostic information on renal and patient survival. Data from this study may be useful for informed decision making by patients and nephrologists.

Disclosure of Interest: None Declared

Keywords: Pathology, Prognosis

Diagnostic Approaches & Interventions

PO-110

Outcomes of Rituximab use in renal patients in Royal Stoke University Hospital

T. Aljemmali [1,*], A. J. Varghese [1], J. Wessels [1]

[1]Renal Medicine, ROYAL STOKE UNIVERSITY HOSPITAL, Stoke on Trent, United Kingdom

Preferred Presentation Method: Poster

Introduction: Rituximab (RTX) is an anti-CD20 monoclonal antibody and has been approved by NICE to be used in patients with antineutrophil cytoplasmic antibody-associated vasculitides (AAVs) to induce remission and to treat relapse, also in patients with systemic lupus erythematosus (SLE) and lupus nephritis (LN) who have failed to respond or are having adverse events to two or more standard immunosuppressive therapies.

Objectives: We reviewed our patient cohort at Royal Stoke University Hospital (RSUH) Renal Department to assess the outcomes of RTX therapy and adverse events.

Methods: Clinical data was collected by reviewing patients' medical records in the Vasculitis and Lupus outpatient clinics from 01/01/2010 to 01/11/2016 at RSUH. Patients' renal function using estimated glomerular filtration rate (eGFR) and quantitative proteinuria by using protein-creatinine ratio in urine samples were collected from hospital laboratory records.

Results: In the 6 year period, a total of 19 patients received RTX therapy. All patients were screened for viral hepatitis, human immunodeficiency virus and tuberculosis before RTX. All patients were given cotrimoxazole as prophylaxis. Also, all patients received premedication with intravenous methylprednisolone and chlorpheniramine before RTX infusion.

11 patients had AAVs, 7 patients had SLE/LN and 1 patient had mixed cryoglobulinaemia syndrome. In the AAVs patient group, 2 patients who were positive for proteinase-3(PR3) AAVs received RTX as induction therapy and 9 patients were given RTX as treatment for relapse of vasculitis. 8 of these 9 patients were PR3 AAVs positive and one was myeloperoxidase(MPO) AAVs positive. 6 patients had a single relapse while 3 patients had two relapses. 3 patients who were PR3 AAVs positive continued RTX 6-monthly to maintain remission. All 7 patients with SLE/LN received RTX for treatment of relapse, 2 patients required additional courses of RTX to maintain remission.

In ANCA vasculitis relapsed patients, eGFR 6 months after the date of RTX therapy was similar to the baseline eGFR prior to relapse. RTX stabilised renal function in 100% of our cohort. In 1 of the patients given RTX for induction therapy, eGFR 6 months after therapy improved from 11 ml/min to 85 ml/min. In SLE/LN, RTX controlled SLE relapse and reduced proteinuria by 65% as an average (40-90%). It also stabilised renal function in 5 patients & improved eGFR in 1 patient.

Adverse effects of RTX included 1 patient developed mild allergic reaction to Rituximab. 8 patients developed infective complications. 2 patients had Cytomegalovirus infection, 2 patients had lower respiratory tract infection, 1 patient had herpes zoster, 1 patient had herpes simplex and 1 patient developed severe pneumonia. 1 patient developed hypogammaglobulinemia requiring regular immunoglobulin infusions to reduce recurrent chest infections. No severe anaphylactic reactions, no malignancy and no deaths were reported in these patients cohort.

Conclusion: In our patient cohort, RTX was effective in treating AAVs both as induction therapy and in treatment of relapse. It was also effective in the treatment of relapsed SLE. Infection was the main complication of RTX therapy but was not life-threatening.

Disclosure of Interest: None Declared

Keywords: ANCA, Lupus , Rituximab

Diagnostic Approaches & Interventions

PO-111

Practice Patterns in Management and Outcomes of Primary Membranous Nephropathy: A Single Centre Experience.

M. Durcan [1,*], M. Elsayed [1], A. Morris [1], S. Zaidi [1], A. Ponnusamy [1]

[1]Renal, ROYAL PRESTON HOSPITAL, Preston, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Membranous nephropathy is a common glomerular disease. In the last number of years there has been many clinical trials addressing its management. These trials have altered the treatment patterns of this condition by giving the physician more therapeutic options.

Objectives: The aim of this study was to review the practice patterns in management and outcomes of primary membranous nephropathy at a single U.K centre.

Methods: Clinical demographics, relevant laboratory values and modalities of treatments were collected on all patients with biopsy proven membranous nephropathy between 2004 and 2011. Patients were followed up until November 2016.

The following outcomes were of interest; complete remission (proteinuria less than 30mg/mmol and stable renal function), partial remission (at least 50% reduction in proteinuria from baseline and uPCR <300mg/mmol with stable renal function (<15% drop in eGFR), relapse (recurrence of proteinuria with ≥ 300mg/mmol) and a composite outcome of the following endpoints; doubling of baseline creatinine, start of renal replacement therapy or death.

Image:

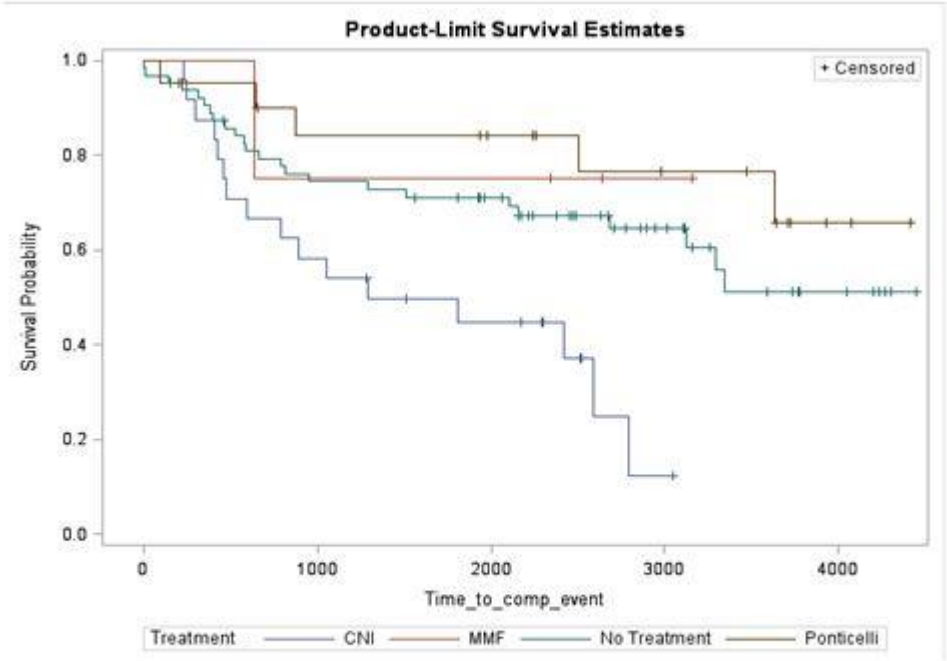


Figure 1. Survival Curves for each treatment modality

Results: 129 incident patients were followed up for a median of 5.56 years. Mean age of patients was 56.5 ±16.7 years of age. 66.6% of patients were male and remainder were female. Prevalence rate of hypertension was 60.6% while 17.4% had diabetes. Mean baseline eGFR was 62.9 ± 34.6 ml/min/1.73m^2. Mean PCR and albumin at diagnosis was 769.83 mg/mmol and 27.9 ± 6.6 g/L, respectively. 56 (43.4%) received immunosuppressive therapy overall**.** 24 (19%) patients were treated with the Ponticelli regime.36 (28%) received a calcineurin inhibitor.12 (9.52%) received mycophenolate mofetial (MMF). Patient and renal survival at last follow up was 71.20%. 51% of study population obtained complete remission. 27% achieved partial remission. 40.17% achieved the composite outcome. Achieving remission (whether partial or complete) decreases hazards of developing composite outcome by 64%. P=0.0007. Treatment with calcineurin inhibitors is associated with a worse composite outcome as can be seen in Figure 1.
Conclusion: Outcomes are comparable and better than what is reported in the literature. Treatment with calcineurin inhibitors is inferior to treatment with other modalities. Further analysis of this finding is underway.

Disclosure of Interest: None Declared

Keywords: Calcineurin inhibitors, Membranous, Patient outcome measures

Diagnostic Approaches & Interventions

PO-112

DOES RENAL BIOPSY LEAD TO A MEASURABLE LOSS OF FUNCTION?

R. Dattani [1,*], D. Ashby [1], J. Galliford [1], P. Hill [1]

[1]NEPHROLOGY, HAMMERSMITH HOSPITAL, IMPERIAL NHS TRUST, LONDON, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients often ask if renal biopsy damages the kidneys, and are usually told that the sample is so small that the effect is negligible. However, the true effect of renal biopsy on GFR is unknown, whilst it is perhaps obvious that the effect cannot be zero.

Objectives: The aim of this study was to determine the effect of renal biopsy on GFR.

Methods: In patients undergoing renal transplant biopsy more than 9 months post transplant, quarterly GFR averages were assessed from 6 months before, to 6 months after the biopsy, so that three interval changes could be observed: pre-biopsy, biopsy, and post-biopsy. Patients were excluded for: GFR instability prior to biopsy (more than 10ml/min change); acute illness indicated by large numbers of readings (more than 24 samples per quarter); and incomplete data. To avoid confounding by indication, only surveillance biopsies were included. The log-modulus transformation was used for hypothesis testing, but not for effect size estimation.

Results: From 312 patients, 228 (aged 20-75, 57.9% male) were suitable for analysis and included. Surveillance biopsies were performed at median (IQR) 35(12-42) months post-transplantation, at a time when mean+/-sd GFR was 57.6+/-19.1ml/min.

GFR change during the biopsy interval was -0.83+/-0.34ml/min, significantly lower than the change during the pre-biopsy interval (+0.15+/-0.28ml/min, p=0.034), and non-significantly lower than the change during the post-biopsy interval (-0.24+/-0.43ml/min, p=0.382). The pre-biopsy interval is selected for stability, therefore the difference between biopsy and post-biopsy intervals was used to calculate the GFR change due purely to biopsy, yielding an estimate of -0.59+/-0.60ml/min. Though the confidence interval surrounding this estimate is large, the effect does appear to be measurable by this method.

In 1621 prevalent transplant patients with creatinine readings one year apart, mean+/-sd GFR change was -1.69+/-0.24ml/min, though because of graft loss, this would underestimate the average GFR change. A biopsy-induced reduction in function of 0.5ml/min would therefore equate approximately to a 3 month reduction in graft survival.

Conclusion: The loss of GFR due to percutaneous renal biopsy appears measurable by this method, and may be in the region of 0.5ml/min, equivalent to a reduction in graft survival of 3 months. Data from other centres would be helpful in defining this estimate with greater accuracy. If confirmed, the small but measurable loss of GFR due to renal biopsy suggested by this study might be helpful in guiding biopsy decisions.

Disclosure of Interest: None Declared

Keywords: eGFR, Glomerular function, Survival

Epidemiology & Public Health

PO-113

40 year mortality trends in 45,000 English incident treated end-stage renal disease patients, 1970-2010

B. Storey [1,*], N. Staplin [2], C. Harper [1], R. Haynes [1], C. Baigent [1], C. Winearls [3], R. Goldacre [4], M. Goldacre [4], M. Landray [4], W. Herrington [2]

[1]Medical Research Council-Population Health Research Unit (MRC-PHRU), Clinical Trial Service Unit and Epidemiological Studies Unit (CTSU), Nuffield Department of Population Health (NDPH), [2]CTSU, NDPH, Uni of Oxford, [3]Oxford Kidney Unit, Oxford University Hospitals NHS Foundation Trust, [4]Big Data Institute, NPDH, Uni of Oxford, Oxford, United Kingdom

Preferred Presentation Method: Oral or Poster

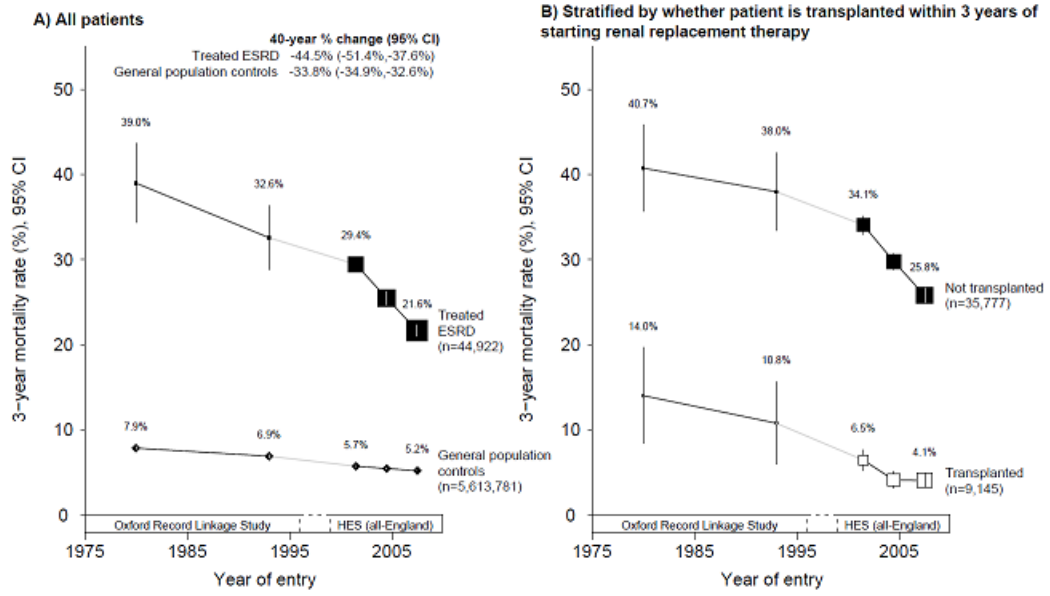
Introduction: Since maintenance dialysis programs began there have been substantial changes in the population structure and prevalence of co-morbidities among incident end-stage renal disease (ESRD) patients. To date, no large study has reported mortality rates in both treated ESRD and general populations standardized to the same comorbidity as well as age and sex distribution.

Objectives: To derive a retrospective cohort of treated ESRD patients with information on comorbidity spanning 40 years, and compare short-to-medium term mortality rates to those from general population controls.

Methods: Mortality-linked electronic hospital admission data from the Oxford Record Linkage Study (1970-1996) and Hospital Episode Statistics (2000-2008) were used to identify retrospective cohorts of treated ESRD patients (n=44,922) and general population controls (n=5,613,781) and derive their respective baseline co-morbidity. Poisson regression was used to calculate three-year mortality rates standardized to the age, sex and comorbidity structure of an “average” 1970-2008 RRT population.

Image:

Figure: Standardized three-year mortality rates in new treated end-stage renal disease patients and general population controls



Results: In new treated ESRD patients the median age at initiation of RRT in 1970-1990 was 49y (IQR 36-60) increasing to 63y (49-73) by 2006-2008. Over that period, there were increases in the prevalence of vascular disease (10.0 to 28.3%) and diabetes (6.7 to 34.3%). Standardized 3-year all-cause mortality in treated ESRD patients over the 40 years fell by

44.5% (95% CI 37.6–51.4%), steeper than the 33.8% decline (32.6–34.9%) observed in general population controls. Declines in three-year mortality rates were evident both for those who received a kidney transplant and those who remained on dialysis. [**Image**]
For non-vascular causes, 3-year standardized mortality rates have fallen faster among treated ESRD (40y percentage change: 49.5%, 95% CI 42.0-56.9%) than general population controls (17.8%, 15.9-19.7%). In contrast, vascular mortality rates have fallen less steeply in ESRD patients (32.6%, 16.8-48.3%) than the general population (53.4%, 52.1-54.6%).
Conclusion: Since 1970, there have been marked improvements in all-cause mortality among treated ESRD patients, irrespective of RRT modality. Non-vascular mortality rates in ESRD patients have fallen more steeply than the general population, whereas the opposite is true for vascular causes.

Disclosure of Interest: None Declared

Keywords: Epidemiology, ESRD

Epidemiology & Public Health

PO-114

Adverse outcomes following trimethoprim for urinary tract infection in patients over 65: a cohort study

E. Crellin [1], K. Mansfield [1], D. Nitsch [1], I. Douglas [1], A. Root [1], E. Williamson [2], L. Smeeth [1], L. Tomlinson [1,*]

[1]Non-communicable disease epidemiology, [2]Medical Statistics, London School of Hygiene and Tropical Medicine, London, United Kingdom

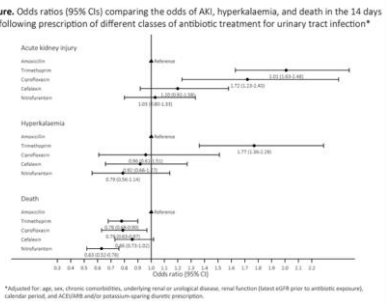
Preferred Presentation Method: Oral or Poster

Introduction: Co-trimoxazole (trimethoprim/sulfamethoxazole) has been associated with sudden death but it is not known if acute kidney injury (AKI) or hyperkalaemia are the mechanisms.

Objectives: To determine whether trimethoprim for urinary tract infection (UTI) is associated with AKI, hyperkalaemia, or sudden death among older adults.

Methods: We used UK electronic primary care records from the Clinical Practice Research Datalink linked to the Hospital Episode Statistics database to identify adults 65 years and over with a prescription for trimethoprim, amoxicillin, cephalexin, ciprofloxacin, or nitrofurantoin prescribed up to 3 days after a primary care diagnosis of UTI between 1997 and 2014. The outcomes were AKI, hyperkalaemia and death within 14 days of antibiotic-treated UTI. We used logistic regression to calculate odds ratios (OR) for adverse outcomes following antibiotic-treated UTI (comparing each antibiotic to amoxicillin as the reference), adjusting for age, sex, chronic comorbidities, renal function, calendar period, and use of ACE inhibitors/Angiotensin receptor blockers (ACEI/ARB) or potassium-sparing diuretics.

Image:



Results: Among a cohort of 1,191,653 over 65s we identified 187,187 individuals with at least one antibiotic-treated UTI, comprising a total of 443,009 antibiotic-treated UTIs. The odds of AKI and hyperkalaemia in the 14 days following antibiotic prescription were higher following trimethoprim than following amoxicillin (AKI: adjusted OR 2.01 [95% CI 1.63-2.48]; hyperkalaemia: adjusted OR 1.77 [95% CI 1.36-2.26]). However, the odds of death following antibiotic prescription were lower following trimethoprim than following amoxicillin (adjusted OR 0.78 [95% CI 0.68-0.90]). Risk of adverse outcomes were higher in men, and with increasing age, comorbidities, declining renal function, and combination use of ACEI/ARB with potassium-sparing diuretics.

Conclusion: Our results demonstrate that trimethoprim is associated with greater risk of AKI and hyperkalaemia compared to other antibiotic treatment for UTI, among the general population and not just those treated with ACEI/ARB.

Disclosure of Interest: None Declared

Keywords: Epidemiology, Prescribing

Epidemiology & Public Health

PO-115

Serum creatinine elevation following renin-angiotensin system blockade and long-term cardiorenal risks

M. Schmidt [1], K. Mansfield [2], K. Bhaskaran [2], D. Nitsch [2], H. Toft Sørensen [3], L. Smeeth [2], L. Tomlinson [2,*]

[1]Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark, [2]Non-communicable disease epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom, [3]Internal Medicine, Regional Hospital of Randers, Randers, Denmark

Preferred Presentation Method: Oral or Poster

Introduction: Guidelines recommend that patients who experience a ≥30% increase in creatinine after initiating angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin-receptor blockers (ARBs) should stop taking them, but the risks associated with lower levels of creatinine increase are unknown.

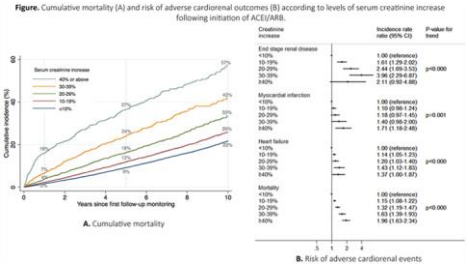
Objectives: We examined long-term cardiorenal outcomes associated with increased levels of post-initiation creatinine.

Methods: Design: Population-based cohort study using electronic health records from the Clinical Practice Research Datalink and Hospital Episode Statistics (1997–2014).

Subjects: ACEI/ARB initiators (n=122,363).

Main outcome measures: We used Poisson regression to compute incidence rate ratios and 95% confidence intervals (CIs) for end-stage renal disease, myocardial infarction, heart failure, and death, comparing users with creatinine increases ≥30% (n=2,078) versus those without (n=120,285). We adjusted for age, sex, calendar period, socioeconomic status, lifestyle factors, chronic kidney disease, diabetes, cardiovascular comorbidities, and concomitant use of other antihypertensive drugs.

Image:



Results: Among the 1.7% of individuals with creatinine increases ≥30%, a higher proportion were female, elderly, had cardiorenal comorbidity, and used NSAIDs, loop diuretics or potassium sparing diuretics. Creatinine increases ≥30% were associated with an increased adjusted incidence rate ratio for all outcomes, compared with increases <30%: 3.43 (95% CI: 2.40-4.91) for end-stage renal disease, 1.46 (95% CI: 1.16-1.84) for myocardial infarction, 1.37 (95% CI: 1.14-1.65) for heart failure, and 1.84 (95% CI: 1.65-2.05) for death. A detailed categorisation of increases in creatinine levels (<10%, 10%>19%, 20%>29%, 30%>39%, and ≥40%) revealed dose-response relation for all outcomes (all p-values for trends <0.001). Notably, creatinine increases below 30% were also associated with increased incidence rate ratios for all outcomes, including death (1.15 [95% CI: 1.09-1.22] for increases of 10%>19% and 1.35 [95% CI: 1.23-1.49] for increases of 20%>29%, using <10% as reference). Results were consistent across calendar periods, patient subgroups, and among continuing users.

Conclusion: Creatinine increases following ACEI/ARB initiation were associated with adverse cardiorenal outcomes in a dose-response relation, even below the guideline-recommended threshold of a 30% increase for stopping treatment.

Disclosure of Interest: None Declared

Keywords: Epidemiology, Prescribing

Epidemiology & Public Health

PO-116

Stroke Care Variation in End Stage Renal Failure (ESRF): A National dataset Analysis comparing ESRF to the general Population

M. Findlay [1,*], M. J. MacLeod [2] on behalf of Scottish Stroke Care Audit, W. Metcalfe [3] on behalf of Scottish Renal Registry, J. Traynor [4] on behalf of Scottish Renal Registry, J. Dawson [1], P. Mark [1]

[1]Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, [2]Institute of Medical Sciences, University of Aberdeen, Aberdeen, [3]Department of Renal Medicine, Royal Infirmary of Edinburgh, Edinburgh, [4]Department of Renal Medicine, Queen Elizabeth University Hospital, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Stroke is more common with higher case fatality in people with ESRF but whether this reflects difference in case mix or measures of care is unclear.

Objectives: Using data from the Scottish Renal Registry (SRR) & Scottish Stroke Care Audit (SSCA) we assessed for variation between those with and without ESRF.

Methods: We identified all people with ESRF on renal replacement therapy (RRT) who suffered stroke between 01/01/05-31/12/13. We separated these patients by RRT modality and used propensity score matching to identify matched controls with stroke and no ESRF during the same period for each modality (matching age, sex, prior atrial fibrillation, stroke, cardiovascular disease, hypertension, diabetes & deprivation/rurality status). We used SSCA data to obtain details of circumstances of admission, use of brain imaging & antiplatelet therapy, length of stay & discharge destination. We used Scottish death records for vital status up to 31/08/15. Data were analysed using SAS v9.4.

Results: There were 61,480 patients in the SSCA with ≥1 stroke episode from 01/01/05-31/12/13. 278 with ESRF suffered a stroke during follow-up (195 on haemodialysis (HD), 27 on peritoneal dialysis (PD) & 56 with a renal transplant (RT)). The prevalent RRT population in 2009 was 4238.

Compared to matched controls, people on HD who suffered stroke were less likely to be independent in activities of daily living (60.0 v 77.6%, p<0.0001) or live alone pre stroke (24.1 v 34.3%, p=0.0119), or be able to walk at presentation (31.3 v 39.3%, p=0.035). Those on HD were more likely to be admitted from an acute hospital (10.8 v 2.6 %, p<0.0001) and less likely to be admitted from home (81.5 v 91.0%, p=0.0035) or via their GP (5.6 v 12.1%, p=0.034). There were no differences between PD and RT patients and controls. PD patients had longer admissions (23 vs 9 days, p=0.02), HD patients were less commonly managed on a stroke unit (62.6 vs 80.3%, p<0.0001), more commonly discharged from stroke care to an acute hospital (18.0 v 4.8%, p<0.0001) and less likely to be discharged home (49.2 v 68.7%, p<0.0001). There were no differences in use of brain imaging or aspirin across groups. HD and RT patients were more likely to die during their admission (23.1 vs 14.0% & 19.6 vs 9.3% respectively) and all ESRF had higher death rates at of follow-up (HD 86.2 v 54.0%, PD 81.5 v 54.0% and RT 66.1 v 36.1%, p <0.0001).

Conclusion: There are differences between patients with ESRF who suffer stroke and matched stroke controls. People with HD are more severely affected at baseline, fewer are managed in an acute stroke unit, and case fatality is higher in all types of RRT.

Disclosure of Interest: M. Findlay Conflict with: Funded by a Kidney Research UK Fellowship Award & Research Grant from Darlinda's Charity for Renal Research, M. J. MacLeod: None Declared, W. Metcalfe: None Declared, J. Traynor: None Declared, J. Dawson: None Declared, P. Mark: None Declared

Keywords: Cardiovascular Disease, Epidemiology

Epidemiology & Public Health

PO-117

Hidden in plain sight: the prevalence of De Lorenzo syndrome in non-dialysis chronic kidney disease and transplant patients

T. J. Wilkinson [1,*], D. W. Gould [1], S. Xenophontos [1], A. L. Clarke [1], J. Neale [1], D. Richler-Potts [1], A. E. White [1], E. L. Watson [1], J. L. Viana [1], A. C. Smith [1]

[1]LEICESTER KIDNEY EXERCISE TEAM, UNIVERSITY OF LEICESTER, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Routinely measured in clinical practice, body mass index (BMI) masks De Lorenzo syndrome (DLS) (normal-weight-obesity) i.e. normal BMI but excessive body fat % (BF%). DLS is prevalent in 8% of the general population and is associated with sarcopenic obesity, inflammation, mortality, and cardiovascular disease (CVD).

Objectives: No data exists on DLS prevalence in non-dialysis chronic kidney disease (CKD) or transplant recipient (TR) patients. However, in a population with increased CVD risk, the ability to correctly diagnosis obesity is paramount to effective healthcare.

Methods: 71 CKD (59±13 years, 54% male, eGFR 33±19ml/min/1.73^2) and 35 TR patients (52±12 years, 66% male, eGFR 54±21ml/min/1.73^2) were studied. BMI (weight/height^2) was calculated, and BF% measured by bioelectrical impedance analysis (BIA). Normal BMI was classified as <25kg/m^2, and healthy and overweight/obese BF% defined using established age, sex, and ethnic-derived cut-offs.

Patients were categorised as follows:

1. DLS or normal-weight-obese (NW-O): Normal BMI *but* overweight/obese BF%
2. Normal-weight-lean (NW-L): Normal BMI *and* healthy BF%
3. Overweight/obese (OW/O): Overweight/obese BMI *and* overweight/obese BF%
4. Misclassified: Overweight/obese BMI *but* healthy BF%

Table:

	Combined *n*/106 (%)	TR *n*/35 (%)	CKD *n*/71 (%)	*P (TR vs. CKD)*
DLS / NW-O	**18 (17%)**	**9 (26%)**	**9 (13%)**	.093
NW-L	16 (15%)	6 (17%)	10 (14%)	.679
OW/O	60 (57%)	18 (51%)	42 (59%)	.450
Misclassified	12 (11%)	2 (6%)	10 (14%)	.201

Results: The table shows overall DLS prevalence. DLS prevalence in females was greater in TR than CKD (50 vs 9%) (*P*=.002). Despite a comparable BMI, in the CKD group DLS was associated with poorer eGFR (35±17ml/min/1.73^2) than NW-L (41±27ml /min/1.73^2) (*P*=.029).

Conclusion: Approximately 1 in 8 CKD patients (13%), and 1 in 4 TR patients (26%) had DLS. This prevalence is greater than the general population. Over half of patients were classified as overweight/obese by both BMI and BF% methods. Additionally, 1 in 10 patients were actually *misclassified* as overweight or obese (by BMI) despite having a healthy BF%. As previously found, DLS was more prevalent in females. Presence of DLS was associated with worse eGFR possibly due to the effect of excessive adiposity.

In conclusion, 17% of renal patients were overweight or obese, but this was masked by a normal BMI. These patients are at substantial increased risk of CVD, mortality, and poor graft survival if a TR. Remarkably, our data suggests (DLS + OW/O) that 74% of patients are obese or overweight based on BF%. This study highlights the need and importance of an accurate diagnosis of obesity in clinical practice (e.g. BIA).

Disclosure of Interest: None Declared

Keywords: Bioimpedance, Obesity, Transplant outcome

Epidemiology & Public Health

PO-118

QUANTIFICATION OF THE ASSOCIATION BETWEEN CHRONIC KIDNEY DISEASE STATUS (STAGE 3-5 NOT ON RENAL REPLACEMENT THERAPY) AND CAUSE-SPECIFIC HOSPITALISATION: A UK POPULATION-BASED COHORT STUDY

M. Iwagami [1,*], B. Caplin [2], L. Smeeth [1], L. Tomlinson [1], D. Nitsch [1]

[1]Department of Non-Communicable Disease Epidemiology, LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, [2]Centre for Nephrology, UNIVERSITY COLLEGE LONDON, London, United Kingdom

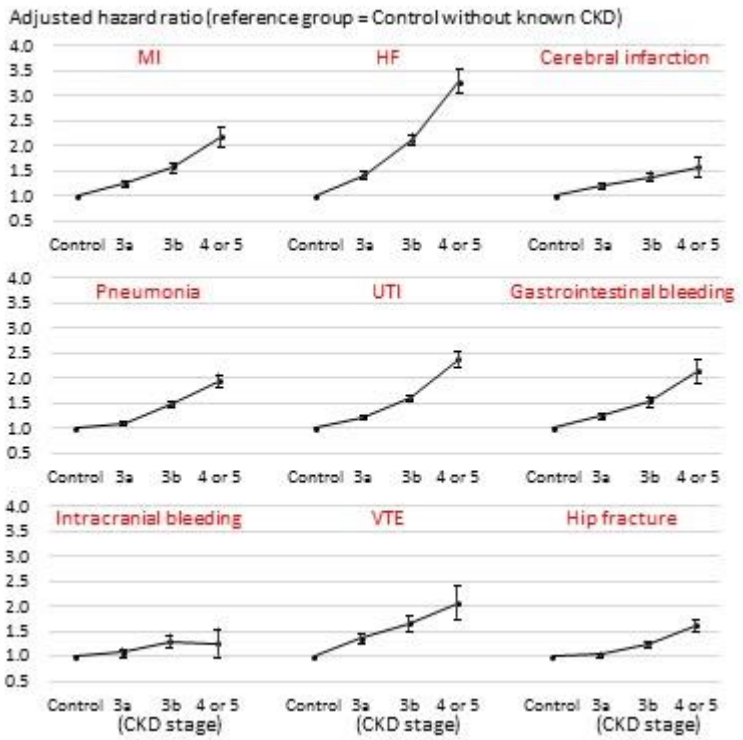
Preferred Presentation Method: Oral

Introduction: Although chronic kidney disease (CKD) status and stage is associated with increased risk of all-cause hospitalisation, it remains unlear which causes of hospitalisation are specific to patients with CKD.

Objectives: To quantify the association between CKD status and cause-specific hospitalisation in absolute and relative terms, and to identify causes of hospitalisation specific to patients with CKD, as compared with those without known CKD in the UK general population.

Methods: Using Clinical Practice Research Datalink linked to Hospital Episode Statistics, we identified adults with CKD (estimated glomerular filtration rate <60 mL/min/1.73m^2 twice for ≥3 month) not on renal replacement therapy (RRT) between 2004 and 2014. As a control group, we selected random patients without CKD from the database, matched for age, sex, general practice, and calendar time. Outcomes were hospitalisations due to 9 common conditions as the primary diagnosis after cohort entry: heart failure (HF); myocardial infarction (MI); cerebral infarction; pneumonia; urinary tract infection (UTI), gastrointestinal bleeding; intracranial bleeding; venous thromboembolism (VTE); and hip fracture. For each outcome, follow-up continued until the first occurrence of that outcome, death, RRT initiation, or last data collection. We calculated an incidence rate difference for each outcome between matched patients with and without CKD. Cox regression was used for each outcome, stratifying by matched pair and adjusting for ethnicity, socio-economic and smoking status, BMI and 17 chronic diseases in Quality Outcome Framework. Subgroup analysis was done by CKD stage.

Image:



Results: We created a cohort of 242,349 matched pairs (median age 76 [IQR 70-82], male 39.3%) with and without CKD. The largest incidence rate difference was seen for HF with 6.6/1000 person-years (PY) (due to the incidence rate of 9.7 vs. 3.1/1000 PY in patients with and without CKD), followed by UTI with 5.2/1000 PY (13.1 vs. 7.9/1000 PY) and pneumonia with 4.4/1000 PY (12.6 vs. 8.2/1000 PY). Relative risk (patients with vs. without CKD) was largest for HF with adjusted hazard ratio of 1.66 (95% CI, 1.59 – 1.75), followed by VTE with 1.55 (1.46 – 1.64) and MI with 1.40 (1.34 – 1.46). In subgroup analysis by CKD stage, the effect size was largest for HF (Figure).

Conclusion: Among the cause-specific hospitalisations studied, HF marked the largest absolute risk difference and relative risk. Although CKD status and stage can be a marker of multimorbidity, priority should be given to prevention and outpatient-based management of HF for narrowing the gap of hospitalisation rate between patients with and without CKD.

Disclosure of Interest: None Declared

Keywords: CKD, Epidemiology

Epidemiology & Public Health

PO-119

Albuminuria is the principle modifiable risk factor for progression to end-stage renal disease in individuals of South Asian ethnicity: a prospective observational study

M. Jesky [1,*], A. Fenton [1], K. P. Ng [1], P. Yadav [1], S. Stringer [1], I. Dasgupta [2], C. Ferro [1], P. Cockwell [1]

[1]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, [2]Renal Unit, Heart of England NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic kidney disease (CKD) is very common and associated with adverse outcomes, creating a heavy burden for individuals, their families and society. People of South Asian ethnicity have a higher rate of progression to end-stage renal disease (ESRD) compared to white individuals. However, whether there are modifiable risk factors for accelerated progression of CKD in people of South Asian ethnicity is unknown.

Objectives: Utilizing a large, UK based, ethnically and socioeconomically diverse CKD cohort we investigated potentially modifiable risk factors for accelerated progression of kidney disease in people of South Asian ethnicity.

Methods: Individuals recruited to end March 2014 in the Renal Impairment in Secondary Care (RIISC; NCT01722383) prospective, observational cohort study were included. The cohort comprised patients with pre-dialysis CKD who fulfilled criteria for secondary care follow-up as defined by the UK National Institute for Health and Care Excellence 2008 CKD guidelines. Detailed demographic, socio-economic and bio-clinical characteristics were collected at baseline. Primary end-points included progression to ESRD or death. Univariable and multivariable survival analyses, including Cox proportional hazards and competing risk regression were performed.

Results: 727 (white 507, South Asian 150, black 70) out of 745 individuals recruited to end March 2014 were analysed. Median eGFR was 25.7 ml/min/1.73m2 (IQR 19.5-33.5) and median urine albumin creatinine ratio (ACR) was 32.8 mg/mmol (IQR 6.7-127.6). During the follow-up period from October 2010 until February 2016, 151 (20.8%) individuals reached ESRD and 76 (10.5%) died.

There was no difference in eGFR between ethnic groups. However, there were major differences in proteinuria as measured by ACR; this was highest in South Asian participants (median 84.1 mg/mmol, IQR 25.9-170.2), compared to those of black ethnicity (53.2 mg/mmol, IQR 9.9-137.3) and white ethnicity (20.0 mg/mmol, IQR 4.5-101.4) (p=0.0001). By Cox survival analysis, individuals of South Asian ethnicity (HR 1.62, 95% CI 1.11-2.35, p=0.012) and black ethnicity (HR 1.79, 95% CI 01.10-2.90, p=0.019) had an increased risk of ESRD compared to individuals of white ethnicity. Subsequent multivariable analyses attenuated the difference between ethnicities. Importantly, ACR was the major independent modifiable risk factor associated with accelerated progression of kidney disease in people of South Asian ethnicity. Other factors independently associated with worse outcome were lower age, male gender, lower eGFR, lower serum albumin and lower haemoglobin.

Conclusion: Albuminuria is the principle modifiable risk factor for accelerated progression to ESRD in people of South Asian ethnicity. Treatments to reduce albuminuria should be optimized in people of South Asian ethnicity. Research is needed into why albuminuria is typically higher in this ethnic group.

Disclosure of Interest: None Declared

Keywords: CKD Progression, Ethnicity

Epidemiology & Public Health

PO-120

Hazardous Alcohol Intake is Associated with Elevated Estimated Glomerular Filtration Rate in Hospitalised Patients

J. Law [1,*], J. Arnold [1], F. Evison [2], I. Dasgupta [3], P. Cockwell [1], C. Ferro [1]

[1]Department of Renal Medicine, [2]Department of Health Informatics, UNIVERSITY HOSPITALS BIRMINGHAM NHS TRUST, [3]Department of Renal Medicine, Heart of England NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: There is increasing evidence of an association between elevated (>105 ml/min/1.73m^2) estimated glomerular filtration rate (eGFR) and all-cause, and cardiovascular mortality. Very limited historical evidence suggests a possible connection between excessive alcohol intake and a higher eGFR.

Objectives: Using a current, large, UK based, ethnically and socioeconomically diverse patient cohort we investigated the relationship between alcohol intake and eGFR.

Methods: The first 2437 individuals recruited into the Acute Care Quality in Chronic Kidney Disease (ACQUATIK)[1] prospective observational cohort were included. The cohort comprised patients admitted to hospital who were not previously known to renal services. Detailed demographic, socioeconomic and bio-clinical data were collected on the day of admission. Weekly alcohol unit intake was assessed using an on-line calculator (www.nhs.uk/tools/pages/alcohol-unit-calculator.aspx). Hazardous alcohol intake was defined as a weekly consumption of > 21 units in men, and 14 units in women. Univariable and multivariable regression analyses were performed.

Results: The mean age of the cohort was 61 years, 47% were female and 87% were of white ethnicity. Mean eGFR was 82 ± 28ml/min/1.73m^2, with 516 (21%) having an eGFR >105 ml/min/1.73m2 and 554 (23%) had an eGFR<60 ml/min/1.73m^2. 926 patients (38%) reported drinking alcohol with 348 (14%) reporting hazardous drinking. Patients with elevated eGFR were more likely to be hazardous drinkers (25% v 18%; P=0.01). Conversely, patients with an eGFR<60 ml/min/1.73m2 were less likely to be hazardous drinkers (12% v 22%; P<0.001).

In univariable linear regression analysis, hazardous alcohol intake was associated with a higher eGFR (β=4.023; 95% CI 2.469–5.577; P<0.001). This association persisted in multivariable analysis after adjustment for multiple parameters including age, gender, ethnicity, body mass index, medication, co-morbidities and socio-economic status (β=3.208; 95% CI 1.941–4.475; P<0.001).

In multivariable logistic regression analysis, patients with a hazardous alcohol intake were more likely (Odds Ratio 2.2; 95%CI 1.5-3.1; P<0.001) to have an elevated eGFR compared with patients with lower alcohol intake or non-drinkers after multiple adjustments as above.

Conclusion: Hazardous alcohol intake is associated with higher eGFR overall and with elevated eGFR (>105 ml/min/1.73m^2) in particular despite multiple adjustments. The potential mechanisms behind this association require further investigation. Whether hazardous alcohol intake explains, at least in part, the relationship between elevated eGFR and poor outcomes remains to be determined.

References: 1. Arnold JJ, et al. Acute Care QUAliTy in chronic Kidney disease (ACQUATIK): a prospective cohort study exploring outcomes of patients with chronic kidney disease. BMJOpen 2015;5:e006987

Disclosure of Interest: None Declared

Keywords: CKD, eGFR, Epidemiology

Epidemiology & Public Health

PO-121

Mortality in young patients on renal replacement therapy in Scotland

P. Gallacher [1,*], M. Findlay [2], K. Donaldson [3], A. Doyle [4], J. Fox [2], I. Khan [5], B. MacKinnon [6], J. McDonald [6], R. Peel [7], I. Shilliday [8], E. Spalding [9], V. Sanu [10], J. Traynor [6], W. Metcalfe [6] and Scottish Renal Registry

[1]Renal Medicine, Royal Infirmary of Edinburgh, Edinburgh, [2]Queen Elizabeth University Hospital, Glasgow, [3]Dumfries and Galloway Royal Infirmary, Dumfries, [4]Victoria Hospital, Kirkcaldy, [5]Aberdeen Royal Infirmary, Aberdeen, [6]Scottish Renal Registry, Glasgow, [7]Raigmore Hospital, Inverness, [8]Monklands Hospital, Airdrie, [9]University Hospital, Crosshouse, [10]Ninewells Hospital, Dundee, United Kingdom

Preferred Presentation Method: Oral

Introduction: Young patients on renal replacement therapy (RRT) have a significantly increased mortality rate compared to age-matched subjects with normal renal function.

Objectives: We sought to characterise the deaths of young patients on RRT to understand if the causative factors differ from those responsible for the deaths of older patients on RRT.

Methods: Data from the Scottish Mortality Audit on RRT (SMARRT), a Scottish Renal Registry project, identified patients (aged ≥18 years) who died whilst receiving RRT in Scotland between 01 January 2008 and 31 December 2015. We categorised patients according to age at death (group: A= 18-39 years; B= 40-49 years; C= ≥50 years). Variables analysed included cause of death group, primary renal diagnosis (PRD) group, co-morbidities, RRT modality and vascular access for haemodialysis (HD) at death. From postcode of residence we derived the Scottish index of multiple deprivation (SIMD). SMARRT also records if compliance with treatment is considered a potential contributor to death. Statistical analyses were performed using SPSS; Mann–Whitney U or Chi-Square tests were performed as appropriate for group comparisons.

Results: A total of 3,501 adult patients died whilst on RRT during the eight-year study period. Of these, 87 (2.5%) patients were classed as age group A, 216 (6.2%) were group B and 3,197 (91.3%) group C. Interstitial renal diseases were the most common PRD group in groups A and B (34.5% and 35.2%, respectively). For group C, it was multisystem disorders (26.2%). In group A patients, 63.2% were on HD at the time of death and 31.0% dialysed via an arteriovenous fistula. The prevalence of ischaemic heart disease in this group was just 3.4%, significantly less than for group C patients ($p<0.01$).

Deaths across all age categories were most frequently due to cardiovascular causes: A (29.9%), B (38.9%), and C (32.1%). Myocardial infarction was considered causal of death in just 2.3% of group A patients, *versus* 13.3% of group C patients ($p<0.05$). However, hyperkalaemia was considered the primary cause of death in 9.2% of group A patients, compared with just 0.5% and 0.2% of group B and C deaths, respectively ($p<0.01$).

Non-compliance was considered a contributory factor to death in 20.7% of group A patients, significantly more than for group B (13.9%) and group C patients (2.8%) ($p<0.01$). Sixty point nine percent of group A patients were in the most deprived SIMD quintiles (1 and 2), compared with 56.5% of group B patients and 45.9% of group C patients ($p<0.01$).

Conclusion: Across all age categories, mortality in patients on RRT was most commonly due to cardiovascular aetiology. Hyperkalaemia, non-compliance and social deprivation were identified as key factors associated with the death of young

patients on RRT. These data represent an important step towards identifying how to reduce the number of deaths in this population.

Disclosure of Interest: None Declared

Keywords: Epidemiology, RRT, Young adults

Epidemiology & Public Health

PO-122

Association between obesity and outcome after acute admissions in end stage renal disease

K. Gillis [1,*], T. Collidge [1]

[1]Glasgow Renal and Transplant Unit, NHS GREATER GLASGOW AND CLYDE, Glasgow, United Kingdom

Preferred Presentation Method: Poster

Introduction: The relationship between body mass index (BMI) and outcome in patients with end stage kidney disease differs from the general population, with better outcomes observed in patients with high body weight (1-3). The relationship between BMI and outcome during acute illness in patients receiving renal replacement therapy is less certain.

Objectives: To determine the relationship between obesity and mortality during emergency admission to hospital, in patients with end stage kidney disease

Methods: We performed a retrospective analysis of our renal electronic database, including patients who underwent emergency admission to the Glasgow Renal and Transplant Unit over the period 2001 to 2016. Patients were grouped by BMI, with obesity defined as BMI > 30. Outcome measures were time to death, as well as death during admission, and at 30, 90 and 365 days. Subgroup analysis was performed by modality of renal replacement therapy.

Results: There were 5200 admissions of 1612 patients, with 1031 of these occurring in patients with obesity. Admissions were shorter in the obese group (4 vs 5 days; $p = 0.001$). There was no difference in admission (5.5 vs 4.1%; $p = 0.14$) or 30 day mortality (6.3 vs 8.7%; $p = 0.10$), but 90 (7.9 vs 13.9%; $p < 0.001$) and 365 day mortality (19.6 vs 32.8%; $p < 0.001$) was lower in the obese group. The obese group had significantly higher serum albumin (34 vs 33 g/dL; $p = 0.004$) but with no difference in C-reactive protein (16 vs 17 g/L; $p = 0.32$).

On sub group analysis by modality of RRT, there was no difference in admission or 30-day mortality between the two groups across different treatment types. The protective effect of obesity on 90 (7.5 vs 15.1% $p < 0.001$) and 365 day (20.1 vs 34.9%; $p < 0.001$) mortality was only evident in the haemodialysis group.

The relationship between the time to death and BMI was evaluated using stepwise multivariate linear regression with inclusion of variables at p values less than 0.05. In the model, BMI, age at admission, CRP at admission, albumin prior to admission, and albumin at admission were independent predictive factors of time to death, whilst CRP prior to admission was not predictive ($R^2 = 0.14$, $p < 0.001$).

Conclusion: Patients with end stage renal disease who are obese are at the time of acute hospitalisation are at the same risk of in-hosptial, and 30 day mortality as those who are non-obese.In the longer term, obesity is a protective factor, but this effect is mostly observed in patients receving haemodialysis as opposed to peritoneal dialysis or those with kidney transplants. This protective effect may relate to nutritional factors in the non-obese population.

References: 1. Mortality risk factors in patients treated by chronic haemodialysis, Report of the Diaphane collaborative study. Degoulet et al, Nephron 1982

2. Influence of excess weight on mortality and hospital stay in 1346 haemodialysis patient. Fleischman et al, Kidney International 1999

3. Body mass index, dialysis modality and survival: Analysis of the United States Renal Data System Dialysis Morbidity and Mortality Wave II Study. Abbott et al, Kidney International 2004

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Obesity

Epidemiology & Public Health

PO-123

High prevalence of Non-Alcoholic Fatty Liver Disease in Chronic Kidney Disease

R. Chinnadurai [1,*], D. Vassallo [1], J. Ritchie [1], D. Green [1], P. Kalra [1]

[1]Department of Renal Medicine, Salford Royal NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Non-alcoholic fatty liver disease (NAFLD) is the most common form of chronic liver disease in Western countries. Depending on the diagnostic criteria used, the prevalence of NAFLD ranges from 10-24% in the general population to 30-50% in diabetic populations[1]. NAFLD has been shown to be a strong independent predictor of cardiovascular disease[2] and a risk factor for developing chronic kidney disease(CKD)

Objectives: To estimate the prevalence of NAFLD in a Cohort of advanced CKD patients and to investigate the impact of NAFLD on cardiovascular and renal outcomes

Methods: All patients recruited in the Salford Kidney Study (SKS) who had an Ultrasound (US) of the liver performed between January 2000 to December 2014 were sampled in this retrospective observational study**.** Data collected from electronic patient records included US report and Indication, baseline patient characteristics, and blood results. Data was analysed using SPSS software.

Table:

Factor	NAFLD N=183 (21%)	NORMAL N=669 (79%)	P-VALUE
Hypertension	156(85%)	504(75%)	0.004
Diabetes Mellitus	89(48.6%)	200(29.8%)	0.000
Ischemic Heart Disease	55(30.05%)	183(27.3%)	0.471
ALT (U/L) Median(IQR)	28(21 – 40)	20(15- 28)	0.000

Results: Of the 3061 patients registered in the SKS, 1419 patients had a liver US during the study period. 271 patients were excluded due to history of alcohol excess, concurrent renal replacement therapy, hepatitis and other chronic liver disease. Of the remaining 1148, the US was reported as normal in 752, NAFLD in 205 and 191 had other abnormalities (cysts, haemangiomas, malignancy etc). The estimated prevalence of NAFLD was therefore 17.9%in our cohort. NAFLD was diagnosed incidentally during an US assessment for a renal indication (AKI, CKD, ADPKD) in 17% (100 of 589 US). Comparative analysis was undertaken in 852 (183 NAFLD and 669 with normal liver US) patients with complete datasets. At baseline, median age of the study group was 66 years and median eGFR was 33.5mL/min/1.73m^2. Patients with NAFLD had more Hypertension, Diabetes Mellitus and Raised Alanine Aminotransferase levels(ALT) (Table 1). There were no significant differences between the groups in terms of smoking status, blood pressure and previous cardiovascular events. Body Mass Index was significantly higher in NAFLD group 31 vs 27 kg/m^2(P= <0.0001). Prevalence of NAFLD was 30.8% in diabetics with liver US and full data sets

Conclusion: The prevalence of NAFLD in our CKD cohort may be an underestimation of the true prevalence due to the retrospective nature of our study, and the fact that US were not performed in all patients. We hope that future prospective studies can help establish the burden of this condition in this co-morbid population. Further analyses are being carried out to explore the impact of NAFLD on Cardiovascular and renal Outcomes in the CKD population

References: 1.L. Orlic et al,Chronic Kidney Disease and Nonalcoholic Fatty Liver Disease—Is There a Link? Gastroenterology Research and Practice Volume 2014, http://dx.doi.org/10.1155/2014/847539

2. Hongyun Lu et al, “Independent Association between Nonalcoholic Fatty Liver Disease and Cardiovascular Disease: A Systematic Review and Meta-Analysis,” International Journal of Endocrinology, vol. 2013, Article ID 124958, 7 pages, 2013. doi:10.1155/2013/124958

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, CKD, Diabetes

Epidemiology & Public Health

PO-124

An ontological approach for identifying chronic kidney disease from primary care data

N. Cole [1,*], P. Swift [1], R. Suckling [1], N. Poh [2], H. Liyanage [3], R. Byford [3], S. de Lusignan [3]

[1]South West Thames Renal Unit, Epsom and St Helier Hospitals NHS Trust, London, [2]Department of Computer Science, [3]Department of Clinical and Experimental Medicine, University of Surrey, Guildford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The identification of chronic kidney disease (CKD) in primary care is vital for treating and managing patients appropriately, as well as for surveillance and research purposes. Previous studies in the United Kingdom (UK) have usually attempted to do so using estimated glomerular filtration rate (eGFR), and not included measures of proteinuria or clinical coding in their approach.

Objectives: The principle aim of this study was to develop a comprehensive method for identifying and staging CKD from primary care data, using an ontological approach.

Methods: Data from the Royal College of General Practitioners (RCGP) Research and Surveillance Centre (RSC) were used for this cross-sectional study. The identification and staging of CKD was carried out in keeping with the Kidney Disease: Improving Global Outcomes (KDIGO) clinical practice guidelines. Three parallel approaches were used for case definition: Read (Version 2) clinical codes consistent with a diagnosis of CKD; determination of eGFR (CKD-EPI) using ≥ 2 creatinine results taken ≥ 90 days apart; demonstration of proteinuria on two occasions ≥ 90 days apart.

Results: The total cohort consisted of 1,464,335 patients. The median age was 39 years, 50.5% were female and 11.1% were known to be of non-white ethnicity. A baseline eGFR was available for 547,935 individuals (37.4%). Use of eGFR alone identified 40,694 individuals with CKD stage 3-5, giving an overall prevalence of 2.8%. The prevalence was 6.9% in those aged over 50 years and 15.9% in those over 70 years. Proteinuria estimations identified a further 9,378 individuals with CKD that did not meet diagnostic criteria using eGFR in isolation (*i.e.* those with CKD stages 1-2). 18,788 of the 50,072 (37.5%) with CKD based on eGFR and proteinuria did not have a CKD Read code. In addition, 27,792 patients had a CKD Read code but did not meet the criteria for CKD stage 1-2 based on an eGFR of ≥ 60mL/min/1.73m^2 and the absence of proteinuria.

Conclusion: The crude prevalence rate of CKD in this population was lower than other studies that have reported rates of between 4.0-8.5% in the UK. However the rates of CKD in the older population confirm that CKD is common. The mismatch between laboratory-defined CKD and clinical CKD coding raises the possibility that a significant number of individuals have not been identified for appropriate monitoring and management.

Disclosure of Interest: None Declared

Keywords: CKD, GFR, Renal service planning

Epidemiology & Public Health

PO-125

The effect of revascularization in patients with anatomically significant atherosclerotic renovascular disease presenting with high-risk clinical features.

D. Vassallo [1,*], J. Ritchie [1], D. Green [1], C. Chrysochou [1], P. Kalra [1]

[1]Renal Department, Salford Royal NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with atherosclerotic renovascular disease (ARVD) and high-risk clinical presentations have been largely been excluded from randomized controlled trials comparing renal revascularization and optimal medical therapy[1,2].

Objectives: To explore the effect of revascularization on death, progression to end-stage kidney disease (ESKD) and cardiovascular events (CVE) in a highly selected cohort of patients with ARVD.

Methods: All patients with a radiological diagnosis of ARVD referred to our tertiary center have been recruited into a single-centre cohort study between 1986 and 2014. Patients with ≥70% unilateral or bilateral ARVD together with one or more of the following putative high-risk presentations were designated 'high-risk': flash pulmonary edema (FPE), severe hypertension, rapidly deteriorating renal function. The effect of revascularization on clinical outcomes in high-risk patients, patients with bilateral severe ARVD and those with <1g proteinuria at baseline was compared to 'control' patients who had the same degree of renal artery stenosis but did not exhibit these features.

Table: Table 1 Effect of revascularization on clinical end-points in high-risk patients with rapidly deteriorating renal function, bilateral ≥70% renal artery stenosis (RAS) and baseline proteinuria <1g/day

	High-risk ARVD patients with rapidly deteriorating renal function [Hazard Ratio (95% confidence interval] n=44	High-risk ARVD patients with bilateral ≥70% RAS [Hazard Ratio (95% confidence interval] n=41	High-risk ARVD patients with baseline proteinuria <1g/day [Hazard Ratio (95% confidence interval] n=99
Death	0.62 (0.34-1.14)	0.59 (0.25-1.38)	0.64 (0.38-1.05)
ESKD	0.47 (0.25-0.85)	0.35 (0.15-0.84)	0.52 (0.32-0.86)
CVE	0.51 (0.29-0.91)	0.54 (0.24-1.20)	0.52 (0.32-0.83)
Any	0.51 (0.29-0.90)	0.50 (0.23-1.10)	0.57 (0.36-0.90)

Results: Median follow-up was 58.4 months (IQR 25.4-97.3). Revascularization was associated with a reduced risk of progression to ESKD, CVE and all combined events in patients with rapidly deteriorating renal function (ESKD: HR 0.47 [95% CI 0.25-0.85], p=0.01; CVE: HR 0.51 [95% CI 0.29-0.91], p=0.02; Any: HR 0.51 [95% CI 0.29-0.90], p=0.02). High-risk patients with bilateral ≥70% RAS and those with <1g/day baseline proteinuria also had significantly better renal and cardiovascular outcomes post revascularization when compared to controls.

Conclusion: Our results indicate that revascularization may be of benefit in patients with anatomically significant RAS who present with rapidly deteriorating renal function, especially in the presence of severe bilateral ARVD or <1g/day proteinuria.

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2. Cooper CJ, Murphy TP, Cutlip DE, et al. Stenting and medical therapy foratherosclerotic renal-artery stenosis. *N Engl J Med*. 2014;370(1):13-22.

Disclosure of Interest: None Declared

Keywords: CKD Progression, Epidemiology, Renovascular disease

Epidemiology & Public Health

PO-126

Determinants of long-term outcomes in patients with atherosclerotic renovascular disease and high-risk clinical features.

D. Vassallo [1,*], D. Green [1], J. Ritchie [1], C. Chrysochou [1], P. Kalra [1]

[1]Renal Department, Salford Royal NHS Foundation Trust, Salford, United Kingdom

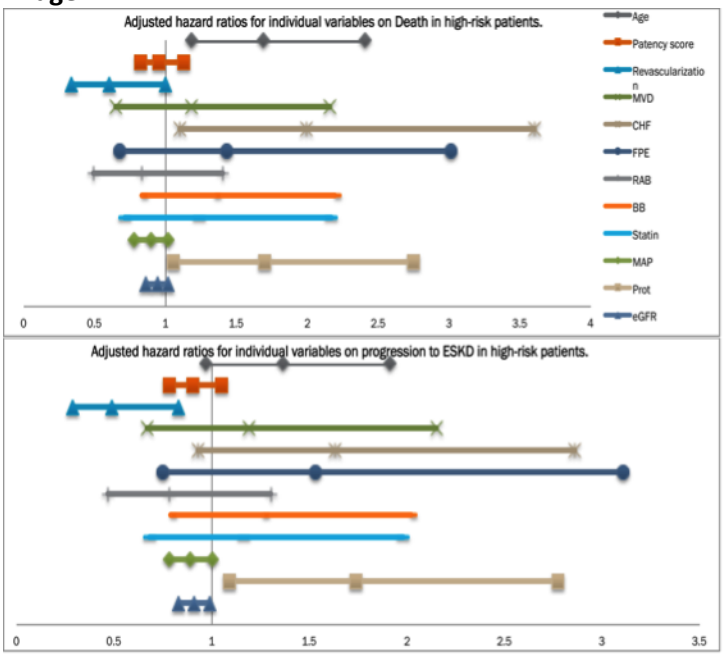
Preferred Presentation Method: Oral or Poster

Introduction: Although most patients with atherosclerotic renovascular disease (ARVD) remain stable on multi-targeted vascular protective therapy, a small but important proportion of patients present with a 'high-risk' clinical phenotype. There is observational evidence that these patients may gain added benefit from renal revascularization[1,2].

Objectives: In this study we aim to compare the phenotype of ARVD patients with severe anatomical disease and 'high-risk' clinical presentations with that of asymptomatic patients with less severe anatomical disease and to explore determinants of long-term outcomes in these two selected patient subgroups

Methods: Patients with a radiological diagnosis of ARVD were recruited into our single-center study between 1986 and 2014. Patients with >70% unilateral or bilateral ARVD together with one or more of these putative high-risk presentations were designated 'high-risk': flash pulmonary edema (FPE), severe hypertension, rapidly deteriorating renal function. Patients who did not meet these criteria were designated 'low-risk'. Univariable and multivariable Cox regression analyses were used to explore the association between individual variables and the following end-points: death, end-stage kidney disease (ESKD), cardiovascular event (CVE) and the first of any of these events.

Image:



Results: Out of a total of 843 patients who met inclusion criteria, 131 (15.5%) were designated high-risk. A larger proportion of high-risk patients underwent revascularization, and more were established on statins and renin-angiotensin blockade at baseline compared to 'low-risk' patients. While 'high-risk' status was associated with increased adjusted hazard ratio for all four end-points, it only reached statistical significance for CVE (HR 1.28 [95% CI 1.01-1.62] p=0.044). Multivariate analysis revealed renin-angiotensin blockade was associated with reduced risk of death (HR 0.42[95% CI 0.23-0.77], p=0.004), CVE (HR 0.65 [95% CI 0.42-0.99] p=0.046 and any event (HR 0.64 [95% CI 0.41-0.94]

p=0.024). Revascularization conferred protection against ESKD (HR 0.58 [95% CI 0.36-0.92] p=0.02) and CVE (HR 0.63 [95% CI 0.41-0.97] p=0.037). Better diastolic blood pressure and renal function at time of diagnosis were also associated with reduced risk of adverse outcomes.
Conclusion: Traditional cardiovascular risk factors together baseline proteinuria and renal function are associated with adverse events in patients with ARVD. Our results emphasize the fact that risk stratification of patients with ARVD may help select those individuals who gain benefit from revascularization.
References: 1.Herrmann SMS, Saad A, Textor SC. Management of atherosclerotic renovascular disease after Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL). Nephrol Dial Transplant. 2014;30(3):366-375. 2.Ritchie J, Green D, Chrysochou C, Chalmers N, Foley RN, Kalra P a. High-risk clinical presentations in atherosclerotic renovascular disease: prognosis and response to renal artery revascularization. Am J Kidney Dis. 2014;63(2):186-97.

Disclosure of Interest: None Declared

Keywords: CKD Progression, Epidemiology, Renovascular disease

Epidemiology & Public Health

PO-127

Baseline urinary findings in young adults with progressive kidney dysfunction in Nicaragua

E.-T. Smpokou [1,*], B. La Rosa Garcia [1], J. Morton [2], J. Le Blond [3], J. Glaser [4], A. Camacho [5], D. Faber [6], A. Aragón [5], J. Norman [1], N. Pearce [7], D. Nitsch [7], M. González [5], B. Caplin [1]

[1]Centre for Nephrology, University College London (UCL), London, [2]Health and Safety Laboratory, Buxton, [3]Royal School of Mines, Imperial College London, London, United Kingdom, [4]La Isla Network, Illinois, United States, [5]Research Center of Health, Work and Environment (CISTA), National Autonomous University of Nicaragua, [6]La Isla Foundation, León, Nicaragua, [7]Non-Communicable Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic Kidney Disease of undetermined cause (CKDu) has emerged as a public health problem in Central America, also known as Mesoamerican Nephropathy (MeN)[1]. CKDu has caused the death of thousands of young rural adults many of whom work in sugarcane production[2]. CKDu is not related with traditional risk factors such as hypertension, diabetes mellitus and obesity[3].

Objectives: We are undertaking a community-based cohort study in a region of Nicaragua affected by CKDu, investigating factors associated with decline in estimated glomerular filtration rate (eGFR)[4]. The aim of this analysis was to characterise the urinary findings at baseline and quantify any associations with progressive renal dysfunction over the follow-up period.

Methods: Blood and urine samples have been collected from 350 apparently healthy men and women (3:1) 18-30 years old from 9 different communities in Nicaragua who have been followed-up every 6 months for a period of 2 years since 2014. Dipstick urinalysis was performed on previously frozen samples (Siemens Multistix 10 SG Reagent Strips) and urine albumin and creatinine quantified using bromocresol green and Jaffe methods, respectively. We then compared the urinary findings of those with more stable function and those with rapid loss of kidney function (as defined by a modelled decline in eGFR of >10.5mL/min/year over the follow-up period using a multilevel model).

Table: Frequency of protein measured by dipstick urinalysis and the albumin: creatinine ratio (ACR) stratified by change in eGFR in the baseline population.

		Whole Cohort (n=350)	Stable Group (n=297)	Declining Group (n=53)
Protein	Neg, n (%)	294 (84)	251 (84.5)	43 (81.2)
	Trace, n (%)	38 (10.8)	34 (11.5)	4 (7.5)
	≥1+, n (%)	18 (5.2)	12 (4.0)	6 (11.3)
ACR	≥30mg/mmol, n (%)	6 (1.7)	5 (1.7)	1 (1.9)

Results: Overall, urinary abnormalities were infrequent and mild in our study population. Median albumin:creatinine ratio (ACR) was 0mg/mmol (IQR: 0-44). No differences in urinary dipstick posititvity for blood or leucocytes were observed between the groups who went on to lose kidney function compared to the stable group. Although there was a trend toward increased proteinuria on dipstick in the declining group, ACR was not elevated (Table).

Conclusion: Our findings are consistent with previous reports that suggest CKDu is not a primary glomerular disorder. Simple urine tests are unlikely to be useful in identifying those with the early stages of the disease.

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Disclosure of Interest: E.-T. Smpokou Conflict with: Colt Foundation, B. La Rosa Garcia: None Declared, J. Morton: None Declared, J. Le Blond: None Declared, J. Glaser: None Declared, A. Camacho: None Declared, D. Faber: None Declared, A. Aragón: None Declared, J. Norman: None Declared, N. Pearce: None Declared, D. Nitsch: None Declared, M. González: None Declared, B. Caplin: None Declared

Keywords: CKD, Epidemiology, Urinalysis

Epidemiology & Public Health

PO-128

Patient Choice in Advanced Chronic Kidney Disease

R. Pyart [1,*], K. Donovan [1], G. Roberts [1]

[1]Nephrology, CARDIFF AND VALE LHB, Cardiff, United Kingdom

Preferred Presentation Method: Poster

Introduction: The incidence of advanced chronic kidney disease is rising in the context of an ageing population with increasingly complex comorbid conditions.

Objectives: The purpose of this study was to explore differences in patient choices at the early decision making process against initiating mode of renal replacement therapy (RRT) and survival. We also reviewed the impact of comorbidity and deprivation on outcomes.

Methods: Retrospective analysis was performed of 3,191 patients with chronic kidney disease stage V who were referred for pre-dialysis education over a ten year period in a single centre study. The interview identified patient choice regarding renal replacement therapy. The Charlson Comorbidity Index (CCI) and Welsh Index of Multiple Deprivation were used to estimate the burden of comorbidity and level of deprivation respectively.

Image:

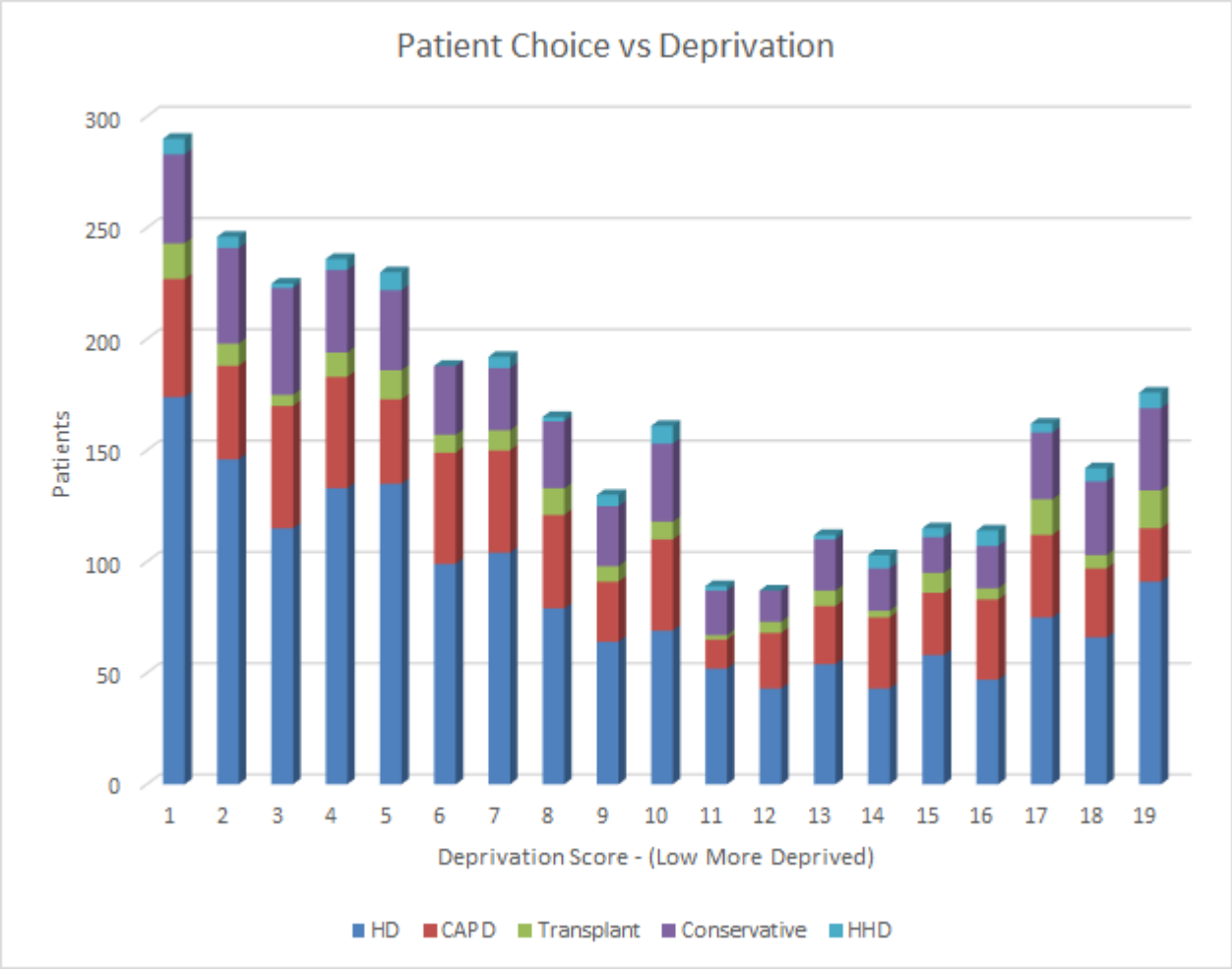

Table:

Modality Choice	% Starting Chosen Modality	% Switched Modality	% Still Pre RRT	% Dying Pre RRT
HD	51.2%	4.4%	17.6%	26.8%
PD	38.4%	31.8%	17.6%	12.2%
Transplant	27.2%	32.4%	38.2%	2.3%
Conservative		3.2%	22.8%	74.1%

Results: The baseline characteristics at time of interview were: age 66.2 +/- 15.8 years, 60.4% male, mean CCI score of 2.8 (excluding 2 points for CKD). 55%, 22% and 18% chose to plan for haemodialysis, peritoneal dialysis and conservative care respectively. 21.2% patients who chose a form of RRT died before initiating any RRT, while a further 19.5% remained "predialysis". Of the patients who chose peritoneal dialysis, almost equal numbers went on to start on a different modality as did ultimately start on peritoneal dialysis. Peaks in RRT were seen in the most deprived and most affluent areas, with significantly older patients discussing RRT in the most affluent areas. Age and comorbidity were independent predictors of mortality while deprivation was not.

Conclusion: This study confirms that the predialysis interview can identify multiple factors which may predict the likely outcome of different renal replacement modalities for individual patients and allow more informed decision making to take place. Further work is needed to look at the impact of deprivation on outcomes for patients with chronic kidney disease.

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Disclosure of Interest: None Declared

Keywords: Conservative kidney care, Haemodialysis, RRT

Genetic Disorders

PO-129

Lessons learned from a multidisciplinary renal genetics clinic

S. Alkanderi [1,*], L. Yates [1], S. Johnson [1], J. Sayer [1]

[1]Institute of Genetic Medicine, Newcastle University, Newcastle, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Inherited renal disorders comprise a significant proportion of cases in both paediatric and adult nephrology services. Genetic advances have advanced rapidly whilst clinical models of care delivery have remained static.

Objectives: Here we describe a cohort of patients attending a multidisciplinary renal genetics clinic and the insights gained from this experience.

Methods: A retrospective review of clinic cases and their molecular genetic diagnosis over a five year period.

Results: We report details of 244 individuals including 80 probands who attended the clinic. The commonest reasons for referral was familial haematuria which accounted for 37.5% of cases and cystic kidney disease, accounting for 31% of cases. 18 probands had a known molecular genetic diagnosis and were referred for genetic counselling and screening of at risk relatives and management plans. 62 probands and their families were referred for a precise molecular diagnosis and this was achieved in 26 cases (42%). The most frequent new genetic diagnoses were *COL4A5* mutations underlying familial haematuria and familial end stage renal disease. The clinic also allowed for patients with rare renal syndromes to be reviewed, such as ciliopathy syndromes, allowing detailed phenotyping and often a precise molecular genetic diagnosis to be provided.

Conclusion: The integration of modern day genetics and genomics into multidisciplinary clinics often allows a precise diagnosis which benefits patients, their relatives and the clinicians providing care and future management.

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Genomics, Patient experience

Genetic Disorders

PO-130

Very early-onset autosomal dominant polycystic kidney disease due to bi-allelic mutations in PKD1 and PKD2

J. Chong [1,*], M. Durkie [2], A. Dalton [2], A. C. Ong [1]

[1]Academic Nephrology Unit, University of Sheffield, [2]Sheffield Diagnostic Genetics Service, Sheffield Children's NHS Foundation Trust, Sheffield, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Autosomal dominant polycystic kidney disease (ADPKD) usually presents in early adult life but can present at any age. Very rarely, ADPKD can be diagnosed in utero or in infancy (under the age of 2) with a very early onset (VEO) presentation associated with a high recurrence rate in subsequent pregnancies. Recently, several case reports have reported the presence of biallelic *PKD1* or *PKD2* mutations often involving a hypomorphic allele, incompletely penetrant in the heterozygous state.

Objectives: We report the results of a retrospective audit of VEO patients (n=20) referred to our service for genetic testing and confirm a high incidence (60%) of biallelic mutations in this group.

Methods: We conducted a retrospective review of all children referred for ADPKD genetic testing to the Sheffield Diagnostic Genetics Service (SDGS) between 2010 and 2015, with clinical presentations aged 2 and below. Testing was carried out by bi-directional sanger sequencing of all coding exons and ±25bp intron/exon boundaries of the *PKD1* and *PKD2* genes. For the duplicated region of *PKD1* (exons 1-33), *PKD1*-specific long-range PCR was performed followed by nested PCR and bi-directional sequencing. From February 2016 onwards all samples were tested by long-range PCR and next-generation sequencing (NGS) of *PKD1* and *PKD2*. For 3 cases found initially by Sanger sequencing to have only one hypomorphic variant detected (n=2), or with no mutations detected (n=1), testing was repeated by NGS but no additional variants were found.

Results: Of the 20 children included in this study, 12 (60%) had biallelic variants in *PKD1* or *PKD2*. Of the rest, 5 patients were heterozygous for *PKD1* (25%), and 3 patients had no mutation detected (15%). Of those with 2 mutations, 6 (50%) were found *in trans*, 1 *in cis*, and parental origin was indeterminate for the remainder. 3 *de novo* mutations were detected. Altogether, we identified 28 mutations (12 novel) in this cohort, of which 23 were in *PKD1*, 5 in *PKD2*. 8 of the novel mutations had an inheritance pattern consistent with a hypomorphic mutation.

Conclusion: Our results confirm that a majority of children with VEO ADPKD carry biallelic *PKD1* or *PKD2* mutations. These have important implications for genetic and reproductive counselling and emphasize the need for completeness of genetic analysis in this subgroup. The detection of potential hypomorphic mutations has significant implications for the interpretation of mutations in apparently asymptomatic adults. The contribution of other cystic genes in those with one or no mutations detected remains to be determined.

Disclosure of Interest: None Declared

Keywords: ADPKD, Children

Genetic Disorders

PO-131

Fractional excretion of magnesium is a highly sensitive and specific biomarker for HNF1B-associated renal disease

R. Clissold [1,*], R. Oram [1], T. McDonald [1], B. Shields [1], A. Hattersley [1], C. Bingham [2]

[1]University of Exeter Medical School, [2]Royal Devon and Exeter NHS Foundation Trust, Exeter, United Kingdom

Preferred Presentation Method: Poster

Introduction: Heterozygous mutations in the gene that encodes hepatocyte nuclear factor 1β (*HNF1B*) are the commonest monogenic cause of developmental kidney disease. Electrolyte abnormalities, including hypomagnesaemia and hyperuricaemia, are frequently seen. Hypomagnesaemia is secondary to renal magnesium (Mg) wasting, although the fractional excretion of magnesium (FEMg) has only been reported in a very small number of affected patients.

Objectives: Our objective was to compare renal Mg wasting in individuals with HNF1B-associated renal disease and patients under the care of a general nephrology clinic to see if FEMg may serve as a biomarker for the disease.

Methods: Creatinine (Cr) and Mg were measured in paired serum and spot urine samples in 15 patients with an *HNF1B* mutation and 14 age- and sex-matched individuals from a general nephrology clinic. Exclusion criteria included a native GFR <30 mL/min/1.73m^2 and the use of either Mg supplementation or medications associated with hypomagnesaemia (diuretics, calcineurin inhibitors and proton pump inhibitors). FEMg was calculated ([urine Mg x serum Cr/serum Mg x urine Cr] x 100) and compared between the two groups.

Results: FEMg was a highly discriminative marker of HNF1B-associated renal disease: median FEMg was higher in the HNF1B cohort at 10.56% (interquartile range [IQR] 7.5-14.37) compared to the clinic cohort (2.47% [IQR 1.8-3.08], p<0.0001). Receiver operating characteristic (ROC) analysis, with HNF1B-associated disease status as the dependent variable, results in an area under the curve of 0.99 (95% confidence interval 0.95-1). A cut-off for FEMg of 5.65% was 100% sensitive and 93% specific for patients with an *HNF1B* mutation. Median serum Mg was lower in the HNF1B cohort at 0.66 mmol/L (IQR 0.54-0.7) compared to the clinic cohort (0.87 mmol/L [IQR 0.81-0.9], p<0.0001). Serum Mg was below the normal reference range of 0.7-1 mmol/L in 10/15 (67%) individuals with HNF1B-associated disease compared to 1/14 (7%) clinic patients, p=0.002.

Conclusion: In individuals with developmental kidney disease of uncertain cause, FEMg ≥5.65% should lead to referral for *HNF1B* genetic testing even if the serum Mg is within the normal reference range. FEMg is both cheap (£0.52) and easy to measure. If these results are confirmed in a larger prospective study, it should be implemented as a screening test in routine clinical care.

Disclosure of Interest: None Declared

Keywords: Development, Magnesium

Genetic Disorders

PO-132

Symptomatic pancreatic exocrine deficiency is an important clinical feature of HNF1B-associated renal disease

R. Clissold [1,*], M. Hudson [2], T. McDonald [1], B. Shields [1], A. Hattersley [1], C. Bingham [3]

[1]University of Exeter Medical School, [2]Exeter National Institute for Health Research Clinical Research Facility, [3]Royal Devon and Exeter NHS Foundation Trust, Exeter, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Heterozygous mutations in the gene that encodes the transcription factor hepatocyte nuclear factor 1β (*HNF1B*) are the commonest monogenic cause of developmental kidney disease. Extra-renal phenotypes frequently occur, including diabetes mellitus and pancreatic hypoplasia; the latter is associated with subclinical exocrine dysfunction. Faecal elastase-1 (FE-1) levels have only been reported in a small number of individuals with HNF1B-associated disease, the majority of which have diabetes.

Objectives: Our objective was to (i) measure FE-1 in affected patients both with and without diabetes and (ii) assess the degree of symptoms associated with pancreatic exocrine deficiency.

Methods: FE-1 was measured by enzyme-linked immunosorbent assay on a single spot stool sample in 147 control individuals without diabetes and 38 patients with an *HNF1B* mutation or whole-gene deletion. Symptoms related to pancreatic exocrine dysfunction (abdominal pain, loose stools and unintentional weight loss) were assessed by direct questioning and a subset of the HNF1B cohort (n=7) underwent pancreatic imaging with either computerised tomography or magnetic resonance imaging scanning.

Results: We defined a low FE-1 based on the 2.5th percentile of the control cohort (410 μg/g stool). FE-1 was <410 μg/g stool in 18/29 (62%) individuals with HNF1B-associated renal disease where a stool sample was available. Only 8/29 (28%) had a FE-1 measurement suggestive of exocrine pancreatic insufficiency at <200 μg/g stool. Of these, 3/8 suffered with abdominal pain, loose stools and/or unintentional weight loss; all experienced symptomatic improvement and weight gain after commencing pancreatic enzyme replacement therapy. 6/7 individuals who underwent imaging in the HNF1B cohort had evidence of pancreatic hypoplasia; FE-1 was <200 μg/g stool in 2/6 patients. FE-1 was <410 μg/g stool in 7/15 (47%) HNF1B patients without diabetes compared to 11/14 (79%) of those with diabetes (p=0.1), suggesting FE-1 levels are not simply a marker of diabetes status in HNF1B-associated disease.

Conclusion: In individuals with developmental kidney disease of uncertain cause, FE-1 levels <410 μg/g stool should prompt consideration of referral for *HNF1B* genetic testing. Three patients in this HNF1B cohort had symptomatic pancreatic exocrine deficiency that improved once enzyme replacement therapy was established. This highlights the importance of measuring FE-1 in patients with known HNF1B-associated renal disease complaining of chronic abdominal pain, loose stools or unintentional weight loss.

Disclosure of Interest: None Declared

Keywords: Development

Glomerular Pathobiology

PO-133

Age adjusted 5 year mortality in ANCA associated vasculitis patients treated with Rituximab as an induction agent.

N. Naz [1,*], K. Abdulnabi [1], A. banerjee [1]

[1]Renal, WIRAL UNIVERSITY HOSPITAL, Wirral, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: There is limited long term data on use of Rituximab (without cyclophosphamide combination) as the primary /Induction agent in ANCA associated vasculitis (AAV) .There is no trial comparing the safety of Rituximab in older versus younger age groups. We looked into 5 years follow up of new AAV patients treated with rituximab as the main induction agent with Prednisolone (without cyclophosphamide combination), including 15 patients with serum creatinine > 354µmol and 6 patients with lung haemorrhage not requiring ventilator support.

Objectives: Our aim was to investigate the long term patient and renal survival in patients above or below 75 yrs of age.

Methods: We retrospectively assessed 32 new AAV patients treated with Rituximab as an induction agent without Cyclophosphamide. We divided them into two groups, age <75 and >75. 5 years median renal and patient survival was assessed

Results: 37% patients were female, 60% patients presented with serum creatinine <500umol/l and 40% >500umol/l. 19% i.e. 6 patients presented with lung Haemorrhage not requiring artificial ventilation. C-ANCA was positive in 56% patient versus P-ANCA in 44%.

Average age is 69 (min 24 and max 89).There were total of 17 patients age less than 75, and 15 patient age more than 75. In the younger age group, only 2 patients died, median survival was 66 months, with median HD free survival of 43 months. While in older age group 12 patients died, over all median survival was 27 months and median HD free survival was 26.2 months.

No malignancies were reported in either group

Conclusion: Rituximab is safe and effective treatment as an induction agent in a younger age group.

Very high mortality in age group >75.

Age is a significant predictor of survival

Disclosure of Interest: None Declared

Keywords: ANCA, Vasculitis

Glomerular Pathobiology

PO-134

Investigating the role of thymosin-beta4 in maintaining podocyte shape and function

E. Vasilopoulou [1,*], R. Assuncao De Sousa Brites [2], P. Riley [3], D. Long [2]

[1]Medway School of Pharmacy, Universities of Kent and Greenwich, Chatham, [2]Developmental Biology and Cancer, UCL GOS Institute of Child Health, London, [3]Department of Physiology, Anatomy and Genetics, University of Oxford, Oxford, United Kingdom

Preferred Presentation Method: Poster

Introduction: Glomerular disease is characterised by morphological changes in podocyte cells accompanied by proteinuria. Thymosin-β4, the major G-actin-sequestering protein in mammalian cells, regulates actin cytoskeleton assembly, cell morphology and motility. We have previously reported that thymosin-β4 is localised in podocytes in the mouse glomerulus and that loss of thymosin-β4 exacerbates proteinuria and induces podocyte migration following glomerular injury[1]. However, the precise role of thymosin-β4 on podocyte morphology in health and disease is unknown.

Objectives: To investigate the effects of thymosin-β4 on podocyte shape and function.

Methods: Differentiated immortalised mouse podocytes were transfected with control or thymosin-β4 siRNA. Cell viability (MTT assay), migration (wound-healing assay), actin cytoskeleton morphology (phalloidin staining) and the activity of the Rho-GTPases, RhoA and Cdc42, were assessed. To induce podocyte injury, primary podocytes from wild-type or thymosin-β4 knockout mice were cultured in media with normal (5mM) or high (25mM) glucose levels for 7 days and effects on the actin cytoskeleton were assessed.

Results: Transfection of differentiated mouse podocytes with thymosin-β4 siRNA resulted in >90% knockdown of endogenous thymosin-β4 levels ($p<0.001$). Knockdown of endogenous thymosin-β4 increased podocyte migration *in vitro* ($p<0.05$) without affecting podocyte viability. There was F-actin rearrangement, demonstrated by increased formation of cytoplasmic stress fibres ($p<0.001$), and increased RhoA activity ($p<0.05$) in podocytes transfected with thymosin-β4 siRNA compared with control siRNA whereas Cdc42 activity was unaffected. Primary podocytes from thymosin-β4 knockout mice also had increased cytoplasmic stress fibres compared with wild-type podocytes. Culture of wild-type podocytes in high glucose increased cytoplasmic stress fibres whereas loss of thymosin-β4 concomitant with high glucose further compounded this effect ($p=0.057$).

Conclusion: Endogenous thymosin-β4 regulates podocyte cytoskeletal dynamics and is likely to have a protective role, maintaining podocyte shape and function following hyperglycaemic injury.

References: 1. Vasilopoulou, E*., et al.* Loss of endogenous thymosin beta4 accelerates glomerular disease. *Kidney international* **90**, 1056-1070 (2016).

Disclosure of Interest: None Declared

Keywords: Diabetic nephropathy, Glomerular function, Podocyte

Glomerular Pathobiology

PO-135

Vasculitis a challenge: A review of two unusual presentations

R. Chinnadurai [1,*], M. Patel [1], A. Vardhan [1]

[1]Department of Renal Medicine, Central Manchester University Hospitals NHS Foundation Trust, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Despite advances in the management of Vasculitis, establishing a diagnosis can sometimes be a challenge. We describe two interesting cases of vasculitis to highlight the varied presentation and challenges in diagnosis and management.

Objectives: To highlight the challenges faced in diagnosis and management of our two cases of vasculitis.

Methods: Review of records of two cases of vasculitis in terms of presentation, clinical course, management and outcome.

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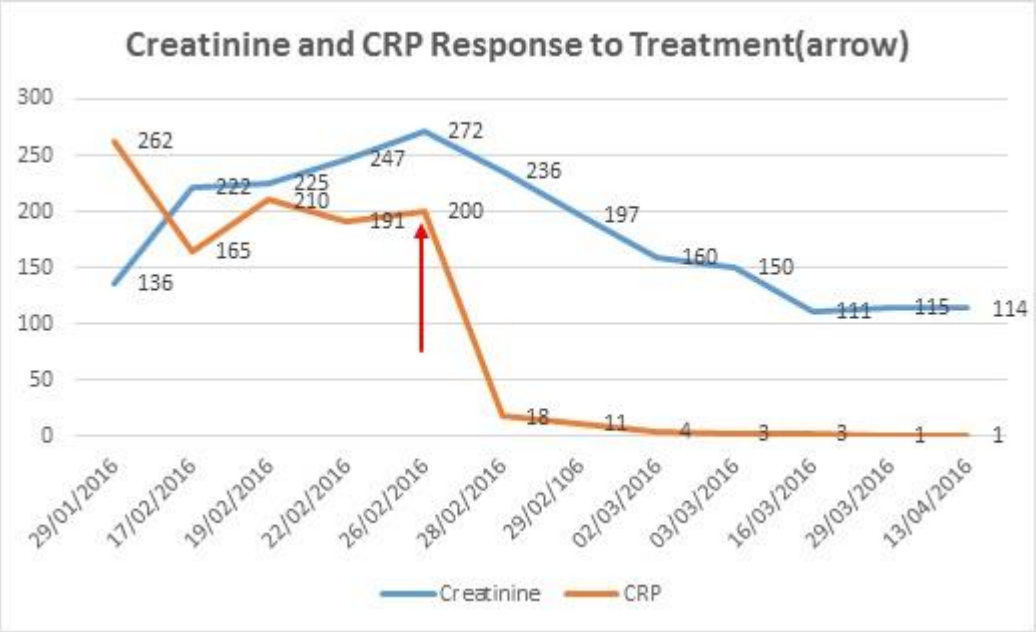

Results: Case 1: A 59-year-old previously fit and well male presented to his GP with a 4 week history of feeling generally unwell along with leg swelling, breathlessness and weight loss. He was initially referred to the Gastroenterologists and Respiratory Physicians with a suspicion of underlying malignancy. He had several inconclusive radiological and invasive gastrointestinal investigations before being admitted to a peripheral hospital 5 months after his initial presentation. He was then found to be heavily nephrotic with Urine Potein Creatinine Ratio of 505 mg/mmol and Albumin of 18 g/L. His renal function was preserved with creatinine of 72 µmol/L and his routine immunology screen was negative. He was transferred to our centre two weeks later and underwent a kidney biopsy which raised the possibility of Cryoglobulinaemic Vasculitis with Glomerulonephritis. His serum was positive for cryoglobulins. He was treated with high dose Steroids, Plasma Exchange and Rituximab. Despite this his clinical condition deteriorated and he developed multiorgan failure requiring ventilatory support and Renal Replacement Therapy in the form of CVVH. He succumbed to his illness while in Intensive Care to concomitant infective complications.

Case 2: A 55-year-old previously fit and well female presented to a peripheral hospital with a two-week history of non-specific abdominal pain, nausea with occasional vomiting. She had no overt symptoms or signs suggestive of systemic vasculitis apart from persistent mild pyrexia. Systemic examination was unremarkable except for bilateral flank tenderness. Her urine dipstick showed 1+blood, 1+protein, 1+cast. Blood tests showed CRP elevated to 262 mg/L and creatinine to 136 umol/L. Initial investigations were directed towards diagnosing a possible infective cause for her illness. She underwent a septic screen including multiple blood cultures, urine cultures, full infectious diseases screen and several radiological investigations including a whole body CT scan. Her immunology screen was negative. She was manged as Pyrexia of Unknown Origin with broad spectrum antibiotics. She was transferred to our centre due to worsening symptoms and declining renal function despite 4 weeks of treatment. On transfer, she had a kidney biopsy which showed a Pauci-immune Crescentic Glomerulonephritis confirming the diagnosis of ANCA negative vasculitis. She was commenced on high dose steroid therapy and pulsed IV Cyclophosphamide and had a prompt recovery in terms of symptoms, inflammatory markers as well as renal function. (Fig 1)

Conclusion: Both these patients presented with non-specific systemic symptoms not typical of a systemic vasculitic process. Both had multiple radiological and other invasive investigations prior to the diagnosis of vasculitis which was made following a kidney biopsy. A high index of suspicion and a low threshold for early tissue diagnosis could have identified vasculitis earlier in these cases. The overall outcome can vary quite significantly depending on how and where patients initially present.

Disclosure of Interest: None Declared

Keywords: ANCA, Cryoglobulinaemia, Vasculitis

Glomerular Pathobiology

PO-136

Increased prevalence of thyroid disease in patients with ANCA associated vasculitis

M. Prendecki [1,*], L. Martin [1], A. Tanna [1], M. Antonelou [1], C. Pusey [1]

[1]Imperial College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: In addition to the known association between different auto-immune diseases, ANCA associated vasculitis (AAV) has previously been associated with thyroid disease possibly due to use of anti-thyroid medications which can induce ANCA. In our clinical practice we have noted a higher prevalence of thyroid disease than would be expected in the general population.

Objectives: To identify the prevalence of thyroid disease and its association with the use of anti-thyroid drugs in patients with AAV.

Methods: We identified 279 patients with AAV, diagnosed between 1991 and 2014. Patients were excluded if they were diagnosed prior to 1990 or if insufficient clinical information was available. Data were collected retrospectively on ANCA type, features of vasculitis, history of thyroid disease and treatment.

Results: Of 279 patients with AAV, 60 (21.5%) had evidence of thyroid disease; 49 (17.6%) patients had hypothyroidism (5 patients with transient or subclinical hypothyroidism), 10 (3.6%) had hyperthyroidism (5 patients with transient or subclinical hyperthyroidism) and 1 patient had goitre without derangement of thyroid function. Of the patients with hyperthyroidism 3 developed subsequent hypothyroidism after anti-thyroid treatment. Two of the patients with derangement of thyroid function also had goitre and 2 had thyroid nodules. Forty-three patients (71.7%) received treatment with thyroxine, 3 patients (5%) received radio-iodine followed by thyroxine, and only 2 patients (3.3%) were treated with propylthiouracil.

There were more female patients in the group with thyroid disease than those with AAV and no thyroid disease (73.3% vs. 45.2% female, p=0.0002 chi-squared) and patients were more likely to have anti-MPO antibodies than negative for MPO (56.7% vs. 30.5%, p=0.0016). A greater proportion of patients with thyroid disease had evidence of renal involvement as part of their vasculitis 95% vs. 81.7%, (p=0.02).

Conclusion: Our data shows a prevalence of thyroid disease of 21.5% and prevalence of hypothyroidism of 17.6% in our group of patients with AAV. This is much higher than the reported population prevalence of hypothyroidism in the UK which is around 1%. This was particularly evident in women for whom the prevalence of hypothyroidism in our cohort was 30.8% compared to around 2% in the general population. The prevalence of hyperthyroidism was also higher but the difference less marked- 3.6% in our population compared to reported population prevalence between 0.5-2.0%. This was seemingly independent of the use of anti-thyroid drugs, with only 2 documented cases of previous use of PTU in our series. In patients with AAV, thyroid disease seems to associate with MPO-ANCA and with renal involvement of vasculitis.

Given the high prevalence of thyroid disease, particularly hypothyroidism, in our group of patients with AAV we would suggest that patients diagnosed with AAV should be assessed for evidence of thyroid disease.

Disclosure of Interest: None Declared

Keywords: ANCA, Autoantibodies, Vasculitis

Glomerular Pathobiology

PO-137

ANCA-associated vasculitis is associated with a high risk of arterial and venous thrombosis

A. Kang [1,*], M. Antonelou [1], A. Tanna [2], N. Arulkumaran [1], F. W. Tam [2], C. D. Pusey [2]

[1]Imperial College Renal and Transplant Centre, [2]Renal and Vascular Inflammation Section, Department of Medicine, Imperial College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: A few previous studies have shown an association between ANCA-associated vasculitis (AAV) and cardiovascular disease (CVD) and venous thromboembolism (VTE), which may be mediated by inflammation or anti-plasminogen antibody.

Objectives: We aimed to determine the incidence and risk factors for arterial and venous thrombosis in ANCA-associated vasculitis (AAV) in a UK population.

Methods: This single-centre retrospective cohort study presents the incidence of arterial thrombosis (defined as coronary events and ischaemic stroke), VTE and all-cause mortality in people diagnosed with AAV between 2005 -2014. We collected patient baseline characteristics, risk factors for CVD and VTE, and events of CVD, VTE, AAV relapse and death.

Results: 204 patients with AAV were identified with a median follow-up of 5.3 [range: 0.08-10] years or total of 1088 person-years. The overall incidence rate (IR) was 2.76/100 person-years for CVD (1.65 for coronary events and 1.10 for ischaemic stroke) and 1.47/ 100 person-years for VTE (0.83 for DVT only and 0.64 for PE with or without DVT). When we compared these results with reported rates for the UK population, the rates in AAV patients were 17 times higher for coronary events, 10 times higher for incident stroke and 20 times higher for VTE. The incidence of both CVD and VTE events was highest in the first year but remained elevated for the entire follow up period (IR for years 2 to 10 were 2.22 and 1.00 per 100 person years for arterial and venous thrombosis respectively). On univariate analysis, increasing age ($p=0.001$), prior VTE ($p=0.004$), renal involvement ($p=0.020$), MPO ANCA type ($p=0.011$), lower albumin ($p=0.004$), higher CRP ($p=0.001$) and prior ischaemic heart disease ($p<0.001$) at diagnosis of AAV were significantly associated with subsequent CV events. However, on multivariate analysis only prior ischaemic heart disease was a predictor of CV events. CVD (but not VTE) was an independent predictor of all-cause mortality. When we removed patients with prior CVD the incidence of CV events was still elevated at 2.32/ 100 person-years (1.26 for coronary events and 1.06 for ischaemic stroke). There was no significant difference in baseline characteristics between those who suffered VTE and those who did not.

Conclusion: Patients with AAV have a high incidence of arterial and venous thrombosis. Thromboprophylaxis should be considered in the care of patients with AAV.

Disclosure of Interest: None Declared

Keywords: ANCA, Cardiovascular Disease, Thrombosis

Glomerular Pathobiology

PO-138

Non-classical monocytes orchestrate inflammatory myeloid retention to mediate tissue damage in immune-complex-mediated glomerulonephritis

T. Turner-Stokes [1,*], A. Garcia-Diaz [1], D. Pinheiro [1], T. Cook [1], C. Pusey [1], K. Woollard [1]

[1]Medicine, IMPERIAL COLLEGE LONDON, London, United Kingdom

Preferred Presentation Method: Oral

Introduction: Recent work using a mouse model of glomerulonephritis (GN) suggests non-classical monocytes patrol the capillaries of glomeruli and mediate an inflammatory response through prolonged interactions with neutrophils during GN. However, this model does not produce histopathological features of glomerular inflammation that resemble human disease and hence has limited clinical relevance.

Objectives: We used intravital confocal microscopy in a rat model of severe crescentic GN (nephrotoxic nephritis, NTN) to directly visualise the dynamic changes that occur in monocyte subset behaviour and leukocyte-endothelial interactions during glomerular inflammation in vivo. NTN in rats is more reproducible and histopathologically translatable to human GN than the mouse model.

Methods: Intravital imaging was performed using confocal microscopy in hCD68-GFP WKY transgenic reporter rats to enable tracking of GFP^{pos} monocytes within glomerular capillaries. Myeloid subpopulations (classical monocytes, non-classical monocytes and neutrophils) were identified in rats using FACS and molecular phenotyping. Non-classical ($Lin^{neg}CD68^{pos}CD43^{high}CX3CR1^{high}CCR2^{low}$) and classical monocytes ($Lin^{neg}CD68^{pos}CD43^{low}CX3CR1^{low}CCR2^{high}$) were labelled in-vivo and neutrophils identified as $Lin^{neg}CD68^{neg}CD43^{high}CXCR2^{high}$ cells. These myeloid subpopulations were tracked in real-time and their behaviour analysed in situ during disease, compared to controls.

Results: Rat myeloid subpopulations are homologous to human cells and change their blood frequency during NTN. Within the glomeruli, during NTN, there was increased recruitment of non-classical monocytes but their dwell time did not change significantly. Conversely, neutrophils and classical monocytes underwent increased retention, with marked increases in their dwell times, but without increased recruitment. No transendothelial migration of any myeloid population was noticeable during disease. Non-classical monocytes displayed a distinct migratory behaviour, scanning glomerular capillaries for prolonged periods of time, even in the absence of inflammation. Neutrophils underwent stationary retention at the endothelial interface during NTN, illustrated by a significant fall in their confinement ratio. Further work is in progress to understand the molecular basis for these distinct behavioral phenotypes and the mechanisms of tissue damage during endothelial retention.

Conclusion: Using this innovative in vivo imaging technique in a clinically relevant model of GN, our data suggest that non-classical monocytes play a role in orchestrating the inflammatory response to immune complex deposition within glomerular capillaries and may drive changes in neutrophil behaviour that mediate glomerular damage. In conclusion, we have defined the distinct spatial and temporal patterns of intravascular monocyte subset behaviour and recruitment during crescentic glomerulonephritis.

Disclosure of Interest: None Declared

Keywords: Anti-GBM disease, Glomerulonephritis, Monocyte

Glomerular Pathobiology

PO-139

Membranous Glomerulonephritis with Crescents

A. L. Nikolopoulou [1,*], I. Huang-Doran [1], S. McAdoo [1], M. Griffith [1], H. T. Cook [1], C. Pusey [1]

[1]Renal Section, Imperial College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The coexistence of membranous glomerulonephritis (MGN) with necrotising and crescentic glomerulonephritis (NCGN) is rare.

Objectives: We examined the incidence and outcomes of patients with MGN and NCGN treated at our centre and the association with antineutrophil cytoplasm (ANCA) or anti-glomerular basement (anti-GBM) antibodies.

Methods: We report the clinical and pathological findings of 12 patients with MGN and NCGN, identified from our renal biopsy database from January 1998 to July 2016.

Results: The cohort consisted of 5 women and 7 men with a median age of 72 years (range 34 to 79 years). ANCA and anti-GBM positivity was tested by ELISA and was positive in 11 patients: 5 MPO-ANCA, 1 PR3-ANCA, 5 anti-GBM; one patient was negative and the biopsy showed IgA deposition. Clinical presentation included heavy proteinuria (median urinary protein: creatinine ratio 716mg/mmol,range 88 to 5600), microscopic haematuria and acute kidney injury (median creatinine 547micromol/L (6.18mg/dL, range 86 to 1125 micromol/L)). Pathologic evaluation revealed MGN and NCGN with crescents involving a mean of 32% of glomeruli. Immunohistology available in 11 cases showed granular IgG deposits with linear IgG in the anti-GBM cases. Electron microscopy showed stage I or II MGN changes in the majority of cases. Anti-phospholipase A2 receptor (PLA2R) and anti -thrombospondin domain 7A (THSD7A) staining was negative in 9 available biopsies and no causes of secondary MGN were identified. One patient had a biopsy that showed MGN alone 6 months prior to anti-GBM disease. One patient had pre-existing p-ANCA vasculitis 2 years prior to MGN.

Follow up was available for all 12 patients, and all were treated with steroids, together with cyclophosphamide (n=8), plasma exchange (n=2), rituximab (n=3) and MMF (n=2), alone or in combination. At a mean follow up of 69 months, 5 patients progressed to ESRD (3 with anti-GBM and 2 with ANCA antibodies) and 6 had stabilisation or improvement of renal function. Three patients with ESRD died during the follow up period. The only independent predictor of progression to ESRD was serum creatinine at presentation.

Conclusion: MGN combined with NCGN is a rare dual glomerulopathy in which anti-PLA2R and anti-THSD7A antibodies are not generally detected. Presentation is with proteinuria, haematuria and acute kidney injury. Prognosis is variable and seems to be related to renal function at presentation.

Disclosure of Interest: None Declared

Keywords: ANCA, Glomerulonephritis, Membranous

Glomerular Pathobiology

PO-140

Investigating the effect of podocyte loss of glycogen synthase kinase 3 α (GSK3α) in glomerular injury models

J. Hurcombe [1,*], A. Lay [1], L. Ni [1], F. Barrington [1], M. Saleem [1], S. Patel [2], J. Woodgett [3], S. Quaggin [4], G. Welsh [1], R. Coward [1]
[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, [2]University of Cambridge, Cambridge, United Kingdom, [3]University of Toronto, Toronto, Canada, [4]Northwestern University, Chicago, United States

Preferred Presentation Method: Oral or Poster

Introduction: Glycogen synthase kinase 3 (GSK3) is a multi-functional serine/threonine kinase existing as two distinct but related isoforms (α and β). There is evidence that the GSK3 isoforms have different functions: GSK3β null mice die during late embryogenesis due to hepatocyte apoptosis and cardiac defects whereas whole body GSK3α knockout mice are viable and interestingly, exhibit enhanced insulin sensitivity. A number of cell-specific GSK3 knockout mouse models have been described and indicate that the functions of the GSK3 isoforms are cell-type dependent.

Objectives: Podocyte inhibition of GSK3β has been suggested to be beneficial in a variety of disease models. This study aims to show if deletion of GSK3α in the podocyte has a similar protective effect.

Methods: We have generated transgenic mice with podocyte-specific ablation of GSK3α. These mice were then studied in a number of models of kidney injury: an Adriamycin nephrosis model and streptozotocin to induce diabetic nephropathy. Additionally we have developed a conditionally immortalised cell line to investigate podocyte loss of GSK3α *in vitro*.

Results: Preliminary data suggest that podocyte knockout of GSK3α does not improve albuminuria in mice given intravenous Adriamycin to induce kidney injury. Similarly, podocyte-specific GSK3α knockout mice rendered diabetic with Streptozotocin did not show a significant difference in urinary albumin:creatinine at 20 weeks when compared with cre negative littermate controls.

In light of previous studies indicating increased insulin sensitivity in GSK3α null mice, we hypothesised that depletion of GSK3α in podocytes might also enhance insulin sensitivity in this cell type. A GSK3α knockout podocyte cell line was developed and these cells stimulated with insulin at 10nM and 100nM. Results from these experiments suggest that loss of GSK3α does not increase insulin sensitivity (with respect to phosphorylation of serine/threonine kinase AKT and extracellular signal-related kinase, ERK) in GSK3α knockout podocytes compared with control cells.

Conclusion: Podocyte loss of the GSK3α isoform does not appear to be protective in models of kidney injury in contrast with reported observations for GSK3β. This suggests that therapeutic intervention should specifically target the β isoform.

Disclosure of Interest: None Declared

Keywords: Animal model, Podocyte

Glomerular Pathobiology

PO-141

Identifying the role of angiopoietin-2 on glomerular mesangial cells

S. Benedetti [1,*], K. Dunn [2], C. M. Peppiatt-Wildman [2], D. A. Long [1]

[1]Great Ormond Street Institute of Child Health, UCL, London, [2]Medway School of Pharmacy, Urinary System physiology Unit, The Universities of Kent and Greenwich at Medway, Chatham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Angiopoietins (Angpt) are vascular growth factors which play an important role in maintaining the structure and integrity of the glomerular filtration barrier. In healthy adult glomeruli, Angpt1 is constitutively expressed in glomerular podocytes and activates Tie2 which is predominately found in glomerular endothelia leading to blood vessel survival and stabilisation. However, during disease conditions, including diabetic nephropathy and glomerulonephritis, the Angpt1 antagonist, Angpt2, is upregulated. Furthermore, podocyte-specific overexpression of Angpt2 in otherwise healthy adult mice leads to the leakage of albumin from the glomerulus, but the mechanisms underlying this observation are not well understood.

Objectives: We explored the hypothesis that Angpt2 might alter the biology of the perivascular mesangial cells which provide structural support for glomerular capillaries. Specifically, we hypothesize that i) Angpt2 reduces mesangial coverage of vessels by decreasing the migration of these cells to the vasculature; (ii) Angpt2 alters mesangial contraction, which may lead to changes in their ability to regulate vascular tone; (iii) the biological effects in (i) and (ii) are mediated by Angpt2 binding directly to mesangial Tie2 or modulation of mesangial integrin signaling.

Methods: FACS-sorting was used to isolate murine mesangial cells. In-vitro exogenous Angpt2 stimulation experiments were performed on mesangial cells and wound-healing assays used to assess migration A novel in-situ kidney slice model has been used to detect Angpt2-induced changes in vasculature tone ex-vivo.

Results: In murine glomeruli the mesangial marker NG2 labelled a cell population mainly located in the glomerular core. FACS-sorted $NG2^+$ glomerular mesangial cells (n = 3) are viable, proliferating and express the Angpt2 target Tie2 *in vitro*. They also express β1, α5 and αV integrins, which have been shown to be Angpt2 direct targets. Accordingly, wound-healing assays revealed that exposure of NG2+ glomerular mesangial cells to exogenous Angpt2 (72 hours) leads to a statistically significant decrease in cell migration *in vitro* (CTR cells:146.8µm ± 15.87; Angpt2-treated cells: 52,91µm ± 19.74. n = 3, *p = 0.24). Finally, preliminary experiments performed using the novel *ex-vivo* kidney slice model to study in situ mesangial -mediated control of vascular tone showed that a specific yet unidentified subset of glomerular cells respond to Angpt2 stimulation.

Conclusion: Overall this data suggests an active role for Angpt2 on mesangial biology and function. These studies will enhance our basic understanding of mesangial-endothelial interactions in kidney health and disease allowing us to unravel how Angpt2, a key driver in glomerular disease, precisely alters blood vessels and may identify the mesangial as a new therapeutic target for renal disease.

Disclosure of Interest: None Declared

Keywords: Glomerular function, Growth factors, Mesangial cell

Glomerular Pathobiology

PO-142

TRPC6 KO Podocytes Have Increased Adhesion and Decreased Attachment

L. Farmer [1,*], G. Welsh [1], M. Saleem [1]

[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: A variety of genetic mutations in TRPC6 are known to cause FSGS and identify this protein as a target for the treatment of nephrotic syndrome. TRPC6 is a membrane localised ion channel with a high calcium conductance and previous work has suggested that its pathology is due to gain of function of the channel and increased calcium conductance. However several newly identified disease causing mutations show no change in, or decreased, calcium conductance. This suggests that these mutations may be affecting the podocyte in other ways than simply calcium conductance.

Objectives: Our objectives were to generate conditionally immortalised TRPC6 KO podocytes and use these as a basis to investigate the role of TRPC6 in adhesion and motility of the podocyte. We could then reintroduce WT TRPC6 and look for novel TRPC6 binding partners. Disease causing mutant constructs would also be introduced to assess how these affected podocyte function.

Methods: Conditionally immortalised podocyte cell lines have been generated from TRPC6 KO C57Bl/6 mice. GFP tagged WT/mutant TRPC6 was stably reintroduced into the KO cell line through generation of lentiviral constructs. These cell lines were then characterised to determine cell motility and adhesion using scratch and adhesion assays. GFP TRAP beads were used to immunoprecipitate TRPC6 and proteomics was performed to identify novel binding partners. These interactions were confirmed through immunoprecipitation of both GFP tagged and endogenous protein. Immunofluorescence and Western Blotting have been used to look at the expression and location of these proteins.

Results: TRPC6 KO cells appeared morphologically normal and expressed podocyte markers. Scratch assays showed that the cells were significantly less motile than podocytes of WT mice, re-introduction of WT TRPC6 reversed this phenotype. The KO podocytes adhered at the same rate as WT cells but were significantly slower to detach suggesting that TRPC6 is playing a significant role in focal adhesion complexes. The actin cytoskeleton is also reorganised in the KO podocytes. Proteomics studies have identified several actin and/or calcium binding proteins as being TRPC6 binding partners which have been confirmed through immunoprecipitation. Membrane preparations and immunofluorescence have been used to look at the location of these proteins. Work is ongoing to establish differences in binding/localisation between WT and mutant TRPC6 in podocytes.

Conclusion: TRPC6 plays a role in the adhesion and motility of the podocyte. New binding partners have been identified which could be contributing to this function. Mutations in TRPC6 could be affecting protein-protein interaction as well as calcium conductance giving a new insight into how these mutations could cause glomerular injury.

Disclosure of Interest: None Declared

Keywords: FSGS, Glomerular function, Podocyte

Glomerular Pathobiology

PO-143

Prolonged exposure of podocytes to insulin causes insulin resistance via proteasomal degradation of the insulin receptor

A. Lay [1,*], V. Betin [1], J. Hurcombe [1], F. Barrington [1], G. Pearson [1], M. Østergaard [1], G. Welsh [1], R. Coward [1]
[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Insulin resistance plays a major role in the pathogenesis of type 2 diabetes and the metabolic syndrome, including the development of albuminuria and diabetic nephropathy (DN). Podocytes are insulin responsive cells and the specific deletion of the podocyte insulin receptor (IR) *in vivo* causes features reminiscent of DN. While there is also evidence that circulating factors associated with insulin resistance may disrupt podocyte insulin signalling, the molecular mechanisms underpinning the development of podocyte insulin resistance in diabetes remain unclear.
Objectives: This study aimed to investigate how factors associated with systemic insulin resistance influence podocyte insulin signalling and, consequently, the development of renal disease in situations of insulin resistance, including DN.
Methods: Conditionally immortalised human and mouse podocyte cell lines and glomeruli isolated from db/db DBA2J mice were studied. Podocyte insulin responses were investigated with western blotting, cellular glucose uptake assays and automated fluorescent imaging of the actin cytoskeleton. QRT-PCR was employed to investigate changes in mRNA. Human cell lines stably overexpressing the IR and nephrin were also generated, using lentiviral constructs.
Results: Podocytes exposed to a diabetic environment (high glucose, high insulin and the pro-inflammatory cytokines TNF-α and IL-6) become insulin resistant with respect to activation of PI3K and MAPK signalling and glucose uptake. We found that prolonged exposure to high insulin concentrations causes an increase in IR degradation via a proteasome-dependent, bafilomycin-sensitive pathway. Reintroducing the IR into insulin resistant human podocytes rescues upstream phosphorylation events, but not glucose uptake. Stable expression of nephrin is also required for the insulin-stimulated glucose uptake response in podocytes and for efficient insulin-stimulated remodelling of the actin cytoskeleton.
Conclusion: Chronic exposure of podocytes to high insulin levels causes insulin resistance via proteasomal degradation of the IR. However, both the IR and nephrin are required for full insulin sensitivity of this cell. As hyperinsulinaemia is associated with insulin resistance, this could be an important contributing factor in the development of renal disease in the insulin resistance population.

Disclosure of Interest: None Declared

Keywords: Diabetic nephropathy, Podocyte

Glomerular Pathobiology

PO-144

Neuropeptide Y is a novel modulator of podocyte function and its loss is protective in models of albuminuric renal disease

A. Lay [1,*], F. Barrington [1], G. Welsh [1], R. Coward [1]

[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Neuropeptide Y (NPY) is one of the most abundant peptides of the central and peripheral nervous systems, with a key role in energy homeostasis. NPY also has a number of growth-factor-like effects in a range of tissues; with 4 functional receptors identified in mammals. As such, NPY is implicated in a multitude of conditions, including obesity and insulin resistance. Interestingly, the common Leu7pro7 polymorphism, thought to increase NPY secretion, has been associated with proteinuria and an increased susceptibility to nephropathy in type 1 diabetic patients. However, little work has been done to investigate the role of NPY in albuminuria.

Objectives: We aimed to investigate the effect of NPY on podocyte function and determine how a loss of NPY signalling would influence albuminuria *in vivo.*

Methods: Conditionally immortalized human and mouse podocytes were studied *in vitro* to determine NPY receptor signalling. For our *in vivo* investigations we studied wild-type (WT) 129Sv and NPY-deficient (NPY-/-) 129Sv mice, comparing two models of albuminuric renal injury; adriamycin nephropathy and streptozotocin (STZ)-induced diabetic nephropathy (DN).

Results: NPY signals to human and mouse podocytes, causing an increase in PI3K and ERK MAPK activity which is blocked in the presence of the Y2 receptor antagonist BIIE0246, indicating these responses are NPY2R-dependent. Using automated microscopy we also identified that NPY stimulates an increase in intracellular calcium concentrations in podocytes, which in turn promotes the nuclear translocation of NFAT. Using both focused insulin-signalling QPCR arrays and RNAseq, we observed a highly significant reduction ($p=10^{-125}$ for RNAseq) in NPY mRNA in insulin resistant podocytes *in vitro*, compared to controls. Data from the nephromine database, comparing DN patient groups, suggests this also occurs in human glomeruli. Interestingly, in contrast to WT controls, NPY-/- mice are protected from albuminuria 6 months after the induction of STZ-DN (a 4-fold increase in albuminuria is observed in WT mice, p=0.036 WT citrate vs STZ. No significant increase in albuminuria is observed in NPY-/- mice, p=0.6828 NPY-/- citrate vs STZ). Similarly, 14 days after the induction of adriamycin nephropathy, NPY-/- mice had a significantly (p=0.0172) lower level of albuminuria than WT controls.

Conclusion: These studies have identified a novel role for NPY in podocyte biology. Future work aims to further investigate whether therapeutic targeting of NPY systems could be beneficial in the treatment of proteinuric renal disease, including DN.

Disclosure of Interest: None Declared

Keywords: Animal model, Glomerular function, Podocyte

Glomerular Pathobiology

PO-145

Glomerular IGFBP-1 is down regulated in diabetic nephropathy and is important for podocyte function

L. Hale [1], A. Lay [1,*], E. Marquez [1], J. Hurcombe [1], L. Gillam [1], J. Allington [1], R. Lennon [2], G. Welsh [1], J. Holly [3], C. Perks [3], R. Coward [1]

[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, [2]Wellcome Trust Centre for Cell-Matrix Research, University of Manchester, Manchester, [3]IGFs & Metabolic Endocrinology Group, UNIVERSITY OF BRISTOL, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The secreted insulin-like growth factor binding proteins (IGFBPs), of which there are 6, are involved in modulating the IGF system; prolonging the half-life of IGF-I and –II as well as regulating their passage into tissues and receptor binding. Additionally, IGFBPs have been shown to exert IGF-independent effects on cell growth, differentiation and survival. Dysfunction in the IGF axis is associated with a multitude of renal conditions, including diabetic nephropathy, and we and others have previously shown that IGF-I and IGF-II signalling modulates podocyte biology. Interestingly, there is also evidence to suggest IGFBPs are linked to the pathogenesis of albuminuric renal disease, as polymorphisms in the IGFBP-1 gene have been associated with renal disease in type 2 diabetic patients.

Objectives: This project aimed to study the role of IGFBP production within the glomerulus in diabetic and non-diabetic environments and to investigate the signalling and functional responses of podocytes to IGFBP stimulation.

Methods: Conditionally immortalised human glomerular endothelial cells, mesangial cells and podocytes were studied *in vitro.* IGFBPs were detected in concentrated cell culture supernatants by western blotting. Podocyte responses to IGFBPs were determined by western blotting, cell viability assays, migration assays, adhesion assays and Electrical Cell-Substrate Impedance Sensing (ECIS). An IGFBP mRNA screen was performed in nephroseq, alongside QRT-PCR analysis of kidney tissue from type 1 diabetic mice, to determine any changes in glomerular IGFBPs in diabetic nephropathy (DN).

Results: IGFBPs 1-6 were detected, to varying degrees, in supernatants concentrated from human glomerular endothelial cells, mesangial cells and podocytes. We found that podocytes respond to IGFBPs via activation of PI3K and MAPK pathways, in an IGF-IR-independent manner. Of all the IGFBPs studied (1-6), we found IGFBP-1 stimulation increased podocyte survival, adhesion to collagen IV and migration. Data obtained through nephroseq revealed a significant down-regulation of IGFBP-1 mRNA in glomeruli of human DN patients and of db/db (type 2 diabetic) mice. We also found a significant reduction in IGFBP-1 mRNA in STZ-diabetic mice, compared to controls.

Conclusion: This work demonstrates that IGFBPs are produced by, and can signal to, glomerular cells. Interestingly, IGFBP-1 is down-regulated in diabetic glomeruli and directly influences a number of key podocyte processes. Thus, strategies to increase glomerular IGFBP-1 levels may be beneficial in the treatment of DN.

Disclosure of Interest: None Declared

Keywords: Diabetic nephropathy, Podocyte

Glomerular Pathobiology

PO-146

Partial loss of the IGF1 receptor in the murine podocyte is physiologically beneficial.

M. Marchetti [1,*], F. Barrington [1], A. Lay [1], J. Hurcombe [1], K. Garner [1], V. Betin [1], L. Ni [1], G. Welsh [1], R. Coward [1] and Bristol Renal

[1]Bristol Renal, UNIVERSITY OF BRISTOL, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The Insulin like growth factor (IGF) axis is classically associated with cell development, survival and growth in biological systems. The major receptor through which IGFs signal is the IGF1-receptor (IGF1R). We have previously shown that knocking down the IGF1R *in vitro* in human podocytes by 97% is highly detrimental resulting in cell death suggesting that IGF signalling is a critical survival pathway in this cell type [1].

Objectives: To understand the physiological importance of podocyte IGF signalling in the perfused glomerulus we generated and studied podocyte specific IGF1R transgenic knockdown mice.

Methods: We initially developed podocyte targeted mice that were homozygous for the floxed IGF1R and heterozygous for podocin cre. However these mice developed no phenotype so we increased the level of podocyte IGF1R excision by generating mice that had one IGF1R null allele and the other allele floxed which were crossed with podocin cre (podIGF1RKD). We then crossed this model with a tandem-tomato (tT)-GFP reporter mouse which enabled us to isolate purified podocytes (enriched > 5000% for nephrin and podocin, and decreased > 80% for PECAM in GFP compared to TR cells).

Results: The model we developed revealed podocyte knock down of the IGF1R by 80% ($p<0.005$) and that the related insulin receptor (IR) increased by 300%. These mice were born with normal Mendelian frequency and surprisingly had no renal phenotype. At 9-months of age they were well and had comparable urinary albumin:creatinine ratios and normal renal histology. We then studied the role of podocyte IGF signalling in the setting of glomerular stress by examining an Adriamycin glomerulopathy model comparing 8-week old podIGF1RKD mice with littermate IGF1R sufficient controls. Interestingly this revealed that podIGF1RKD mice were protected against disease progression with improved glomerular histology and less albuminuria compared to controls ($p<0.005$). We then generated primary culture podocyte cell lines from the mice. These showed that 80% IGF1R knock down podocytes were still able to respond to IGF1 stimulation by phosphorylating their PI3K and MAPK pathways. We are currently examining their endoplasmic reticular (ER) responses to elucidate if they are protected from ER stress (phosphoPERK, XBP1 and CHOP translocation). We speculate that ER stress will be reduced.

Conclusion: Substantial reduction of IGF signalling to the podocyte is not developmentally catastrophic and in some settings can protect against the progression of renal disease. Our work collectively suggests that too much or too little podocyte IGF stimulation can be detrimental and that partially inhibiting IGF signalling to the podocyte may be therapeutically beneficial.

References: 1. Hale et al J Pathol. 230:95-106 2013.

Disclosure of Interest: None Declared

Keywords: Albumin, Glomerular function, Podocyte

Glomerular Pathobiology

PO-147

Prognostic evaluation of the Oxford MEST score and Crescents in an Henoch Schönlein purpura cohort

A. Morris [1,*], M. Elsayed [1], M. Durcan [1], K. Frame [1], S. Zaidi [1], B. Nair [1], A. Dhaygude [2], A. Ponnusamy [1]
[1]Renal Medicine, [2]ROYAL PRESTON HOSPITAL, Preston, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Henoch Schönlein purpura (HSP) is a multisystem leukocytoclastic small-vessel vasculitis with deposition of immune complexes containing immunoglobulin A, neutrophil and eosinophilic infiltration. Both HSP nephritis and IgA nephropathy (IgAN) are indistinguishable on renal biopsy. Despite having a more severe presentation in adults, HSP is typically self-limiting in nature with transient nephritis. As such, current clinical practice advocates supportive management only and HSP has been excluded form most classification models and therapeutic studies of IgAN.

Objectives: To evaluate the relationship between different histological features on renal biopsy and disease progression over a five year period.

Methods: We constructed a cohort of consecutive patients with biopsy proven HSP from 2004 – 2011. Data on demographic, laboratory, histological and treatment parameters were retrospectively reviewed over a five year follow up period. The OXFORD MEST histological parameters and presence of crescents were the main predictor variables, while the main outcome was the mean change in eGFR at the end of follow up. CKD-EPI equation was used to calculate eGFR. The study hypotheses were investigated by applying a series of general linear models, adjusting for treatment status, with a level of significance of α=0.05.

Table: Table 1: Change in eGFR at five years according to key histological features

Histological parameter (present vs. absent)	Adjusted mean difference in eGFR at 5 year	
	mls/min.1.7m^2 (95%CI)	P value
Mesangial hypercellularity	-7.01 (-105.7, 91.69)	0.87
Endocapillary hypercellularity	-5.27 (-64.87, 75.42)	0.87
Crescents	-10.6 (-66.14, 44.88)	0.68

Results: A total of 15 patients contributed to this cohort. The mean age was of 23.6 $\pm$ 15 years. Females represented 60% of the cohort. Mean eGFR at entry and at the end of the study were, 93.7 $\pm$ 29.6 and 99.7 $\pm$ 30.7, respectively. The distribution of pathological findings were as follows: 6% had mesangial hypercellularity, 46.67% had endocapillary hypercellularity, 13% had segmental sclerosis and 13% had tubular atrophy and interstitial fibrosis. Crescents were present on 60%. Of those with crescents 66% received immune modulating treatment. None of the histological features, including the presence of crescents, was associated with significant change in eGFR after 5 years of follow up. Table 1.

Conclusion: Our findings suggest that when the Oxford MEST score for IgAN is applied to HSP nephritis no histopathological feature dictated a worse outcome. Similarly, the presence of crescents was not an adverse prognostic marker for disease progression. We hypothesised that the use of immunosuppression in the context of crescents or endocapillary hypercellularity may not be warranted in the absence rapidly deteriorating function. A larger scale study to develop reliable risk prediction model for patients with HSP is warranted.

Disclosure of Interest: None Declared

Keywords: Glomerulonephritis, HSP, Prognosis

Glomerular Pathobiology

PO-148

Cardiotrophin-1: a new therapeutic target for glomerular disease

N. Perretta-Tejedor [1,*], E. Vasilopoulou [1], C. Martínez-Salgado [2], D. Long [1]

[1]Developmental Biology and Cancer, UCL GOS Institute of Child Health, London, United Kingdom, [2]Department of Physiology and Pharmacology, University of Salamanca, Salamanca, Spain

Preferred Presentation Method: Oral or Poster

Introduction: During glomerular injury, podocytes are damaged resulting in proteinuria accompanied by marked inflammation and fibrosis. Therefore, therapies that modulate the inflammatory response have the potential to improve kidney function and significantly reduce the morbidity and mortality associated with glomerular disease. Cardiotrophin-1 (CT-1), is a member of the interleukin-6 family of cytokines and binds to receptors glycoprotein 130 (gp130) and leukaemia inhibitory factor receptor (LIFR). CT-1 has been shown to have anti-inflammatory and anti-fibrotic actions in animal models of unilateral ureteral obstruction, but its role in glomerular disease is yet to be established.

Objectives: To examine the role of CT-1 in the normal and diseased glomerulus.

Methods: CT-1 expression was assessed in normal murine kidneys and a mouse model of nephrotoxic serum-induced glomerulonephritis (NTS). Mouse podocytes were cultured and transfected with siRNA against *Ct1* to assess changes on migration, proliferation, the actin cytoskeleton and Cdc42 activation. Finally, to examine the effect of CT-1 administration on NTS progression, mice were injected with either CT-1 or saline between days 7 to 21 and kidney function and histology assessed.

Table:

Results: CT-1, LIFR and GP130 were localised in podocytes, both *in vivo* and *in vitro*. Knock-down of endogenous *Ct1* in mouse podocytes significantly increased migration after 24 hours ($p<0.01$), reduced Cdc42 activity ($p<0.05$) and reduced the percentage of cells with stress actin fiber organisation ($p<0.05$). NTS administration reduced the glomerular expression of CT-1 after 7 ($p<0.01$) and 21 ($p<0.01$) days of NTS administration. CT-1 treated NTS mice had significantly reduced albuminuria compared with non-treated animals ($p<0.05$) which was accompanied by a reduction in the number of inflammatory cells (F4/80 positive) in the periglomerular area of the kidney ($p<0.01$).

Conclusion: Endogenous CT-1 is expressed in podocytes and can modulate their shape. CT-1 administration may be a promising new approach for treating glomerular disease.

References:

Disclosure of Interest: None Declared

Keywords: Anti-GBM disease, Inflammation, Podocyte

Haematological and Malignant Disorders

PO-149

Biomolecular estimation of renal insufficiency progression in cases of various surgical treatment of renal cell carcinoma

A. Rossolovsky [1], O. Berezinets [1,*], G. Maslykova [1]

[1]Reconstructive uronephrology, SARATOV MEDICAL UNIVERSITY, Saratov, Russian Federation

Preferred Presentation Method: Oral or Poster

Introduction: Despite different approaches to the diagnosis and management of patients with renal cell carcinoma (RCC), the basis of its treatment is still surgery [1]. Renal insufficiency progression in the postoperative period is also caused by activation of molecular mechanisms of nephrofibrosis in response to acute kidney injury (AKI) and perioperative renal tissue hypoxia followed by functional illness. Defining the high level of IL-18 in urine predicts the presence of acute kidney injury 24 hours before the increase of creatinine level [2]. Furthermore, it was shown that interleukin - 18 (IL-18), being a product of activated inflammasomes, may play an important role in the growth, invasion and metastasis of renal cancer [3]

Objectives: The aim of this study is evaluation of renal function, depending on the type of surgery performed, and determination of prediction GFR

Methods: 60 patients with histologically distinctive RCC T1-3M0N0 were examined. Patients were randomized into 3 groups: 1 – traditional surgical technique of nephrectomy, 2 – laparoscopic nephrectomy, and 3 – patients after laparoscopic resection of the tumor. Collected data included age, gender, demographic data, medical history, comorbidities, perioperative creatinine levels and GFR. NGAL concentrations, IL-18 were examined with ELISA in the samples of blood serum and urine at the preoperative stage, on the 5th postoperative day and in 1 month of postoperative supervision. Renal function was studied using the designed GFR equation (CKD-EPI 2009). The differences in the clinical data and clinical variables were compared using Spearman rank correlation and t-test

Results: Postoperative GFR (1 month after surgery) was significantly higher among patients undergoing nephrectomy, executed both in traditional and laparoscopic techniques. GFR - EPI was respectively 45.4, 55.2 and 82.3 mmol /L in the 1st, 2nd and 3rd groups. A decrease of renal function by 22% was noted among patients of Group 1; 20% in Group 2; and kidney function improved by 23% ($p \leq 0,05$) among patients of Group 3. AKI markers, IL-18 and NGAL, defined in the early postoperative period, were increased among patients who had open nephrectomy. Furthermore, a strong correlation between the preoperative significant IL-18 levels and postoperative GFR ($r = 1$, $p \leq 0,05$) was revealed during Spearman method correlation analysis

Conclusion: Laparoscopic resection of RCC is mandatory surgical treatment of RCC. The level of IL- 18 in blood serum can be used as a predictor of poor prognosis. Its increase is correlated with a decrease of renal function during the postoperative period. That way, the data given show that interleukin - 18 in blood serum indirectly reflects close interdependence between the functional ability of the kidneys and the antitumor activity of cytokines

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Disclosure of Interest: None Declared

Keywords: CKD Progression, Ischaemia

Haematological and Malignant Disorders

PO-150

Serum free light chain level at diagnosis in myeloma cast nephropathy-a multicentre study

P. Yadav [1,*], I. Jaffer Sathick [2], N. Leung [2], E. E. Brown [3], M. Cook [4], P. W. Sanders [5], P. Cockwell [1]

[1]Renal Medicine, University Hospital Birmingham NHS Foundation Trust, Birmingham, United Kingdom, [2]Renal Medicine, Mayo Clinic, Rochester, [3]Pathology, University of Alabama at Birmingham, Alabama, United States, [4]Haematology, University Hospital Birmingham NHS Foundation Trust, Birmingham, United Kingdom, [5]Renal Medicine, University of Alabama at Birmingham, Alabama, United States

Preferred Presentation Method: Oral or Poster

Introduction: Myeloma cast nephropathy (MCN), a consequence of excess monoclonal immunoglobulin free light chain (FLC) production, is a common cause of severe renal impairment in multiple myeloma (MM). The level of pathogenic FLC that causes MCN varies substantially and there is uncertainty about the threshold level that should be used to inform clinical practice.

Objectives: The aim of this study was to report the range of FLC levels in serum in newly diagnosed MM patients with acute kidney injury and renal biopsy-confirmed MCN. We also report renal outcome and overall survival (OS) relative to serum FLC level at presentation.

Methods: In a multicentre cohort of MM patients presenting with biopsy-confirmed MCN between 2002-2014, we evaluated prospectively measured serum FLC levels obtained using a single nephelometric assay.

Results: Median age at diagnosis was 63 years (range 38 – 85). 58.2% were male and 88.3% of white ethnicity. Light chain-only MM was the most common paraprotein type (47.6%). Median involved FLC level at diagnosis was 7531 mg/L (range 107-114600). Serum creatinine was 535 µmol/L (range 168 – 2993), eGFR 7 ml/min/1.73m^2 (range 1 – 34), calcium 2.35 mmol/L (range 1.65 – 4.25) and haemoglobin 9.0 g/dL (range 4.6 – 13.1). Two patients had a monoclonal FLC level below 500 mg/L; one was hypercalcaemic, and the other had high-normal serum calcium level and had received an NSAID. 67% of patients received dialysis treatment, 52.1% recovered independent renal function with a median time on dialysis of 36 days (range 10 – 701). 67.3% died with a median OS of 1.4 years (95% CI 0.8 – 2.0). In a univariable analysis, serum FLC level at diagnosis was not associated with renal function recovery or patient survival.

Conclusion: This is the largest reported cohort of patients with biopsy-confirmed MCN and serum FLC levels. Only 2 patients had a serum FLC level below 500 mg/L at diagnosis; both had additional factors known to promote the development of MCN. Serum FLC levels at diagnosis was not associated with renal function recovery or OS. This study will help define the threshold of FLC level in serum that is associated with the development of MCN.

Disclosure of Interest: None Declared

Keywords: AKI, Myeloma, Renal biopsy

Haematological and Malignant Disorders

PO-151

Serum free light chain level is associated with renal function at presentation and renal outcome at post-induction is associated with serum free light chain response in patients with multiple myeloma

P. Yadav [1,*], M. Drayson [2], M. Cook [3], J. Pinney [1], H. Giles [3], Y. S. Aung [3], P. Cockwell [1]

[1]Renal Medicine, University Hospital Birmingham NHS Foundation Trust, [2]Institute of Immunology and Immunotherapy, University of Birmingham, [3]Haematology, University Hospital Birmingham NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Renal impairment (RI) is present in up to 50% of patients with multiple myeloma (MM) at diagnosis and is associated with poor prognosis. Elevated involved immunoglobulin free light chain (FLC) is a major cause of RI in MM.

Objectives: To study the relationships between presentation and post-induction (PI) renal function and serum FLC level in newly diagnosed patients with MM.

Methods: We used central laboratory data from the Medical Research Council Myeloma IX trial, which compared bisphosphonate and thalidomide-based therapies. Patients were divided into 3 eGFR categories: eGFR ≥60 ml/min, normal renal function; eGFR 30-59 ml/min, mild-moderate RI; eGFR <30 ml/min, severe RI. Linear regression and Logistic regression modeling were used to explore independent determinants of renal function.

Results: 52.8% had an eGFR ≥60 ml/min; 37.3% had an eGFR 30-59 ml/min and 9.8% had an eGFR <30 ml/min. Median eGFR in patients with involved lambda (λ) FLC was lower than those with kappa (κ) FLC (58 ml/min [IQR 42-77] vs 63 ml/min [IQR 47-80]; *P*=0.008).

Median eGFR for patients with light chain only (LCO) myeloma and IgD MM was lower than those with the other paraprotein isotypes (LCO myeloma 49 ml/min [IQR 28-80]; IgD MM 49 ml/min [IQR 36.7-83.0]; IgG MM 62 ml/min [IQR 47-79]; IgA MM 64 ml/min [IQR 49-80]; and IgM MM 65 ml/min [IQR 60.5-84.5]) (*P* <0.0001).

Patients with a difference between involved and uninvolved FLC (dFLC) ≥500 mg/L had a lower eGFR compared to those with dFLC 100-499 mg/L and dFLC <100 mg/L (52 ml/min [IQR 35-72] vs 66 ml/min [IQR 52-82.2] vs 67 ml/min [IQR 55-83] respectively; *P*<0.0001). A dFLC level of 800 mg/L was the optimal cut-off value for prediction of severe RI, with an AUC of 0.80.

Factors associated with eGFR at presentation were FLC level, age and male gender; and not the paraprotein type or FLC isotype at presentation. Factors that were independently associated with RI at PI were: age (odds ratio [OR] 1.033, *P*=0.023); presentation eGFR (OR 0.93, *P*<0.0001) and attainment of ≥VGPR (very good partial response) compared to <PR (partial response) FLC response (OR 0.52, *P*= 0.005).

Conclusion: Age and serum FLC level were associated with eGFR at presentation; and age, presentation eGFR, and serum FLC response correlated with renal outcome at post-induction.

Disclosure of Interest: None Declared

Keywords: AKI, eGFR, Myeloma

Haemodialysis

PO-152

Vascular and endothelial markers in extracellular overhydration in haemodialysis

N. Mitsides [1,*], T. Cornelis [2], N. Diederen [3], N. Broers [3], J. Kooman [3], S. Mitra [1]

[1]Nephrology Department, Central Manchester University Hospitals NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, United Kingdom, [2]Nephrology Department, Jessa Hospital, Hasselt, Belgium, [3]Nephrology Department, Maastricht University Hospital, Maastricht, Netherlands

Preferred Presentation Method: Oral or Poster

Introduction: Fluid management presents one of the greatest challenges in haemodialysis (HD). Excess fluid reservoir is predominantly contained in the extracellular space (ECW). ECW is comprises of 3 compartments: the macrocirculation (Mac), microcirculation (Mic) & the interstitium (IF) separated by the endothelium (Ec) & IF matrix (Ec-IF barrier). The involving & interplay of factors that govern this interface in determining the ECW hydration status in HD is unclear & explored here.

Objectives: We investigated vascular & endothelial factors at the Ec-IF barrier in relation to varying states of hydration as derived by multifrequency bioimpedance in HD patients.

Methods: The total body water (TBW) compartments were assessed with Multifrequency bio-impedance (BCM, Fresenius, Germany). Overhydration (OH) was defined as BCM derived OH/ECW>7%. Mac was assessed by pulse-wave velocity (PWV), Blood Pressure (BP) & mean arterial pressure (MAP) measurements (both visit & 24hr ambulatory) while Mic was assessed by measurement of the thickness of the Perfused Boundary Region of the Ec glycocalyx (PBR 5-25ug) & Red Blood Cell Column Width (RBCW), using sublingual capillaroscopy. A panel of pro-inflammatory mediators [C-Reactive Protein, Soluble Amyloid A, Interleukins (IL) 6 & 8, Tumour Necrosis Factor-α] & Vascular Ec markers [Intercellular Adhesion Molecule-1 & 3, Vascular Adhesion Molecule-1 (VCAM-1), E- & P-Selectin, Thrombomodulin (TM) & Matrix Metalloproteinases (MMP) 1, 3 & 9] was analysed to assess the Ec-IF barrier.

Results: Of 72 participants, 30 were in normohydration range (Gr N) (age 53.4±16.3yrs, ECW/TBW 0.46±0.03) & 42 patients overhydrated (Gr O) (age 60.1±12.2yrs, ECW/TBW 0.50±0.03). Gr O had higher BP (MAP: 122.9 9±22.5 vs 111.7±22.2mmHg, p=0.04) & comorbidities (Davies score 1.5 vs 1.0, p= 0.03). PWV (Gr N: 8.7±2.3m/s; Gr O: 9.5±3.1m/s; p=0.25), PBR 5-25ug (Gr N: 1.96±0.25ug; Gr O: 1.97±0.28ug; p=0.97) & RBCW (Gr N: 11.42±1.89ug; Gr O: 10.91±1.76ug; p=0.27) did not differ significantly between the groups.

Gr O had higher serum VCAM-1 (1163.7±330.4 v 930.2±190.0ng/ml, p<0.01), TM (13.5±2.8 v 12.0±2.7ng/ml, p=0.04) & IL-6 (2.7; range 0.6-131.5 v 1.3 range 0.8-7.4 pg/ml, p=0.01). High serum VCAM-1 (OR 1.05; 95% CI 1.01-1.10; p=0.02) together with high BP (MAP: OR 1.07; 95% CI 1.02-1.12; p=0.01) were independent predictors of OH/ECW>7% in a multivariate logistic regression analysis adjusted for age, comorbidity, diabetes (DM), IL6 & TM.

ECW/TBW ratio was associated with VCAM-1, MMP-1 (p=0.02), PBR thickness of 20-25ug capillary size (p=0.03), MAP (p<0.01), age (p<0.01), DM (p=0.01), cardiovascular disease (p<0.01), Lean Tissue Index (LTI) (p<0.01), Fat Tissue Index (FTI) (p<0.01) in a univariate linear regression analysis. In a stepwise multivariate analysis adjusting for these confounders, VCAM-1 (Beta=0.369, p<0.01) was the only significant vascular biomarker predictor independently associated with ECW/TBW (R^2=0.67, p<0.01).

Conclusion: Higher expression of vascular biomarker VCAM-1 is a strong predictor of an overhydrated ECW compartment. Adhesion molecules influence Ec integrity, glycocalyx injury and transendothelial migration of water and solutes into the IF space. Fluid retention in the IF may be dependent on such mediators that alter vascular and IF permeability. The implicated pathways in fluid retention in dialysis need further experimental evidence.

Disclosure of Interest: None Declared

Keywords: Adhesion molecules, Bioimpedance, Blood pressure

Haemodialysis

PO-153

Diabetes management in an Exeter Haemodialysis cohort

L. Kyte [1], D. Meredith [1,*]

[1]Renal, ROYAL DEVON AND EXETER HOSPITAL, Exeter, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Following the release in 2016 of new guidance for the management of adults with diabetes on the haemodialysis (HD) unit from the Joint British Diabetes Societies and the Renal Association[1] we decided to audit our practice

Objectives: 1. Establish current diabetes treatment for our cohort

2. Determine if patients on insulin adjust their doses on dialysis days

3. Establish hypoglycaemia (hypo) frequency in patients treated with insulin and check how hypoglycaemia is managed by the patient, aiming for 15-20g of rapidly absorbed carbohydrate followed by long acting carbohydrate

4. Record the proportion of patients receiving annual eye screening

5. Record the proportion of patients that have had podiatry checks within the last 3 months

6. Record the number of patients (type 1 and 2) who a) possess a glucometer and b) use this at least twice daily as per local recommendations to monitor capillary blood glucose (CBG)

Methods: Data was gathered from our renal database for patients dialysing in our Exeter units and through patient questionnaires. The local eye screening unit were able to provide the date of last screening.

Results: 35% (52/165) of patients on HD in Exeter had diabetes; data was collected for 45 patients (7 type 1 and 38 type 2).

1. 11 on diet alone, 8 gliclazide, 1 repaglinide, 10 basal bolus regimes, 9 medium acting , 5 mixed insulin, 1 long acting (55% on insulin, 76% on hypo-inducing agents)

2. 2 patients on insulin dose adjust on dialysis days- one increases one decreases!

3. Difficult to assess. Asked about blood sugar <4mmol/l; 60% said never, 28% monthly, 12% weekly,however it was noted that 3 patients who said they never had hypos did have CBG<4mmol/l when starting HD at some point in the audit time-frame. 7 patients on insulin do not carry hypo treatment to dialysis. Only 6 were treating hypo appropriately, most were under-treating.

4. 67% up to date with eye screening but an additional 8 under the care of the eye unit. Only 3 were out of date, the others had opted out or did not attend.

5. Difficult to assess. Variety of different assessors- private podiatry, NHS podiatry or Practice Nurse. Patients unsure what constitutes foot screening.

6. 34 patients had a glucometer (76%). Half of these check at least twice daily. 8 of the patients on insulin do not check regularly and 4 on Oral Hypoglycaemic Agents (OHA) have no glucometer despite the risk of hypo.

Conclusion: Guidelines suggest that hypoglycaemia is a common occurrence for patients on haemodialysis who are also on agents which induce hypoglycaemia, our findings do not support this but there is a question over reliability of patient reporting. As a result of this work we are developing an information sheet targetting new HD patients and their GPs to improve hypoglycaemia awareness, hypoglycaemia treatment and to encourage self-monitoring. A system will be put in place to ensure 3 monthly foot screening either in the community or the dialysis unit. Education will be provided to nursing and medical staff to support diabetes management with a hope of improving patient outcomes and reducing admissions with diabetes related issues.

References: 1. Management of adults with diabetes on the haemodialysis unit: summary of new guidance from the Joint British Diabetes Societies (JBDS) and the Renal Association *Br J Diabetes 2016:16;69-77*

Disclosure of Interest: None Declared

Keywords: Diabetes

Haemodialysis

PO-154

Comparative analysis of Single Pool and Surface Area Standardised Standard Kt/v Methods for the Assessment of Haemodialysis Adequacy

V. Dibbur [1,*], K. Ciborowski [1], H. Bandi [2], T. Dasgupta [1]

[1]Renal Medicine, [2]Acute Medicine, Great Western Hospitals NHS Foundation Trust, Swindon, United Kingdom

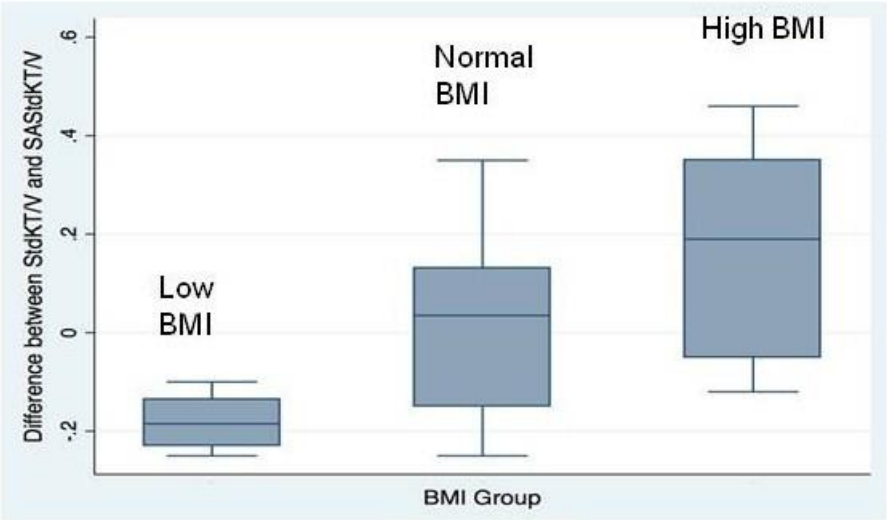
Preferred Presentation Method: Oral or Poster

Introduction: Analysis for Equivalence of Standard KT/V and Surface Area Normalised Standard Kt/v Methods for the Assessment of Haemodialysis Adequacy Among The Patients With Extremes of Body Mass Index.

Objectives: Current guidelines on dialysis adequacy recommend ascertainment of Single pool Kt/v (spKt/v) based on historical studies examining outcomes in dialysis patients. It follows that the use of alternative methods of dialysis adequacy such as surface area normalized adequacy (SAstdKt/v) should produce equivalent measures across groups of patients which share similar clinical characteristics, to allow these newer indices to convey equivalent clinical relevance.

Methods: We performed a retrospective analysis of haemodialysis adequacy indicators in 69 hospital haemodialysis patients. SpKt/v, Body Mass Index (BMI), Surface Area (SA) and SAstd Kt/v were ascertained and compared in clinical groups based on body mass index (BMI) classified as low (<20kg/m2), high (>30kg/m2) and normal (20-30kg/m2) in our study. A delta value was calculated for each patient, to represent the intra-patient difference between these two measures of adequacy. The Kruskall Wallis test was used to examine for equality of the median delta value in each BMI group.

Image:



Results: Among 69 patients, 62.4% patients were male. 37.6% were classified in high and 11.5% as in low BMI groups. Figure 1 shows distribution of delta adequacy distributions in low [-0.19 IQR -0.23 to -0.14], normal [0.035 IQR -0.15 to 0.13] and high BMI [0.19 IQR -0.05 to 0.35] patients. The null hypothesis of equality in medians across these groups was rejected (p=0.0001) suggesting significant heterogeneity of the median intra-patient disagreement between these two adequacy measures in the three BMI groups.

Conclusion: In our cohort, we demonstrate significant heterogeneity among patients of varying body sizes when conventional and surface area standardised measures of dialysis adequacy are compared. The reasons for these observations and their relevance need further study.

References: 1.Daugirdas, J.T., Greene, T., Chertow, G.M., and Depner, T.A. Can rescaling dose of dialysis to body surface area in the HEMO Study explain the different responses to dose in women versus men?. Clin J Am Soc Nephrol. 2010; 5: 1628–1636
2.KDOQI clinical practice guideline for hemodialysis adequacy: 2015 update. Appendix to guideline 3. American Journal of Kidney Diseases. 2015;66(5):884-930.

Disclosure of Interest: None Declared

Keywords: Dialysis adequacy, Haemodialysis

Haemodialysis

PO-155

Prevalence and associated variables of postdialysis fatigue: results of an Italian multicenter study

M. Bossola [1,*] and Enrico Di Stasio, Tania Monteburini, Stefano Cenerelli, Katia Mazzotti, Emanuele Parodi, Vittorio Sirolli, Stefano Santarelli, Fabio Ippoliti, Pier Eugenio Nebiolo, Mario Bonomini, Roberta Melatti, Carlo Vulpio

[1]Nephrology, CATHOLIC UNIVERSITY, Rome, Italy

Preferred Presentation Method: Oral

Introduction: Little is known about postdialysis fatigue (PDF) a very debilitating symptom of chronic hemodialysis patients.

Objectives: To evaluate and define the prevalence of postdialysis fatigue and associated variables.

Methods: In 5 hemodialysis units of northern-centre Italy, patients were regarded to suffer from PDF if they spontaneously offered this complaint when asked the open-ended question: Do you feel better or worse after dialysis? If worse, please specify in which way. A complaint of fatigue would then be probed further with questions directed at its duration, frequency and intensity, allowing for the creation of a fatigue index of severity (one third of the sum of these three parameters, each rated from 1 to 5). Patients were stratified into three groups according the severity of PDF: 1) score=0; 2) score=1-3; 3) score=>3.

Table:

	B	SE	p	Odds Ratio (95% CI)
Age (years)	0.020	0.010	**0.044**	1.02 (1.00-1.04)
ADL	-0.295	0.146	**0.044**	0.75 (0.56-0.99)
IADL	0.056	0.075	0.460	1.06 (0.91-1.23)

Table 1. Multivariate analysis. Dependent variable: PDF. We included in the model variables with significant correlation at the univariate analyses with the exception of TIRD

Results: We studied 271 patients: 164 (60.5%) had PDF and 107 (39.5%) had not. Patients with PDF had a significantly longer TIRD. TIRD was significantly associated with PDF duration, intensity, and frequency. Patients with PDF were older and had a lower ADL score. At multivariate analysis, PDF was significantly associated with TIRD. In the multivariate analysis model that did not include TIRD, PDF was independently associated with age and ADL (Table 1). Sixty (22.1%) patients had moderate PDF and 104 (38.4%) severe PDF. In patients with severe PDF, age and dialytic age were higher, ADL and IADL scores were lower, TIRD was longer and hourly ultrafiltration rate was lower. At multivariate analysis, PDF severity was independently associated with TIRD. In the model that did not include TIRD, PDF severity was associated with ADL only.

Conclusion: PDF is highly frequent and associated with age and ADL. Dialytic variables seem unrelated to PDF.

References: PDF is highly frequent and associated with age and ADL. Dialytic variables seem unrelated to PDF.

Disclosure of Interest: None Declared

Keywords: Haemodialysis

Haemodialysis

PO-156

Dialysis adequacies have no bearing on the symptoms suffered by patients on dialysis.

H. Dukka [1,*], D. Detakats [1], M. Menon [1], D. Simon [1], M. Lambie [1]

[1]RENAL MEDICINE, NHS, stoke on trent, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Dialysis patients both on haemodialysis (HD) and peritoneal dialysis (PD) suffer from multitude of symptoms irrespective of their clearances on dialysis. We analysed symptoms suffered by dialysis patients attending dialysis clinics prospectively.

Objectives: The objectives of this study were to understand the symptom load suffered by dialysis patients and to analyse wether any co-relation exists with age, comorbid score or urea clearances.

Methods: A validated dialysis symptom index questionnaire published in the journal of pain and symptom management, modified to suit the local patient population has been used. The original questionnaire had 30 symptoms out of which 18 commonly complained symptoms were used. 123 patients answered the questionnaire before the doctor's consultation in the clinic. Parameters including age, co-morbidities and urea clearances were recorded.

Results: The mean age (Mean±SD) was 62±14 years.73% of the study group were patients on HD and remaining 27% were on PD. The top 5 symptoms among all patients were post dialysis tiredness (77.7%),joint and muscle pains(66.9%),itching(63.6%), breathlessness (60%) ,muscle cramps(58.5%).Among HD patients post dialysis tiredness (84.9%) joint and muscle pains(72.1%), muscle cramps(66.7%), itching (65.1%), breathlessness(63.2%) were most common. In patients on PD tiredness (59.4%), joint and muscle pains (59.4%), feeling low (59.4%) low appetite (54.5%), restless legs (51.5%) were more common. We did not find any correlation between the comorbid index, age or urea clearances and the number of symptoms complained. About 85% of the patients in the study had adequate clearances, defined as KT/V >1.2 in HD patients and KT/V >1.7 in PD patients. Mean number of symptoms complained by patients with adequate clearances was 6.75 to mean of 10.47 in patients with inadequate clearances.

Conclusion: Dialysis patients complain of multitude of symptoms which may be unrelated to urea clearances, age or comorbid index. Thorough consultations and appropriate investigations should be conducted to identify different pathological processes which may be causing symptoms and possible solutions provided.

Disclosure of Interest: None Declared

Keywords: Dialysis adequacy, Haemodialysis, Peritoneal dialysis

Haemodialysis

PO-157

Factors contributing to unplanned renal replacement therapy initiation in patients with end-stage renal disease – outcomes of a large retrospective observational study

C. Pillay [1,*], N. Arulkumaran [1], W. Brown [1], N. Duncan [1], A. McLean [1]
[1]IMPERIAL COLLEGE HEALTHCARE NHS TRUST, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients requiring an emergency start to renal replacement therapy (RRT) for end-stage renal disease (ESRD) have a higher mortality contrasted to those in whom RRT is initiated electively (planned starters). The differences between modifiable factors and mortality associated with emergency starts to RRT that are unplanned (in patients known to renal services for > 90 days) or unheralded (in patients known to nephrology services for < 90 days) are unclear. Understanding the factors prompting emergency starts to RRT is central to considering how the patient outcomes can be improved.

Objectives: To establish the differences in mortality between planned and emergency RRT initiation.

Methods: Retrospective data collection of consecutive patients commencing RRT at our centre between January 2013 and December 2015.

Results: 930 consecutive patients were followed to a median time of 20.7 months (IQR: 15.3-29.3). 449 (60.3%) had a planned start, 171 (18.4%) had an unplanned start & 198 (21.3%) had an unheralded start. Adjusted for age the odds ratio (OR) of mortality was 0.521 (planned) and 0.654 (unplanned) compared to unheralded starters (p=0.005). Intercurrent illness and an unexpected decline in renal function were factors attributed to 60% and 35% of patients requiring an emergency start to RRT respectively. **Multivariate analysis** revealed that age (OR 1.05, p < 0.001), primary renal diagnoses secondary to diabetes (OR 2.55, p=0.002) and emergency presentation with intercurrent illness compared to a planned start (OR 2.18, p < 0.001) are associated with increased mortality. Emergency presentation with an unexpected decline in renal function or a presentation with ESRD in the absence of acute illness was **not** associated with increased mortality (OR= 1.96, p=0.16).

Conclusion: Our data has identified increased mortality with emergency starts to RRT associated with intercurrent illness at presentation. Other significant predictors of higher mortality include older age and primary renal diagnoses of diabetes. The comparable survival observed between unplanned starters presenting with an unexpected decline in renal function and planned starters does not account for incurred morbidity. Identifying factors associated with a higher mortality in context of unplanned RRT commencement will support risk stratification of patients in whom emergency dialysis initiation may be prevented.

Disclosure of Interest: None Declared

Keywords: Dialysis initiation, Patient outcome measures, RRT

Haemodialysis

PO-158

Infective Endocarditis in Dialysis-Dependent Chronic Kidney Disease

A. Nixon [1,*], N. Desai [1], A. Dhaygude [1], A. Ingram [2]

[1]Renal Medicine Department, [2]Cardio-Respiratory Department, LANCASHIRE TEACHING HOSPITALS NHS FOUNDATION TRUST, Preston, United Kingdom

Preferred Presentation Method: Poster

Introduction: Infective Endocarditis (IE) is a devastating complication of dialysis-dependent chronic kidney disease (CKD).(1, 2) One-year survival rates were reported to be as low as 38% over a decade ago.(2) There have been few more recent reports exploring the survival outcomes of those with dialysis-dependent CKD diagnosed with IE.

Objectives: Our main objective was to establish if there has been an improvement in the clinical outcomes of dialysis-dependent CKD patients diagnosed with IE in recent years. We also wished to review the characteristics of those diagnosed with IE, particularly establishing their mode of vascular access.

Methods: A retrospective review was performed. The local echocardiogram database was reviewed to identify all reports suggesting a valve vegetation between August 2002 and March 2016. Clinical records were then reviewed to identify all those with dialysis-dependent CKD diagnosed with IE. Records were then used to identify the type of vascular access for dialysis, the presence of pre-existing valve lesions, the causative organism and survival outcomes.

Image:

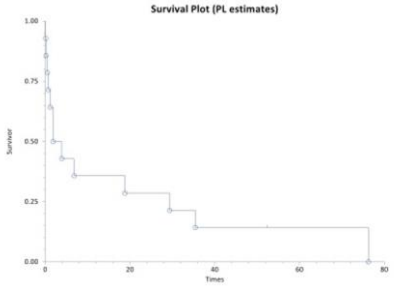


Table:

Valve Involved	Number of Episodes (%)
Mitral	10 (67)
Aortic	4 (27)
Tricuspid	4 (27)
>1 Valve	3 (20)

Results: Fourteen patients with dialysis-dependent CKD were diagnosed with IE. There were 15 episodes of IE. The median age was 65 years (range 32-84 years). There was an equal male to female ratio. The median dialysis vintage was 9 months (range 1-46 months). Thirteen (87%) episodes occurred in those receiving haemodialysis. A central venous catheter was present in only 6 (40%) episodes. A pre-existing valve lesion was present in 9 (60%) episodes. In 2 (13%) episodes patients were known to have had previous valve surgery. Table 1 demonstrates the valve involved in each episode of IE. The causative organism was *Staphylococcus aureus* in 8 (53%) episodes and *Enterococcus sp.* in 5 (33%) episodes. Valve surgery was performed for 3 (21%) patients. Survival rates were as follows: 30-day: 71%; 90-day: 50%; 1-year: 36%. Figure 1 demonstrates Kaplan-Meier survival analysis.

Conclusion: Dialysis-dependent CKD patients, irrespective of dialysis access and the presence of pre-existing valvular heart disease, are at risk of IE. Survival remains low for patients with dialysis-dependent CKD diagnosed with IE. This case series emphasises the importance of minimising the risks of developing a bacteraemia in this patient population. It

also highlights the importance of remaining vigilant for the development of IE whilst treating bacteraemias in dialysis-dependent CKD patients. Further research is needed to improve IE treatment outcomes in this high risk patient group.
References: 1. Doulton T, Sabharwal N, Cairns HS, Schelenz S, Eykyn S, O'Donnell P, et al. Infective endocarditis in dialysis patients: new challenges and old. Kidney Int. 2003;64(2):720-7.
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Disclosure of Interest: None Declared

Keywords: Dialysis, Infection/immunity, Survival

Haemodialysis

PO-159

Increasing dialysate potassium concentration from 1 mM to 2 mM is associated with an increase in the pre-dialysis serum potassium concentration but does not lead to more hyperkalaemia.

A. Friedla [1,*], J. Patrick [1], C. Mason [1], B. Gianina [1], S. Lines [1]

[1]Department of Renal Medicine, NORFOLK AND NORWICH UNIVERSITY HOSPITAL, Norwich, United Kingdom

Preferred Presentation Method: Poster

Introduction: There is an increasing body of observational data that the use of dialysates with a potassium concentration (Kd) <2 mM may be associated with harm[1,2]. We routinely used Kd=1mM dialysates on 2 of our dialysis units.

Objectives: To examine the effects on pre-dialysis serum potassium levels of switching patients from a Kd=1mM to a Kd=2mM dialysate.

Methods: All patients dialysing with a Kd=1mM dialysate were switched to a Kd=2mM dialysate which was otherwise identical in composition. Patients with a pre-dialysis potassium level of >5.5 mM in the preceding 3 months were deemed to be at increased risk of hyperkalaemia and were identified for subgroup analysis and heightened surveillance *a priori*. We compared the average pre-dialysis serum potassium level in the 2 months prior to and the 2 months subsequent to the dialysis switch. We also compared the proportion of patients experiencing at least one episode of hyperkalaemia, using cut-offs of K≥6.5 mM and K≥7 mM, between these two time periods.

Results: Of the 209 patients dialysing on the units, 72 (34%) were using Kd=1mM dialysates. One patient was excluded from analysis as he was transplanted the week of the dialysate switch. Following the switch in dialysates the average pre-dialysis potassium significantly increased (5.0 vs 5.4 mM; p<0.0001). There were no differences in the proportion of patients experiencing at least one episode of hyperkalaemia during the observation periods using cut-off potassium levels of ≥6.5 mM (28% vs 31%;p=0.84) or ≥7 mM (8% vs 14%;p=0.34). Of the 71 patients, 29 had a K>5.5mM documented in the 3 months prior to the switch. For this subset of patients the introduction of Kd=2mM dialysates did not significantly change the average pre-dialysis potassium levels (5.4 vs 5.5 mM; p=0.24). Also, there were no differences in the proportion of patients experiencing hyperkalaemia using cut-off potassium levels of ≥6.5 mM (45% in both groups;p=1) or ≥7 mM (14% vs 17%;p=1).

Conclusion: In our study, switching patients from a Kd=1 to a Kd=2 mM dialysate led to a rise in the average pre-dialysis serum potassium level but did not appear to increase the proportion of patients experiencing hyperkalaemia.

References: 1. Kovesdy CP, Regidor DL, Mehrotra R *et al*. Serum and dialysate potassium concentrations and survival in haemodialysis patients. CJASN 2007; 2: 999-1007

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Disclosure of Interest: None Declared

Keywords: Dialysis, Haemodialysis, Potassium

Haemodialysis

PO-160

Prevalence of HTLV infection in a South East London haemodialysis patient cohort

R. M. Gama [1,*], W. Young [1], M. Zuckerman [2], M. L. Ford [1]

[1]Renal Medicine, [2]Virology, King's College Hospital, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Human T-cell lymphotropic virus (HTLV) is blood borne retrovirus. It is transmitted via transfusion with infected blood products, organ transplants, sexual contact and also via breast milk. HTLV-1 & 2 are associated with myelopathy, other inflammatory diseases and opportunistic infections. HTLV-1 also causes adult T cell leukaemia/lymphoma.[1] HTLV infection is endemic in certain tropical and sub-tropical areas including the Caribbean, parts of Africa and Japan.[2]

In Western Europe, the prevalence of HTLV remains low except in certain high-risk groups such as intravenous drug users and immigrants. All blood and tissue donations are screened for HTLV.[2] However patients undergoing haemodialysis are not routinely screened. King's College Hospital serves a multi-ethnic population with disproportionate representation from both Africa and the Caribbean. In 2015, 46% of Kings patients who reached end stage renal failure were of non-white ethnicity.

Objectives: The aim of this study was to determine the prevalence of HTLV types 1 & 2 in the King's College Hospital haemodialysis population.

Methods: Venous blood samples were collected from all patients who received haemodialysis in April and May 2016. Serum was analysed for HTLV-1 & 2 using Abbott Architect and enzyme immunosorbent assay. Positive results were confirmed with Western blotting via the National Reference Laboratory.

Results: There were 631 patients who received haemodialysis during this period. The ethnicity of this group were white 41.2%, black 40.5%, Indian/Pakistani/Bangladeshi 9.4%, Chinese 1.6%, other 4.0% and unknown 3.3%. Samples for HLTV serology were obtained from 619 patients. All patients tested negative for HTLV-2. Four patients tested positive for HTLV-1. One patient was born in The Gambia (70yrs female) and 3 patients were born in the Caribbean, of which 2 were from Jamaica (85yrs male, 62yrs female) and 1 from St Lucia (82yrs male), giving a prevalence of 0.65% for the tested haemodialysis cohort.

Conclusion: The prevalence of HTLV-1 in our cohort (0.65%) is much higher than that in blood donors in the United Kingdom (0.0052%)[1] and also higher than that found in a study in pregnant women performed in a similar catchment area from 1994-96 (0.39%).[3] Screening for HTLV should, at least, be considered in patients attending renal units serving a multi-ethnic population, particularly those with large populations from HTLV endemic areas. Patients who are HTLV positive should be given information on their condition and may be referred to a national HTLV centre for ongoing monitoring and further management.

References:

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Disclosure of Interest: None Declared

Keywords: Haemodialysis, Infection/immunity

Haemodialysis

PO-161

Assessment of the safety, efficacy and usability of a novel haemodialysis system in the clinic and home

P. Hoyer [1,*], J. Grainger [1], J. Milad [2], G. Harper [1], A. Gardner [1], C. Bebb [3], C. Day [4], C. Breen [5]

[1]Commercial, [2]Executive, QUANTA DIALYSIS TECHNOLOGIES, Alcester, [3]Renal, Nottingham City Hospital, Nottingham, [4]Renal, QE Birmingham Hospital, Birmingham, [5]Renal, Guys and St Thomas Hospital, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The (Quanta SC+) haemodialysis system can be used in both clinic and home care settings and is designed to be operated by the patient, caregiver or a health care professional. Self-care and home haemodialysis (HHD) are under-used modalities, considering the improvement in outcomes and reduced cost when compared to traditional in-centre dialysis. HHD programs with traditional dialysis devices report lengthy training times and a high dropout rate due to system complexity and additional steps required for disinfection.

Objectives: The objective of this study was to assess the safety, efficacy and usability of the system in-clinic and in the patient's home.

Methods: A post market clinical follow-up study on the haemodialysis-dependent, end-stage renal disease (ESRD) patient population. Patients meeting the criteria of a body mass above 50Kg, male or female and an age of ≥18 years were selected by the clinic's principal investigator and informed consent was obtained. Each dialysis therapy was performed on an outpatient basis with a target dialysis time of 4 hours using a bicarbonate-based dialysate at a flow rate of 500 mL/min and a blood flow rates of between 300-450 ml/min..

Results: All treatments were successfully completed with no device related adverse events or safety issues to report. Clinical and technical performance of the (Quanta SC+) haemodialysis system was assessed by patient urea reduction ratio (URR), standardised weekly Kt/V and the percentage of scheduled dialysis treatments completed without premature termination. The average stdKt/V for the study population was >2.1. Review of the usability comments collected from the patient and study nurse operators during the treatments were positive. The system was described as compact, intuitive to use with positive feedback regarding the use of the disposable cartridge component; allowing for a fast turnaround time between different patient treatments, scheduled on the same system on the same day. Home installations of the system were performed routinely and the patient's prescription was delivered.

Conclusion: The (Quanta SC+) haemodialysis system performed safely with acceptable clinical and technical performance in the ESRD subject population. There was no measured loss of therapy time, UF error was acceptable, no significant usability issues were noted, and there were no safety issues in this subject population. Clinical performance was demonstrated by subjects attaining a weekly StdKt/V of greater than 2.1, recommended as a weekly adequacy equivalence by Gotch. SC+ may help to reduce both training burden and participant drop-out rates in HHD programs.

Disclosure of Interest: None Declared

Keywords: Dialysis, Dialysis adequacy, Home haemodialysis

Haemodialysis

PO-162

Variability In Dialysate Temperature and Sodium Prescription Practices: A Survey of Renal Units in England, Scotland & Wales

K. Kharbanda [1,*], S. Mitra [1], I. Dasgupta [2]

[1]Renal, CENTRAL MANCHESTER UNIVSERITY HOSPITALS, Manchester, [2]Renal, Heart of England NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Intradialytic hypotension (IDH) is associated with adverse mortality outcomes[1] and it has been demonstrated that reducing dialysate temperature can reduce episodes of IDH[2] and lead to a reduction in the development of left ventricular regional wall abnormalities[3]. In addition to this, differences in dialysate sodium settings are associated with an increase in IDH and the need for IV fluid resuscitation[4]. Dialysate sodium and temperature settings are simple to modify yet despite this, prescribing patterns of these important variables remain undefined amongst UK renal units.

Objectives: We set out to identify whether variability exists in prescribing practices for dialysate temperature and sodium sodium settings amongst UK renal units.

Methods: We designed a short questionnaire with the aim of gaining responses from renal units across England, Scotland and Wales. The questionnaire was internet-based and consisted of 8 short questions. An invitation to participate in the survey was sent via emails mainly to renal technicians and senior haemodialysis nurses.

Results: We able to send invitations to 55 renal units. We received 28 responses in total (response rate 51%) mainly reported by Renal Technicians. 93% of responding units have a standard dialysate temperature setting with the remainder having a variable setting. The responses for dialysate temperature settings were as follows: 14.3% (37°C), 21.4% (36.5°C), 42.9% (36.0°C), & 7% (35.5°C) and 14.3% individualised to the patients body temperature. 21% of responding units indicated that their dialysate temperature prescribing had not changed in the last few years. The results for dialysate sodium prescribing were: 0% (132 or lower), 3.6% (135), 10.7% (136), 21.4% (137), 53.6% (138), 10.7% (140) and 0% (142 or higher). The prevalence of the use of haemodiafiltration in units ranged from 0 to 100%. The prevalence of units in 4 groups defined as follows {Na≤137 & T≥36.5}, {Na≥138 & T≥36.5}, {Na≤137 & T≤36}, {Na≥138 & T≤36} were 12%, 32%, 28% & 28% respectively.

Conclusion:

Keywords: Haemodialysis, Sodium

Home Therapies

PO-163

Replacement Modality Choice Knowledge in the Non-Renal Multidisciplinary Team - Experience from a single UK centre

F. Abdelaal [1,*], H. Ali [1], J. Baharani [1]

[1]Renal Medicine, HEART OF ENGLAND NHS FOUNDATION TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic Kidney Disease (CKD) is a common health problem which is on an upward trend [1]. Dialysis treatment remains the mainstay for patients with End Stage Renal disease (ESRD) [2, 3].In the UK there has been a significant decline in home dialysis despite its benefits and cost effectiveness. There are many reasons for this including lack of awareness about availability and effectiveness of home dialysis by both patients and healthcare professionals [4-6].

Objectives: Patients with CKD often have multiple co-morbidities and are known to other medical specialties who they may continue to consult when approaching the need for dialysis. We wished to assess home dialysis awareness among the non renal Multi-Disciplinary Team (MDT).

Methods: Home dialysis awareness was assessed by an on-line survey sent to the choosing specialties likely to deal with CKD patients at our centre. The questionnaire aimed to assess knowledge of these individuals regarding home dialysis and establish whether further targeted education was warranted.

Results: 364 questionnaires were sent out with a 26.4% response rate. 69.32% of respondents were working in common specialties dealing with CKD patients (geriatrics 15.9%, cardiology 14.8%, haematology 10.2%, endocrinology 10.2%, urology 10.2% and vascular surgery 8%).

The majority of respondents at 40.39% think that pre dialysis nurses have the most impact on patient's choice of dialysis modality. 58.93% and 23.21% of respondents would opt for Home Haemodialysis (HHD) or Peritoneal Dialysis (PD) respectively if they require dialysis themselves. 50% of respondents think that home dialysis has better outcome of whom 53.85% thought so because of less rate of hospitalisation among home dialysis patients.

81.5% of non-renal MDT did not feel confident in discussing home dialysis options with patients despite seeing a large number of CKD patients. 70% felt that their knowledge about HHD was poor and 74.5% felt that they needed further education about home dialysis.

Conclusion: Knowledge of home dialysis among the non-renal MDT is poor and they lack the confidence to discuss this with CKD patients. In our sample, respondents felt they would benefit from further education. This may increase the uptake of home dialysis by the multi-morbid CKD patient who has a consistent message delivered to them by all relevant healthcare teams about the benefits of home dialysis.

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Disclosure of Interest: None Declared

Keywords: CKD, Dialysis modality choice, Home haemodialysis

Home Therapies

PO-164

Achieving Home Haemodialysis (HHD) programme growth through short training times

K. Atkins [1,*], A. Laird [1], N. Pacy [1], N. Sangala [1], A. Kirk [1], N. Borman [1]

[1]Wessex Kidney Centre, PORTSMOUTH HOSPITALS NHS TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Wessex Kidney Centre (WKC) established a new HHD programme in 2009. Rapidly programme expansion was facilitated by achieving short training times. By June 2016 WKC had trained 134 patients using exclusively the NxStage system one (NSO), with 11.3% of all HD patients dialysing at home.

Objectives: To review the patient population trained for home dialysis including training time, failure rates and therapy retention.

Methods: Demographic data at time of training was retrospectively reviewed in 134 patients trained for HHD. Training time, access type, time on HHD therapy and reasons for therapy cessation were reviewed.

Results: The demographics of the HHD population are mean age 51.4 years (Range 18 to 80 years); 66% male; and mean BMI 27.8 (Range 13.3 to 50.8). The mean Charlson Comorbidity Score was 4 (Range 2 to 10) and 17.9% had diabetes causing renal failure. The majority of patients (88%) were on in centre HD prior to training, 10.5% were pre dialysis and 1.5% from PD. Access type was distributed as 73.9% AVF, 19.4% CVC, and 6.7% PTFE; and the majority of patients use the button hole technique.

The mean training time for all patients was 10.5 sessions (Range 6 to 33 sessions) to dialyse independently at home. Patients are trained in a designated area by the HHD nursing team; patients are hands on with their dialysis from day one of training. The final 2 sessions take place in the patients' home. For existing HD patients fistula cannulation training is encouraged but not essential prior to HHD training. Many of the patients included had not self cannulated prior to commencing training and this was incorporated in their HHD training time. Training failure rates have been very low with only 6% of patients not completing training and a further 1.6% dropping within 3 months for any reason other than renal transplantation. Therapy retention has been excellent with 50.8% of patients still on HHD. Of those who have ceased HHD, 60.7% were for renal transplantation, 9.8% died and 29.5% for other reasons including therapy burden, change in medical condition or access issues. Average time on HHD prior to drop for any reason was 15.2 Months (Range 2 to 74 months).

Conclusion: In conclusion the WKC has successfully achieved a large HHD programme using the NSO. The success of this programme has been facilitated by rapid training with an easy to use system. The data shows very low training failure rates with very good therapy retention despite a wide range of age, BMI, access type and comorbidities. This has allowed HHD to be an option for many more patients.

Disclosure of Interest: K. Atkins: None Declared, A. Laird: None Declared, N. Pacy: None Declared, N. Sangala: None Declared, A. Kirk: None Declared, N. Borman Conflict with: Lectures on behalf of NxStage, Chair of European board

Keywords: Home haemodialysis, Patient education

Home Therapies

PO-165

Analysing mortality data from Renal Registry in Dialysis Patients: Haemodialysis, Home Haemodialysis and Peritoneal Dialysis

M. Edwards [1,*], G. Jones [1], C. Wong [1]

[1]Renal Medicine , AINTREE UNIVERSITY HOSPITAL, Liverpool , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Selection of dialysis modality is often due to patient preference after receiving information about possible options. Among patients on renal replacement therapy in the UK for 2013, 69.8% of patients received haemodialysis, 20.1% received peritoneal dialysis and 10.1% underwent renal transplant. Comparing the long-term outcomes for these patients is essential so that evidence-based decisions about their care can be made.

Objectives: To compare mortality between 3 patient sub-groups on renal replacement therapy in Aintree University Hospital: haemodialysis (HD), home haemodialysis (HHD) and peritoneal dialysis (PD). Furthermore, regular blood results will be analysed to identify possible factors that may lead to improved survival in each modality.

Methods: Using the recorded data from Sigma IT patients were identified as those who required prolonged dialysis lasting ≥3 months over a 5 year period (2011-2016). Furthermore, regular blood results will be analysed to identify possible factors that may lead to improved survival in each modality. Mortality was compared in these groups, including the registered cause of death. Regular blood results were analysed including haemoglobin, bone profile, bicarbonate, parathyroid hormone (PTH) and haematinics, in order to identify areas that may have contributed to outcomes.

Table:

Dialysis modality	HD	HHD	PD
No. of Patients	418	27	70
Alive	232	19	45
Deceased in Hospital/Home	87/99	4/4	9/16
Average no. of sessions	1172	1386	988

Results: There were 515 patients were identified whom required RRT excluding renal transplantation (HD = 418, HHD = 27, PD = 70). A majority of patients were male in all 3 modalities (56-63%), with HHD patients more likely to be younger (average age = 47 years) than those using PD (58 years) or HD (63 years). HHD patients on average died younger (average age = 60 years) than patients in other modalities (PD = 69 years, HD = 71 years). As expected, despite dying at an earlier age, HHD patients spent more days on dialysis than either HD or PD patients.

Conclusion: Our 5 year study demonstrated that home haemodialysis has better survival with 70.4% of the cohort still alive as compared to PD or HD. This positive outcome lends further support to the efficacy of HHD and reinforce the need for clinicians to consider HHD as a first option for incident dialysis patients and not just when PD fails.

References:

Disclosure of Interest: None Declared

Keywords: None

Home Therapies

PO-166

A Single Centre 3 year Experience of Implementing On-line Haemodiafiltration At Home

K. Kharbanda [1,*], S. Mitra [1], G. Dutton [1], J. Woods [1]

[1]Renal, CENTRAL MANCHESTER UNIVSERITY HOSPITALS, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The practice of haemodiafiltration in-centre is gaining momentum with recent studies indicating that its use is associated with an improvement in both all-cause and cardiovascular mortality. Whilst this is more established in the hospital setting, there is little published data on implementing HDF in the home setting.

Objectives: In June 2013 we started the process of switching our home haemodialysis (HHD) programme from high flux haemodialysis (HFHD) to haemodiafiltration (HHDF), and here we present the logistics and outcomes of implementing such a change in our programme.

Methods: We analysed data for 187 patients trained on our HHD programme between June 2013 to January 2017. This included 3 cohorts: Cohort A (n=28) were the prevalent patients who were switched from HFHD to HDF, Cohort B (n=115) were the new patients starting HHDF therapy and Cohort C (n=44) were the prevalent patients who remained on HFHD. Patient characteristics, outcomes, and blood results were obtained from the renal database within our centre. Data on water quality and therapy costs were also analysed.

Results: At the time of implementation our home haemodialysis programme consisted of 72 patients 65 at home and 7 self-care patients. F5008s™ machines designed for HHDF with 2 Diasafe™ filters was utilised with standard RO and dual carbon cartridges. Endotoxin filters were replaced after every 100 treatments. The patient characteristics for Cohort A were as follows: Mean age was 52yrs, 96% AV Fistula prevalence, 11% Diabetics, average weekly prescribed dialysis therapy 18 hours/week. Beta-2 microglobulin (B_2M mean 29.8 ug/ml) remained unchanged during the course of therapy in this group. Cohort B had a mean age of 50yrs, 83% AV Fistula prevalence, 21% Diabetes and average weekly prescribed HD for those completing training 13.7 hours/week. Training time was no difference in training time between the 2 modalities. No specific adverse events relating to HDF therapy were reported. Water quality was assessed at installation and every 6 months by a renal technician. Water was sampled at the RO unit and after the Diasafe filters and 100% of samples had a microbiological purity and endotoxin assay <0.03EU/ml. Chemical water analysis was also performed. All patients had a smooth transition and to date we have no refusals for changing therapy and no patients have needed to switch back to HFHD. Longitudinal biochemical trends, inflammatory markers and Outcome data on survival, hospitalisation, infection rates and technique failure will be presented on the 3 cohorts and comparative data to Cohort C. Reimbursement for utility bills remained unchanged as the increased requirement for the modality was still accommodated within the 180 litres/hour of therapy hour reimbursed pro rata to all HHD patients.

Conclusion: This study demonstrates successful implementation of on-line haemodiafiltration with extended dialysis regimens in the home setting. Water for HHDF can be provided safely in the community at a standard high enough to produce ultrapure dialysate monitored with the use of a standardised water testing protocol. The increased water requirement of the HHDF modality is relatively small and sustainable. Longer term outcomes for extended HHDF regimes remains unknown as does the optimal modality to use in the HHD setting.

Disclosure of Interest: None Declared

Keywords: Haemodiafiltration, Haemodialysis, Home haemodialysis

Hypertension

PO-167

Dietary salt reduction for reducing blood pressure in people with end-stage renal disease receiving dialysis: a meta-analysis

N. Cole [1,*], P. Swift [1], F. He [2], R. Suckling [1]

[1]South West Thames Renal Unit, Epsom and St Helier Hospitals NHS Trust, [2]Wolfson Institute of Preventative Medicine, Barts and The London School of Medicine and Dentistry, London, United Kingdom

Preferred Presentation Method: Poster

Introduction: Dietary salt reduction in the general population results in lower blood pressure and cardiovascular risk. Despite being widely recommended, there is a paucity of evidence as to whether this is applicable to individuals with end-stage renal disease (ESRD) receiving dialysis. Blood pressure is often difficult to control in these patients and they are frequently on multiple anti-hypertensive medications. Clarification as to the importance of dietary salt restriction is long overdue.

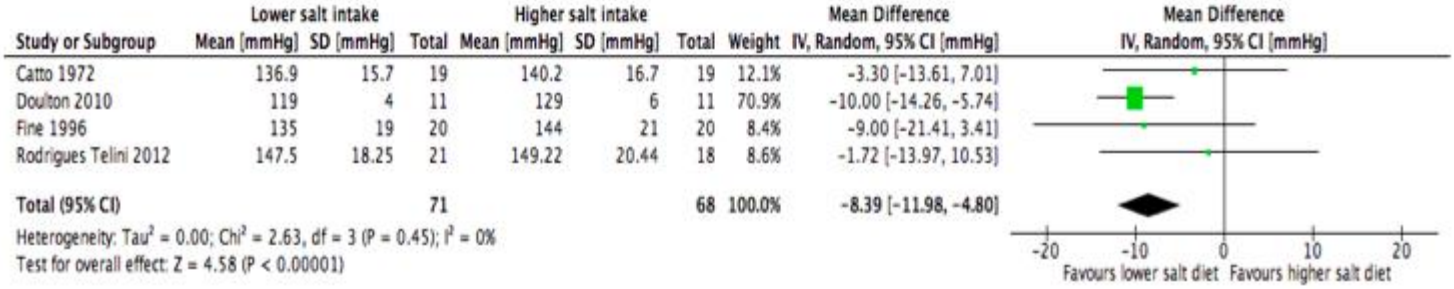
Objectives: To establish whether reducing dietary salt in patients with ESRD on dialysis reduces blood pressure.

Methods: This was a meta-analysis of randomised-controlled trials (RCTs) investigating dietary salt reduction in individuals receiving dialysis. Studies were identified through search strategies for CENTRAL, MEDLINE, and EMBASE. Two authors independently assessed studies for eligibility with the inclusion criteria as follows: participants aged 18 years and over; a reduction in salt intake of at least 2 g/day; an intervention period of at least 1 week. Studies with concomitant interventions (e.g. blood pressure medication and dialysis prescription) were excluded. The primary outcome was change in systolic and diastolic blood pressure (pre-dialysis blood pressure in the absence of 24-hour ambulatory blood pressure). Mean effect sizes were calculated using the random-effects models.

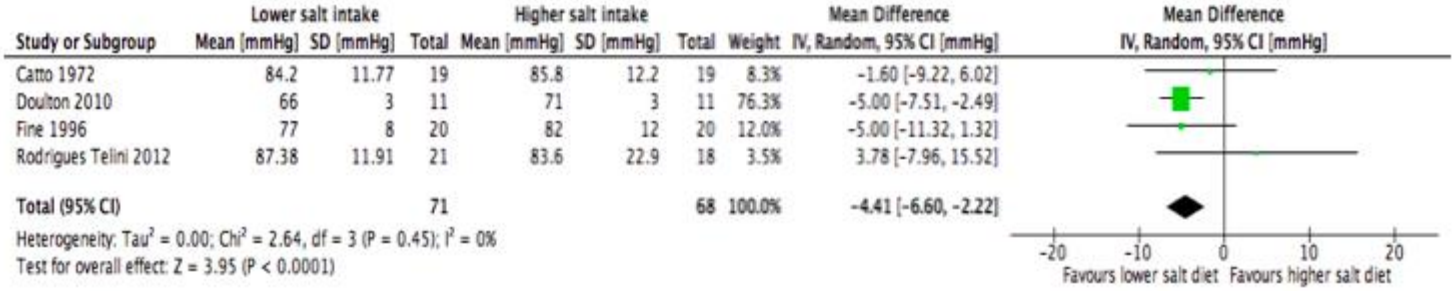
Image:

Figure 1. **Forest plots demonstrating net change in blood pressure with altered salt intake in dialysis patients**

A. Systolic blood pressure



B. Diastolic blood pressure



Results: 848 reports were screened, from which four RCTs (89 participants) were identified for inclusion in the meta-analysis. Three were conducted in haemodialysis patients and one in peritoneal dialysis patients. Three RCTs were crossover trials and one was a parallel study (Figure 1). Dietary salt reduction was associated with 8.4 mmHg reduction in systolic blood pressure (95% CI 4.8-12.0, I^2 = 0%), and a 4.4 mmHg reduction in diastolic blood pressure (95% CI 2.2-6.6, I^2 = 0%).

Conclusion: The results of this meta-analysis emphasise the importance of dietary salt restriction for controlling blood pressure in those with ESRD receiving dialysis.

Disclosure of Interest: None Declared

Keywords: Blood pressure, Dialysis, Sodium

Infection Control

PO-168

Cytomegalovirus Infection in Patients Receiving Immunosuppression for ANCA-Associated Vasculitis: A Multicentre case series.

K. Hill [1,*], J. Tollitt [2], N. Brown [2], M. Morton [3]

[1]Core medical training, Acute Pennine Trust, [2]Renal Department, Salford Royal Foundation Trust, [3]Renal Department, Central Mancheter Foundation Trust, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Protocols for surveillance and management of cytomegalovirus (CMV) in solid organ and haematopoetic stem cell transplant patients are well established. However, current guidelines for patients with ANCA-associated vasculitis (AAV) do not suggest routine surveillance for CMV disease.

Objectives: We sought to identify cases of CMV in patients with AAV to determine whether routine surveillance is something which should be recommended.

Methods: We reviewed the medical records and microbiological databases of 11 cases of CMV infection in patients from two tertiary renal referral centres with either a new diagnosis or relapse of AAV with renal involvement. Study period was 1st January 2010 - 1st October 2016.

Results: Median age of patients was 73 (interquartile range (IQR) = 11). 8 were female and 3 were male. All patients had positive ANCA serology; MPO (n=7), PR3 (n=4). All had renal involvement which was biopsy proven in 10 patients. 7 patients required haemodialysis during acute presentation. 9 patients had extra-renal organ involvement; pulmonary (n=7), ENT (n=3), bowel (n=1) or neurological (n=1). All patients received methylprednisolone plus cyclophosphamide (median dose = 2150mg, IQR = 5400mg, excluding 1 patient where doses unclear and 1 patient where given subsequently). One patient also received azathioprine, mycophenolate mofetil and rituximab, in chronological order. 7 patients had plasma exchange (median total volume = 27L). CMV was diagnosed within 28 days of the last dose of cytotoxic agent in 8 patients, 2 patients were diagnosed subsequently at 51 and 93 days and 1 patient was diagnosed prior to cytotoxics, but after high dose steroids. Indication for testing included pulmonary symptoms (n=6), gastro-enteric symptoms (n=5), systemic symptoms (n=4) or without clearly documented reason (n=2). Median initial CMV log on blood sampling was 3.87 (IQR = 0.85) and 4 patients were CMV positive on other samples: bronchoscopy washings (n=1), sputum (n=1), rectal biopsy (n=1), oesophageal biopsy (n=1). 2 patients had life-threatening gastrointestinal haemorrhages requiring blood transfusion. Median nadir in lymphocyte count within 2 weeks of CMV diagnosis was 0.4x10^9/L (IQR = 0.76). CMV infection caused either a delay or reduction in the total amount of immunosuppression given in 7 out of 11 patients. 6 patients required additional inpatient stay due to CMV infection, either new admission (n=4, mean stay was 26 days) or prolonged admission (n=2).

Conclusion: This case series shows that CMV may manifest in patients undergoing treatment for AAV causing morbidity, hospitalisation, increased length of stay and a delay or reduction in immunosuppression. It highlights that, in the aim of improving patient safety and developing our clinical practice, more routine screening for CMV in AAV may be indicated. The use of CMV prophylaxis for patients at risk needs to be further explored. Larger scale studies are required to ascertain the true prevalence and risk factors for infection.

Disclosure of Interest: None Declared

Keywords: ANCA, CMV, Vasculitis

Infection Control

PO-169

Hormonal Regulation of Virulence in Uncomplicated Urinary Tract Infections caused by Escherichia coli

L. Dixon [1,*], R. Floyd [1]

[1]Institute of Translational Medicine, UNIVERISTY OF LIVERPOOL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: For a quarter of women, urinary tract infections (UTI) represent a recurring problem associated with high socioeconomic costs and persistent infections can cause kidney damage and failure. Women using contraceptive pills containing higher concentrations of progesterone are more likely to have bacteriuria. While the anatomical reasons for the epidemiology of UTI are well known, evidence for bacterial responses to hormone is limited and conflicting. Biofilms contribute to bacterial persistence and resistance to treatment, therefore, understanding whether host-factors modulate resistance is of paramount importance.

Objectives: The aim of this study was to determine how progesterone affects the virulence of *E. coli*, regarding growth, biofilm formation and antibiotic resistance.

Methods: 20 UTI *E. coli* isolates from the North West of England were studied in the presence and absence of 10nM progesterone or 0.1% v/v ethanol as a vehicle control to determine their growth rate, ability to form biofilms and antibiotic sensitivity. Bacterial growth was measured for 24 hours to determine the effect of progesterone on bacterial replication where change in OD_{600} was used to estimate changes in growth. Biofilm biomass was quantified after 24 and 48 hours static culture in the presence or absence of progesterone or vehicle controls using crystal violet staining. Antimicrobial susceptibility testing was performed according to EUCAST guidelines with Tobramycin (10µg), Cefoxitin (30µg), Ciprofloxacin (5µg), Trimethoprim (5µg), Nitrofurantoin (300µg) and Piperacillin/Tazobactam (10µg) containing disks (MAST, UK). Each isolate was cultured overnight in Mueller-Hinton Broth supplemented with progesterone or ethanol and swabbed onto Mueller-Hinton plates alone or containing 10nM progesterone or 0.1% ethanol.

Results: Progesterone impaired growth of all isolates, with significant differences found in 6 isolates compared to controls (n=4 $P<0.05$, n=2 $P<0.01$). Biofilm biomass increased in the presence of 10nM progesterone at 24 hours but the results were not statistically significant. At 48 hours, the biofilm biomass decreased equally in all 3 conditions compared to 24 hours, suggesting the biofilms started to disperse. Progesterone modulated the sensitivity of some isolates to antimicrobials in an antibiotic-specific manner. Progesterone caused a significant increase in sensitivity in 2 isolates to Trimethoprim and 1 to Ciprofloxacin. However, progesterone significantly increased resistance of 1 isolate to Tobramycin, 2 isolates to Nitrofurantoin, 3 to Ciprofloxacin and 3 to Piperacillin/Tazobactam.

Conclusion: These studies suggest that a more personalized-medicine approach to diagnosing and treating UTI based on patients' hormonal profiles may improve clinical outcome. This research has the potential to impact clinical management strategies, however more work in this area is needed.

Disclosure of Interest: None Declared

Keywords: UTI

MDT Education/Research

PO-170

Improving care for patients with multimorbidity through the development of interdisciplinary treatment guidelines and educational resources

H. Beckwith [1,*], C. Plymen [2], S. Singh [1], H. Watts [1], E. Salisbury [1], J. Tomlinson [1], A. Frankel [1]

[1]Renal Medicine, [2]Cardiology, Imperial College NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral

Introduction: Multimorbidity is a significant challenge for modern healthcare. Patients with more than one chronic longterm condition often face difficulty accessing services, fragmented care with systems focussed on individual diseases, conflicting advice from different doctors and complex treatment burdens[1]. Single disease guidelines offer guidance on treatment for a specific condition, often do not take into consideration other diseases a patient has and may even be contradictory.

Objectives: Whilst collaborative care planning is essential[2], it needs to be undertaken in conjunction with consistent clinical guidelines and educational messages for the community healthcare workforce. Recognising the coexistence of cardiac disease and diabetes mellitus amongst our patients with chronic kidney disease, we have developed an approach to improve coordination of care across services.

Methods: Through a working group of healthcare professionals from cardiology, primary care and endocrinology departments (including consultants, specialist registrars, clinical nurse specialists and dieticians.) we have formulated and agreed interdisciplinary treatment guidelines which acknowledge the effect of treatment on other conditions, as well as resolving conflicting information that had previously been distributed through our respective departments.

Results: We identified three key areas where advice from cardiologists and nephrologists differed:

- Permitted creatinine rises after initiation of ACE inhibitors
- 'Sick day rules'
- Target blood pressures

Agreement was reached on a consistent set of guidelines for 'patients with chronic kidney disease and diabetes mellitus' and 'patients with chronic kidney disease and heart failure due to reduced ejection fraction'. We incorporated this advice into our 'management of chronic kidney disease' community guidelines and adjusted the local heart failure guidelines; ensuring a consistent approach to care is facilitated. To support this, we developed educational material based on the agreed educational objectives to be utilised across the different specialities when undertaking community workforce training. We have successfully incorporated these materials into educational sessions for healthcare professionals in the community.

Conclusion: Ultimately we believe our integrated inter-disciplinary approach to care will improve coordination across services and provide the most effective care to patients with more than one chronic long-term condition. Nephrologists need to be aware of the differences in advice offered to patients under their care with more than one long term condition and work with other specialty groups to ensure that coordinated and best practice care is delivered to their patients.

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Disclosure of Interest: None Declared

Keywords: CKD, Development, Patient experience

MDT Education/Research

PO-171

Development of an insitu inter-professional simulation training programme for the management of medical emergencies on the haemodialysis unit, in both the hospital and community units.

K. Watson [1,*], T. Sanctuary [1], O. Keane [1], C. Mainwaring [1], A. Moran [1], A. Mckenzie [1], T. Waring [1], S. Calvert [1], A. Rankin [2]
[1]Postgraduate Department of Medical and Dental Education, [2]Renal Unit, KINGS COLLEGE HOSPITAL NHS FOUNDATION TRUST, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Medical emergencies occur frequently in patients receiving haemodialysis treatment. This is a growing problem with more elderly and comorbid patients being accepted onto haemodialysis programmes, both in-centre and in satellite units. Healthcare teams report high levels of anxiety when attending emergencies on the haemodialysis unit (1). The skills to manage medical emergencies on dialysis exist within the multidisciplinary team but are not always shared effectively (2). Appropriate staff training is therefore important to deliver high quality life-saving treatment to patients who become seriously unwell on the haemodialysis unit (3).

Objectives: This inter-professional team training aims to enhance the skills and confidence of the health care team delivering medical emergency care on the haemodialysis unit as well as develop multidisciplinary team working and peer learning. The inter-professional nature will allow participants to gain knowledge of the skills of their colleagues in the multidisciplinary team. Running the simulation in the actual clinical workplace will allow participants to become more familiar with their work environment and the emergency resources available. This programme aims to develop a more cohesive team between the community satellite units and secondary care, generate quality improvement projects and reduce the number of adverse clinical incidents occurring on the dialysis unit.

Methods: This course entitled "inter-professional simulation training for the management of medical emergencies on the dialysis unit" will run as 90 minutes sessions occurring monthly on the main haemodialysis unit and alternate months rotating around the satellite haemodialysis units. It will use experiential learning through management of a simulated medical emergency. It will involve use of a medium fidelity manikin with a needleable fistula attached to a dialysis machine. Scenarios will include anaphylaxis, septic shock, fistula bleed, air embolus and cardiac arrest. The scenarios will be debriefed using the diamond model (4). The course will be evaluated through a pre and post course questionnaire assessing confidence in managing medical emergencies and attitudes towards multidisciplinary team learning. In addition a follow up survey will be sent to participants three months following to detect any change in practice and to record any quality improvement projects generated. The number of incident reports will also be recorded.

Results: The project design and implementation strategy will be presented.

Conclusion: We present here a patient safety development project in progress. Through this multidisciplinary education, we are aiming to improve the skills in managing medical emergencies on the dialysis unit, improve inter-professional team working and patient care in both in-centre and community satellite dialysis units.

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Disclosure of Interest: None Declared

Keywords: Haemodialysis, Shared decision making, Staff training

Mediators, Receptors and Signalling Pathways

PO-172

Circulating Lipopolysaccharide, Lipopolysaccharide Binding Protein and CD14 Levels in Lupus Nephritis

D. T. M. Chan [1,*], K. Y. Au [1], K. F. Cheung [1], Q. Zhang [1], M. K. Chau [1], S. Yung [1]

[1]Department of Medicine, THE UNIVERSITY OF HONG KONG, Hong Kong, Hong Kong

Preferred Presentation Method: Poster

Introduction: The aetiology and pathogenic mechanisms of lupus nephritis are complex and involves the interplay between genetic and environmental factors. Gut microbiota and their components may modulate immune-reactivity. The role of gut microbiota in the pathogenesis of lupus nephritis has not been investigated. Lipopolysaccharide (LPS) is a component of the outer wall of Gram-negative bacteria. LPS interacts with LPS binding protein (LBP) and is then bound to its receptor CD14, thus triggering downstream signalling and activation of $CD14^+$ cells such as macrophages, neutrophils, and dendritic cells. In addition, the binding of LPS to soluble CD14 can confer LPS-responsiveness to cells normally not expressing CD14.

Objectives: We examined the relationship between the levels of serum LPS, LBP, and CD14 and disease parameters in lupus nephritis patients.

Methods: Paired serum samples during active disease or remission from patients with biopsy-proven Class III/IV±V lupus nephritis were included, and sera from patients with non-lupus renal diseases and healthy subjects served as controls (n=50 for each group). LPS, LBP, and CD14 levels were measured by commercially available limulus amebocyte lysate test and ELISA. Intestinal mucosal permeability in lupus-prone mice was investigated with dextran- and LPS-FITC administration and ZO-1 expression.

Results: Serum LPS and CD14 levels were significantly higher (P<0.05 for both) in lupus nephritis patients compared with non-lupus renal diseases and healthy subjects (P<0.05 for both). Serum LBP level was significantly higher in lupus and non-lupus renal diseases than healthy subjects (P<0.05 for both). Serum LPS, LBP, and CD14 levels were higher during active disease compared with remission in patients with lupus nephritis (P=0.016, 0.025 and 0.035 respectively). LPS level inversely correlated with IgG level (r=-0.253, P=0.029). LBP level correlated with that of CD14. Both LBP and CD14 levels correlated with that of anti-dsDNA antibody, IL-6, and IL-8. CD14 level also showed a negative correlation with C3, lymphocyte and neutrophil counts. Gut permeability was increased in NZBWF1/J mice with active nephritis, and this was associated with increased LPS-FITC in the bloodstream and markedly reduced mucosal ZO-1 expression.

Conclusion: Our data suggest that higher LPS, LBP and CD14 levels in circulation are related to systemic pro-inflammatory status, disease activity in lupus nephritis is associated with higher levels of LPS and its binding molecules, and increased circulating levels of LPS and CD14 in lupus may be attributed to increased gut permeability.

Disclosure of Interest: None Declared

Keywords: Autoimmune disease, Inflammation, Lupus

Mediators, Receptors and Signalling Pathways

PO-173

The clinical relevance of disturbed cortisol-cortisone balance in chronic kidney disease: a pilot study.

M. Sagmeister [1,*], A. Taylor [2], A. Fenton [1], N. Wall [3], D. Chanouzas [3], P. Cockwell [1], R. Hardy [2], L. Harper [4]

[1]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, [2]Institute of Metabolism and Systems Research, [3]Institute of Inflammation and Aging, [4]Institute of Clinical Sciences, University of Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The ratio of active cortisol to inactive cortisone increases with chronic kidney disease (CKD). This ratio is determined by the enzymes 11beta hydroxysteroid dehydrogenase (11β-HSD) type 1 (cortisol activating) and 11β-HSD type 2 (cortisol inactivating). Altered 11β-HSD type 1 activity has been implicated in disease states of inflammation, metabolic syndrome and cardiovascular pathology outside of renal disease, but its role in CKD is not well understood. The expression of renal 11β-HSD type 2 decreases in CKD, consistent with the rise in cortisol/cortisone ratio. However, the significance of altered cortisol-cortisone balance in this context is uncertain.

Objectives: We conducted a pilot study to investigate the clinical relevance of altered cortisol-cortisone balance in CKD.

Methods: We used spot urine samples and biomedical data from 32 patients collected as part of the Renal Impairment in Secondary Care study. Patients had chronic kidney disease stage IV, were not diabetic and not on systemic immunosuppression. Spot urine samples from 19 age- and sex-matched healthy volunteers served as a control. Using liquid chromatography-mass spectrometry, we measured cortisol, its metabolites 5alpha-tetrahydrocortisol (5αTHF) and tetrahydrocortisol (THF), cortisone and its metabolite tetrahydrocortisone (THE).

Results: The CKD group had a significantly raised ratio of (5αTHF+THF)/THE compared to the control group [median 0.87 vs 0.74, p=0.037; Mann-Whitney U test] and a trend toward a raised ratio of cortisol/cortisone [median 0.87 vs 0.67, p=0.070; Mann-Whitney U test]. In the CKD group, (5αTHF+THF)/THE correlated positively with waist-to-hip ratio [Spearman's rho 0.415; p=0.018] and negatively with triglyceride levels [Spearman's rho -0.408; p=0.023]. There was no statistically significant correlation between (5αTHF+THF)/THE or cortisol/cortisone and urinary albumin-creatinine-ratio, white cell count, C-reactive protein, blood pressure, pulse wave velocity, body mass index, total cholesterol, deterioration of glomerular filtration rate over 30 months, initiation of renal replacement therapy or mortality at 30 months.

Conclusion: Our results show that systemic activation of cortisone to cortisol increases in CKD in keeping with previous reports. The association of cortisol activation with central fat distribution fits with the typical pattern of glucocorticoid excess, whereas the association with reduced triglyceride levels is unexpected. This pilot study with limited sample size found no correlation between cortisol activation and markers of systemic inflammation, cardiovascular disease or CKD progression. We plan to validate these findings in a study with a larger sample size.

Disclosure of Interest: None Declared

Keywords: CKD, Corticosteroids

Mediators, Receptors and Signalling Pathways
PO-174
ANCA-associated vasculitis patients exhibit reduced serum levels of soluble RAGE (sRAGE)

T. Page [1,*], F. Brunini [1], J. Cao [1], F. Dudhiya [1], S. McAdoo [1], C. Pusey [1]
[1]Medicine, IMPERIAL COLLEGE LONDON, London, United Kingdom

Preferred Presentation Method: Oral or Poster
Introduction: ANCA-associated vasculitis (AAV) patients exhibit raised levels of circulating calprotectin and HMGB1 (1,2), molecules which are recognised by both the TLR4:CD14 receptor complex and the receptor for advanced glycation end products (RAGE). We have previously shown that monocyte CD14 levels are raised in AAV (3) however, the expression of RAGE and its naturally occurring soluble decoy, sRAGE, has not been previously investigated.
Objectives: In order to understand the role of RAGE and its ligands in AAV we have studied the expression of calprotectin, HMGB1 and sRAGE in AAV, and their relation to disease.
Methods: Serum levels of sRAGE, calprotectin and HMGB1 in 32 AAV patients, recruited from the Hammersmith Hospital, London, were analysed using commercially available ELISAs. Patients with diabetes/ plasma exchange/ dialysis were excluded from the analysis.
Results: whilst HMGB1 levels were not different from healthy controls, the serum level of calprotectin was significantly raised in AAV patients ($p=0.0008$). Patients with active disease showed higher calprotectin levels than patients in remission ($p=0.0049$), however, remission patients also had levels higher than healthy controls ($p=0.0262$) suggesting a persistent degree of immunological activation. Calprotectin levels were higher in AAV patients with renal disease ($p=0.0039$), and correlated with a number of clinical parameters including BVAS, PCR and CRP levels.
In contrast, sRAGE levels were significantly reduced in active AAV compared to patients in remission and healthy controls ($p=0.0001$), and were lower in active GPA than in active MPA ($p=0.0161$). Within the active patient group, sRAGE levels were lower in untreated patients compared to those receiving therapy ($p=0.04$) and showed an inverse correlation with serum calprotectin ($p=0.0209$) levels. sRAGE levels alone did not correlate with renal disease in our cohort. Rather, sRAGE was significantly lower in AAV patients with lung and ENT involvement ($p=<0.0001$).
Conclusion: In agreement with other workers, we found that increased levels of circulating calprotectin correlated with disease activity, and renal involvement in AAV. In addition, our studies have shown for the first time that levels of sRAGE are lower in active AAV patients, and in those with raised calprotectin, suggesting a link between the expression of calprotectin (ligand) and its decoy receptor (sRAGE). Over-expression of calprotectin, coupled with a reduction in the level of circulating sRAGE, may lead to an exaggerated RAGE-mediated response. RAGE signalling induces inflammatory cytokine production, cellular proliferation, vascular re-modelling and apoptosis. This molecule may therefore represent an important mediator of disease in AAV.
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Disclosure of Interest: None Declared

Keywords: Inflammation, Vasculitis

Medicines Management

PO-175

Long term outcomes of daily oral vs. pulsed intravenous cyclophosphamide for ANCA-associated vasculitis in a non-trial setting

J. Royle [1], J. La-Crette [1], P. Lanyon [1], A. Ferraro [2,*], F. Pearce [1]

[1]Rheumatology, [2]Nephrology, NOTTINGHAM UNIVERSITY HOSPITALS, Nottingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Cyclophosphamide may be given as daily oral tablets (PO), or pulsed intravenous (IV) therapy to induce remission in ANCA-associated vasculitis (AAV). A previous trial (de Groot *et al* 2009, n=149) and extended follow up study (Harper *et al* 2012, n=134), demonstrated that IV administration was associated with fewer infections but a greater risk of relapse.

Objectives: In an audit of AAV outcomes, we evaluated this in an unselected observational cohort.

Methods: All patients diagnosed with AAV in our centre between 2006 – 2013 were identified by multiple case ascertainment strategies. We evaluated all those treated with cyclophosphamide, retrospectively reviewing case notes for administration route, baseline characteristics and outcomes. We assessed differences in mortality, relapse, neutropenia and infection using Kaplan-Meier methods, cox regression and logistic regression as appropriate. Unadjusted and adjusted (for age, sex and renal function) values were calculated.

Table:

	Unadjusted HR/OR for PO CYC	**Adjusted HR/OR* for PO CYC**	**P Value (Adjusted HR/OR)**
Death (during follow up)	3.8 (1.4-10.4)	1.3 (0.1-15.2)	P=0.84
Relapse (during follow up)	0.4 (0.2-0.9)	1.0 (0.3-2.9)	P=0.10
Neutropenia (first year)	3.7 (1.0-14.2)	4.4 (0.5-42.7)	P=0.19
Admission with infection (first year)	2.0 (0.8-5.0)	2.2 (0.6-8.6)	P=0.23

Results: 114 patients were identified: 57 received PO and 57 received IV treatment. Baseline characteristics were significantly different; patients receiving PO treatment were older (median age 72 vs 55 yrs, P=<0.05), had higher serum creatinine (mean creatinine 295 vs 80 µmol/L, P=<0.05) and almost universal renal involvement (98% vs 46%, P=<0.05), reflecting the clinical differences that influence whether patients presented to Nephrology and received PO therapy, or Rheumatology and received IV therapy. ANCA serology was predominantly MPO in the PO group (56%) and PR3 in the IV group (61%), P=0.02. Median follow up was 4.0 and 5.0 years respectively.

Overall, 22 patients died in 542 patient-years of follow up (mortality rate of 40.5 per thousand person-years). One year survival was 86.0% in PO and 98.2% in IV patients. One year relapse-free survival was 80.7% in PO compared to 87.3% in IV patients. Hazard ratios for the whole follow up period are listed in table 1.

During the first year after treatment, neutropenia occurred in 10/57 (18%) PO and 3/55 (5%) IV patients, adjusted OR 4.4 (0.5-42.7, P=0.19), whilst infection requiring hospital admission occurred in 16/57 (28%) and 9/55 (16%) respectively, P=0.23. Cancer occurred in 5/57 PO and 3/55 IV patients (P=0.50).

Conclusion: Patients who received PO and IV cyclophosphamide were significantly different at baseline. There was no difference in survival or relapse rates after adjusting for these differences. There was a trend towards more neutropenia and increased admissions with infections in the PO group, but once adjusted for age, sex and renal function these were not significant. In this unselected cohort of patients undergoing remission induction therapy for AAV, rates of admission with infection appear to be higher than those from a previously published RCT. This may help inform clinicians when advising patients of their treatment related risks.

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Keywords: Cyclophosphamide, Vasculitis

Medicines Management

PO-176

Minimising exposure to cyclophosphamide in primary membranous nephropathy - a single centre experience

G. Cho [1,*], K. Loudon [1], L. Willcocks [1]

[1]Department of Renal Medicine, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, United Kingdom

Preferred Presentation Method: Poster

Introduction: Primary membranous nephropathy (PMN) causes of 40% of primary nephrotic syndrome in adults and associated with a 30-35% risk of progression to end-stage renal failure within 10 years of diagnosis. The Modified Ponticelli regime is recommended by KDIGO as standard treatment for those with persistent proteinuria and/or declining renal function following 6 months of conservative management[1]. This remains however, a heavily debated issue given the associated toxicity of treatment. Since 2010 we have used an adapted Ponticelli protocol, replacing oral with pulsed intravenous (IV) cyclophosphamide based on reduced rates of leukopenia and infection in ANCA vasculitis described by *Haubitz et al*[2].

Objectives: We performed a retrospective analysis in patients with PMN treated with IV cyclophosphamide between 2011 and 2016 at a single centre. We sought to establish treatment response and frequency of serious adverse events in this modified protocol.

Methods: Retrospective analysis of eleven patients with biopsy proven PMN and features of progressive disease (rising or persistent proteinuria, deteriorating renal function or persistent nephrotic syndrome) treated with our adapted Ponticelli protocol. All patients were male with an average age of 66.5 years (53 – 77). Median follow-up was 15 months (3 - 48). 9/10 patients were anti-PLA2R positive. Patients received methylprednisolone 500mg IV daily for 3 successive days, followed by oral prednisolone (0.5mg/kg) on months 1, 3 and 5. Pulsed IV Cyclophosphamide (7.5 - 15mg/kg adjusted for age and renal function) was administered on day 1 and 14 of months 2, 4 and 6. Adverse events were recorded throughout treatment and the ensuing 3 months after completion.

Table:

Results: Eleven patients were included in the analysis of which 3 achieved complete remission, 6 partial remission and 2 did not respond. Anti-PLA2 titres were not repeated. 5 patients in total required anti-biotics for a respiratory tract infection – 2 of these necessitated hospital admission. One of these patients also required dose reduction for leukopenia. Average cumulative dose of cyclophosphamide over 6 doses was 5.5 grams (3.3 – 7.2). The reduction in dose of IV cyclophosphamide was on average 60% in comparison to standard oral dosing (2mg/kg/day).

Conclusion: There is a high toxicity associated with the combination of alkylating agents and glucocorticoids. Serious or treatment related adverse events (SAE) affect as many as 60-80% patients[3,4]. Using cyclophosphamide instead of chlorambucil reduces toxicity, with reported SAE's of 20-25% in those treated with cyclical steroids and oral cyclophosphamide[5,6]. In our small cohort we have achieved comparable remission rates in PMN while using considerably lower doses of cyclophosphamide in contrast to the traditional oral ponticelli regime. Our SAE rates were similar to those described in the literature. Larger studies are required to appraise the optimal treatment regime whilst minimising the morbidity associated with immunosuppression.

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Disclosure of Interest: None Declared

Keywords: Cyclophosphamide, Immunosuppression, Membranous

Medicines Management

PO-177

Azathioprine Hypersensitivity Reaction Presenting as Respiratory Sepsis in Vasculitis Patients

V. Carnall [1,*], L. Smyth [1], R. Haigh [2]

[1]RENAL MEDICINE, [2]Rheumatology, ROYAL DEVON AND EXETER FOUNDATION TRUST, Exeter, United Kingdom

Preferred Presentation Method: Poster

Introduction: Azathioprine is an immunosuppressive agent used in vasculitis patients. Recognised side effects include leucopenia and liver dysfunction. Hypersensitivity reactions are well recognised, typically gastrointestinal symptoms and fever. We identified vasculitis patients presenting with pulmonary symptoms, managed as sepsis, and later diagnosed as reactions to azathioprine.

Objectives: To review how hypersensitivity was diagnosed in vasculitis patients and increase awareness of reactions to azathioprine.

Methods: Retrospective review of patient notes with vasculitis on azathioprine who were diagnosed with hypersensitivity.

Results: In the last three years we had three cases of azathioprine induced hypersensitivity presenting with respiratory symptoms. Two of these patients had consecutive presentations occurring after recommencing azathioprine.

The first patient, 69 year old man with microscopic polyangitis presented with gastrointestinal symptoms and breathlessness. He was hypotensive and tachypnoeic with crepitations at lung base and an xray showing consolidation. Urine and blood cultures were negative. He was managed as chest sepsis and developed neck swelling requiring ventilation on ITU. He did not respond to antibiotics but azathioprine was stopped and he recovered. On recommencement of azathioprine his symptoms returned within five days, and on cessation they resolved.

The second patient, a 72 year old gentleman, with microscopic polyangitis and necrotising glomerulonephritis commenced azathioprine and within five days was admitted with pyrexia and hypotension. He was treated for chest sepsis. Urine and blood cultures were negative but he had a high CRP. CT thorax showing bibasal fibrosis with likely aetiology of hypersensitivity. Azathioprine was stopped and he recovered. The azathioprine was recommenced and within two days his symptoms returned. It was stopped and symptoms settled.

The third patient, 64 year old gentleman with C-ANCA vasculitis, commenced azathioprine and within two weeks presented with rigors, vomiting and loose stools. He was treated for chest sepsis for three days but fevers of >38C persisted with high CRP (>200). His chest xray was normal, negative blood and urine cultures. Antibiotics were stopped but symptoms persisted. His azathioprine was stopped the following day and immediate improvement occurred with symptom resolution within 48 hours.

All patients had normal TPMT levels, negative CMV and EBV serology and ANCA titres not significantly elevated.

Conclusion: These cases presented with systemic and pulmonary symptoms and were managed as sepsis for at least three days before azathioprine was stopped. Azathioprine is known to cause hypersensitivity reactions but reversible pneumonitis is documented rarely. All of our patients presented with symptoms suggesting pulmonary involvement. These patients had recently changed from cyclophosphamide to azathioprine in line with standard vasculitis management. An acute vasculitis patient, who has had a recent change to immunosuppression could have a diagnosis of bacterial or atypical infection or a vasculitis flare. In our cases these wre excluded and azathioprine was the unifying causative agent. Vasculitis patients are routinely given azathioprine therefore a better awareness of its hypersensitivity profile is required, particularly alternative presentations, such as respiratory symptoms, to ensure appropriate cessation of azathioprine occurs when they acutely present.

Disclosure of Interest: None Declared

Keywords: Azathioprine, Medicines management, Vasculitis

Nutrition

PO-178

Differences in prevalence of muscle wasting in peritoneal dialysis patients determined by dual electron absorption spectroscopy (DXA) due to variation in guideline definitions of sarcopenia

G. Godlet [1,*], R. Hung [1], B. Wong [1], A. Davenport [1]

[1]ROYAL FREE HOSPITALS NHS FOUNDATION TRUST, London, United Kingdom

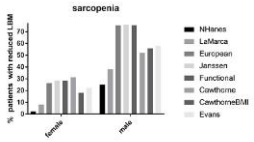
Preferred Presentation Method: Oral or Poster

Introduction: Muscle wasting is associated with increased risk for mortality. There is no agreed definition for muscle wasting, and patients with chronic kidney disease and those on dialysis are at increased risk of sarcopenia due to a combination of factors.

Objectives: We wished to determine whether there were differences in the prevalence of muscle wasting in a cohort of peritoneal dialysis (PD) patients between the more commonly used criteria for defining muscle loss and sarcopenia.

Methods: We measured lean body (LBMI), and appendicular lean mass indices (ALMI) in 325 PD outpatients by dual energy X ray absorption spectroscopy (DEXA), comparing muscle mass with that used to define muscle wasting (sarcopenia) by various clinical guideline publications. Data is presented as mean ± standard deviation, median (interquartile range), or percentage. Standard statistical tests were used to analyse data, (t test, Mann Whitney U test, MANOVA , Kruskal Wallis, or Chi square test) with appropriate post hoc corrections made for multiple testing (Bonferroni and Benjamini-Hochberg), where appropriate.

Image:



Results: LBMI and ALMI did not differ with gender (female 17.7±4.6 kg/m^2, male 17.4±4.3, and female 6.9 (5.6-8.5), male 6.7 (5.3-8.3) kg/m^2 respectively. Depending on the criteria used the prevalence of muscle wasting varied from 2.2-31.3% for women, and 25.1-75.6% for men. Male patients were older, 58.3±16 vs 53.4±15.7 years. Criteria using cut offs derived from young healthy patients gave the higher prevalence rates. The prevalence of muscle wasting was not associated with dialysis adequacy, estimated protein intake, duration of dialysis treatment, co-morbidity, diabetes or ethnicity. The prevalence of sarcopenic obesity was low (0% females, 7% males).

Conclusion: There is currently no agreed universal definition for muscle wasting (sarcopenia), and we found that the prevalence varied markedly depending on the cut off criteria used to define muscle wasting. Very few patients had sarcopenic obesity. The higher prevalence for males requires further study but was not associated with dialysis treatment. Our study highlights the need for agreed criteria to define pathological muscle wasting from that age associated, to allow for interventional screening programs

Disclosure of Interest: None Declared

Keywords: Nutrition, Peritoneal dialysis

Nutrition

PO-179

How do patients make sense of complex renal diet advice? Preliminary qualitative results of the experiences of patients with chronic kidney disease (CKD)

K. Lambert [1,*], J. Mullan [2], K. Mansfield [1]

[1]SCHOOL OF MEDICINE, UNIVERSITY OF WOLLONGONG, [2]Center for Health Research Illawarra Shoalhven Population , Australian Health Services Research Institute, WOLLONGONG, Australia

Preferred Presentation Method: Oral or Poster

Introduction: Dietary self-management is essential in the management of chronic kidney disease (CKD). However the renal diet is complex and the dietary prescription changes over time as kidney disease progresses. Previous research has shown that dietary adherence is often suboptimal and that the diet impacts negatively on social and family life. There is a lack of research describing how patients with CKD make sense of, and apply renal diet advice in practice.

Objectives: (i) Explore and describe the strategies used by patients with CKD to make sense of complex renal diet advice and (ii) identify opportunities to improve dietary adherence and dietetic service provision.

Methods: A qualitative study was undertaken using semi structured interviews. Interview questions were based on Dervin's sense making methodology. Analysis was undertaken using the Framework Approach. Participants were recruited from three renal units (two regional and one rural) from one health district on the south east coast of Australia. Invitations to participate were sent to patients with CKD and their carers, who were either undertaking a renal replacement therapy (RRT, hemodialysis, peritoneal dialysis or a kidney transplant); were considered predialysis; or who had attended an outpatient appointment with a renal dietitian in the previous three months.

Results: To date, 35 individuals have been interviewed (26 patients and 9 carers). The median age of the patients with CKD is 65 years (IQR: 62.75-76 years); 60% were male; and 60% were undertaking a RRT. Approximately one quarter (26%) had undertaken more than one type of RRT.

Responses were both negative and positive. Patients and carers alike described receiving renal diet advice as overwhelming and confusing, especially when it was contrary to healthy eating advice. Study participants described feelings of frustration and panic when trying to make decisions regarding meals or specific foods prior to being given explicit dietary information or when given inadequate information.

Participants also described feeling perplexed and discouraged when individual elements of the renal diet were contradictory. Some respondents also felt relieved when provided with renal diet advice, and this was associated with a desire to take a proactive role in the management of their disease. Frequent contact with a dietitian was highly valued by participants but rarely received. As a result, other staff, patients or online information was used in the interim.

In order to make sense of and apply the renal diet information, patients and carers often created their own individualised renal appropriate meal food lists; or consulted the internet or books for recipes or meal plans. They also used mobile apps to obtain further food composition information or simply made minimal dietary changes and then relied on staff or regular blood tests to alert them when problems arose.

Conclusion: This study provides useful contextual information for renal dietitians about how patients make sense of renal diet information. The study findings can be used to help improve dietetic service provision and may potentially lead to improvements in CKD patients' dietary adherence.

Disclosure of Interest: None Declared

Keywords: Nutrition, Patient experience, Qualitative study

Nutrition

PO-180

How do dietitians help patients make sense of complex renal diet advice? Preliminary results from a qualitative study of renal dietitians' experiences

K. Lambert [1,*], J. Mullan [2], K. Mansfield [1]

[1]SCHOOL OF MEDICINE, UNIVERSITY OF WOLLONGONG, [2]Center for Health Research Illawarra Shoalhven Population , Australian Health Services Research Institute, WOLLONGONG, Australia

Preferred Presentation Method: Oral or Poster

Introduction: Dietary self-management is essential in the management of chronic kidney disease (CKD). Non adherence to the renal diet is associated with poor health outcomes. However there is a distinct lack of research describing the experiences of renal dietitians and how they assist patients with CKD to make sense of, and apply renal diet advice in practice.

Objectives: (i) Explore factors perceived by dietitians to impact on the understanding and adherence of patients with CKD to the renal diet and (ii) explore the strategies used by dietitians to help patients with CKD make sense of complex renal diet advice

Methods: A qualitative study was undertaken using semi structured interviews. Interview questions were based on Dervin's sense making methodology. Analysis of interviews was undertaken using the Framework Approach. Participants were renal dietitians recruited via snowball sampling from professional dietetic and nephrology networks in Australia and New Zealand.

Results: To date, 28 renal dietitians have been interviewed (10.7% male, mean age 43.1 years old (sd 11.0). The mean number of years of experience as a dietitian was 18.7 years (sd 10.7). Approximately three quarters (74%) of the renal dietitians interviewed provided services to patients with all stages of CKD, including those undertaking a renal replacement therapy such as hemodialysis, peritoneal dialysis or a kidney transplant.

Renal dietitians described a range of factors that they perceived to heavily influence the ability of patients with CKD to make sense of, and apply renal diet advice. These factors included: the presence of cognitive impairment and low health literacy, as well as depression, education levels, and socioeconomic status. Factors such as food security and the relationship between the patient and the renal dietitian were also perceived to influence the ability of patients to make sense of, apply the renal diet.

The complexity of the renal diet (i.e. the need to modify multiple nutrients); the changing nature of the diet, and the fact that some components of the renal diet appear contradictory were perceived by dietitians to present the largest intellectual and practical challenges for patients and carers.

Inadequate dietetic staffing in many renal units was a commonly cited source of professional dissatisfaction for study participants. Renal dietitians also described feelings of frustration at being unable to provide renal education sessions in a timely manner and/or at the frequency they believed was required. The lack of funding and time to develop suitably tailored resources (such as multicultural diet sheets, videos, and supermarket tours) was also cited as a barrier to how well a patient understands and adheres to the renal diet.

A range of strategies were described and used by renal dietitians to help patients make sense of complex renal diet advice. The most common included the technique of layering advice over many sessions if able; and / or providing instruction on the renal diet in a didactic manner. Developing long term relationships with their patients was also perceived to be a key strategy to help patients make sense of renal diet advice.

Conclusion: This study provides contextual information about the experiences and practices of renal dietitians. The study findings can be used to help future researchers target interventions to those aspects of clinical practice that have been identified as barriers by renal dietitians in helping patients make sense of their complex renal diet advice.

References:

Disclosure of Interest: None Declared

Keywords: Communication techniques, Nutrition, Qualitative study

Nutrition

PO-181

Outcomes following percutaneous endoscopic gastrostomy tube (PEG) insertion in patients with end stage renal disease

R. Dattani [1,*], M. WILLICOMBE [1], A. KANG [1], P. VLAVIANOS [2]

[1]NEPHROLOGY, [2]GASTROENTEROLOGY, HAMMERSMITH HOSPITAL, IMPERIAL NHS TRUST, LONDON, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The survival and quality of life benefits of percutaneous endoscopic gastrostomy tube (PEG) insertion differ depending upon the indication and comorbidities of the patient. Significant controversy exists for example in patients who have dementia as the primary indication for enteral feeding. End stage renal disease (ESRD) is associated with a poor prognosis, however malnutrition in patients with ESRD has been shown to be an independent risk factor for mortality.

Objectives: This study examines the indications and outcomes following PEG insertion in patients with ESRD.

Methods: We retrospectively identified patients receiving long-term renal placement therapy who underwent a PEG or RIG (radiologically inserted gastrostomy) insertion between 2010 and 2016. Clinical data was collected from medical records, laboratory results and imaging records.

Results: 30 patients underwent enteral tube insertion [22 PEG and 8 RIG tubes]. Median follow up post PEG insertion was 44.0±21.5 months. 20/30 (66.7%) of the patients were male. The median age at the time of insertion was 70.7(63.4-74.4) years. 8/30 (26.7%) were Caucasian. The causes of ESRD included diabetes in 14 (46.7%), glomerulonephritis in 7 (23.3%), unknown in 6 (20.0%) and other specific causes in 3 (10%) patients. 24/30 (80.0%) of patients were on haemodialysis at the time of PEG insertion and 6/30 (20.0%) had a functioning transplant. The median ESRD vintage of the patients was 2.87 (2.23-5.23) years. The indications for PEG insertion included a neurological disorder in 17 (56.7%) [including stroke in 14 (46.7%)], aspiration risk in 8 (26.7%), nutritional support in 3 (10.0%) and an oesophageal disorder in 2 (6.7%).

26/30 (86.7%) patients died during the follow up period, with a 1, 2 and 3-year survival of 31.2%, 15.6% and 5.9%. The median time to death was 5.4 (2.6-11.7) months. 7/30 (23.3%) patients died during the index hospital admission. One patient died as an immediate complication of the procedure. Other complications included bleeding in 7 (23.3%), exit site infection in 13 (43.3%) and recurrent aspiration pneumonia in 14 (46.7%).

Conclusion: This study shows that patients with ESRD who have insertion of a PEG for enteral nutrition have an overall poor prognosis. Careful individual assessment is required before contemplating PEG insertion in patients with ESRD.

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Disclosure of Interest: None Declared

Keywords: Nutrition

Paediatric Nephrology

PO-182

Tolvaptan treatment for severe, neonatal, autosomal dominant polycystic kidney disease.

R. Gilbert [1,*], H. Evans [2], K. Olalekan [3], A. Nagra [1], S. Haq [1], M. Griffiths [4]

[1]Paediatric Nephrology, Southampton Children's Hospital, [2]Paediatric Respiratory Medicine, Southampton Childrens Hospital, [3]Pharmacy, University Hospital Southampton, [4]Radiology, Southampton Children's hospital, Southampton, United Kingdom

Preferred Presentation Method: Poster

Introduction: Patients with severe, neonatal, polycystic kidney disease, whether dominant or recessive, have on several occasions been treated with nephrectomy and early dialysis. This approach has a high mortality rate, at least in part due to refractory hypotension post-operatively due to loss of renin secretion as well as the difficulties involved in managing completely anuric young infants. Tolvaptan, a selective, competative inhibitor of the vasopressin V2 receptor, is lisenced for use in adults to slow the progression of ADPKD.

Objectives: A neonate with bi-allelic abnormalities of *PKD1* had very large kidneys (10.7 x 7.5 x 5.6 cm) causing respiratory compromise and occlusion of the inferior venal cava. There was hypertension, respiratory acidosis and frequent desaturations for whi she received supplementary oxygen. Renal function was abnormal (plasma creatinine 103 µmol/L at 31 days) and hyponatraemia. Tolvaptan was used to correct the hyponatraemia and to minimise renal growth.

Methods: Tolvaptan 0.15 mg/kg/day was started on postnatal day 31. the dose was gradually increased, reaching 0.7 mg/kg/day at 6 months of age and 1 mg/kg/day at 9 months. The dose has been kept at 1 mg/kg/day since then. Because tolvaptan is insoluble in water a suspension (1 mg/ml) was manufactured by the pharmacy to ensure even dosing.

Plasma sodium concentration and liver enzymeswere closely monitored

Results: The kidneys have not changed in size while the patient has grown in length by 24 cm. Respiratory function is normal and supplementary oxygen was stopped at 12 months following a normal sleep study. Estimated GFR has increased from 17 to 60 ml/min/1.73 m^2. There have been no episodes of hypernatraemia of raised liver enzymes.

Conclusion: Tolvaptan may be a useful treatment for severe neonatal polycystic kidney disease.

Disclosure of Interest: R. Gilbert Conflict with: RDG is a member of the data monitoring committee for paediatric trials of tolvaptan, H. Evans: None Declared, K. Olalekan: None Declared, A. Nagra: None Declared, S. Haq: None Declared, M. Griffiths: None Declared

Keywords: ADPKD

Paediatric Nephrology

PO-183

A single low dose schedules of Rituximab is non-inferior to high dose and multiple dose schedules in the treatment of steroid sensitive frequently relapsing nephrotic syndrome

R. A. Dalrymple [1,*], D. Chisholm [2], U. Monachan [1], Y. Tse [2], B. C. Reynolds [3]

[1]Paediatric Renal Department, The Royal Hospital for Children, Glasgow, [2]Paediatric Renal Department, The Great North Children's Hospital, Newcastle, [3]Paediatric Nephrology Department, The Royal Hospital for Children, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Rituximab is an effective treatment for children with steroid dependant (SDNS) or frequently relapsing nephrotic syndrome (FRNS) (1). However the optimum dosing schedule for Rituximab is unclear.

Objectives: To investigate if a single low dose of 375mg/m^2 would be non-inferior to higher or multiple doses in reducing the frequency of disease relapse and time to B cell reconstitution.

Methods: This was a multicentre retrospective observational cohort study of children with a diagnosis of steroid sensitive frequently relapsing nephrotic syndrome where management was in part supervised by paediatric nephrologists based in Glasgow and Newcastle Children's Hospitals, comparing current and previous dosing strategies. Data was extracted from clinical records on the dates of diagnosis, treatment, and relapses, the use of concomitant immunosuppression, and lymphocyte subset profiling pre and post-rituximab administration. Patients treated earlier in the cohort received variable doses of Rituximab, though typically two doses of 750mg/m^2. Later patients received our current regimen of a single dose of 375mg/m^2. The primary outcome being the probability of remaining relapse free 12 month after Rituximab administration. Secondary outcomes were time to relapse (months), probability of being relapse free at 6 and 24 months, time to reconstitution of CD19$^+$ B cells (>1% of the total lymphocyte population) and the probability of requiring additional immunosuppression.

Table:

Dosing strategy (total number of patients)	Mean time to B cell >1% (months)	EFS at 6 months	EFS at 12 months	EFS at 24 months
750mg/m2 x2 doses (12 pts)	7.1	10/12 (83%)	6/12 (50%)	3/12 (25%)
Intermediate dosing strategies (19 pts)	8.9	19/19 (100%)	14/19 (74%)	8/19 (42%)
375mg/m2 X 1 dose (28 pts)	6.5	22/28 (79%)	12/24 (50%)	2/5 (40%)

Table One: Time to B cell reconstitution and event free survival for different dosing strategies

Results:

33 patients received 67 courses of Rituximab. Seven different dosing regimen strategies were used, ranging between 375-750mg/m^2 per dose, with administration of 1-4 doses. There was no difference in event-free survival at 6,12, or 24 months between high and low dose strategies. The mean time to reconstitution of B cells was also not significantly different between groups.

Conclusion: Usage of a single low dosage regimen of Rituximab in the treatment of frequently relapsing nephrotic syndrome does not affect the time to B cell reconstitution or the probability of relapse at 6 and 12 months in our cohort of patients. Longer-term follow-up is required, as is a cost-benefit analysis.

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Disclosure of Interest: None Declared

Keywords: Immunosuppression, Rituximab, Steroid sensitive nephrotic syndrome

Paediatric Nephrology

PO-184

Clinical and genetic phenotype of children and young people with renal dysplasia in Scotland

R. A. Dalrymple [1,*], H. Maxwell [1], C. Gardiner [2]

[1]Paediatric Renal Department, The Royal Hospital for Children, [2]Clinical Genetics, Queen Elizabeth Hospital, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Renal dysplasia is a failure of the normal kidney development, resulting in abnormal renal structure and function. Single gene disorders are increasingly being identified as the underlying cause and a positive genetic diagnosis has been shown to be useful for patients, families and clinicians. A detailed clinical phenotype can allow accurate targeting for molecular genetic testing.

Objectives: An analysis of the clinical and genetic phenotype of children and young people with renal dysplasia known to the Scottish Paediatric Renal and Urology Network.

Methods: We performed an observational study looking at the clinical records of all children and young people with renal dysplasia in Scotland. The Strathclyde electronic renal patient record system (SERPR) was searched for patients aged 25 years or under with a diagnosis of 'renal dysplasia/hypoplasia/hypodysplasia' or 'renal cysts with diabetes syndrome'. The diagnosis of renal hypodysplasia was confirmed by review of radiological, biochemical and pathological investigations. Patients with obstructive aetiologies including neuropathic bladder were excluded, as were patients with acquired renal scarring. The coding system, clinical letters and pathology results were searched for information about their clinical phenotype and severity of renal disease.

Results: To date there are 180 children and young people identified with a diagnosis of congenital renal dysplasia. 41 patients are known to have an underlying genetic diagnosis, including 15 patients with a HNF1B mutation; which is the commonest genetic cause of renal dysplasia. 20 patients have other known syndromes including Townes-Brocks syndrome and Brachio-Oto-Renal (BOR) syndrome and 6 have pathogenic chromosomal abnormalities. A further 36 children have features suggestive of a single gene or syndromic diagnosis and are currently under investigation.

Conclusion: In this cohort of Scottish children and young people with renal dysplasia there is a high incidence of single gene, chromosomal and syndromic diagnoses. From this cohort, it would appear that these diagnoses should be considered in children with renal dysplasia and appropriate investigations performed.

Disclosure of Interest: None Declared

Keywords: Children, Genetic association, Renal tract dysplasia

Paediatric Nephrology

PO-185

Short and long term hemodialysis catheters in pediatric population: a single center experience

M. A. Rahil [1,*], M. Hadj mahammed [2]

[1]Interventional Nephrology, Bachie ben nacer hospital, Biskra, [2]Nephrology, Gahrdaia central hospital, Ghardia, Algeria

Preferred Presentation Method: Oral

Introduction: Vascular access in pediatric population remains a big challenge for interventional nephrologists. In one hand we have the tiny weight and the small diameter of the veins and in the other hand, many of these procedures need general anesthesia where the local anesthesia is not possible.

Objectives: Can interventional nephrologist take in charge the complications of vascular access in children?

Methods: Between January 2014 and mars 2016, 11 pediatric patients with end-stage renal disease (ESRD) were included in this study for hemodialysis catheters. 7 short term hemodialysis catheters (STHC) and 4 long term tunneled catheters (LTHC) were performed. All procedures were under general anesthesia except one case. All catheters were performed by ultrasound guided alone or with fluoroscopy and contrast injection. The mean age is 7.4 years (2.5 –14 years); the mean weight is 23.36 Kg (10 Kg- 40 Kg). The vein used was the RJV for 7 patients, the LJV for 3 patients and the RFV for one patient. One of them presented a dextrocardia with a left superior vena cava and thrombosed left jugular vein; the catheter was done under fluoroscopy with contrast injection to perform a 12 French LTHC in the RJV.

Results: The initial success rate was 100 %. 7 patients (63%) started hemodialysis with a STHC waiting for peritoneal dialysis; 4 patients (36%) have had LTHC after peritoneal dialysis failure. One LTHC presented a tip dysfunction after one month resolved by tip repositioning. One STHC presented infection and has been changed over the wire, and one LTHC presented a catheter related bacteremia after three months resolved by systemic antibiotics and tauroludine lock.

Conclusion: Vascular access for children remains the corn stone for the hemodialysis pediatric population. Arteriovenous fistula is the gold standard to perform hemodialysis session but a little number of surgeons can make it. Short and long term catheters can overcome this constraint waiting for kidney transplantation.

Disclosure of Interest: None Declared

Keywords: Vascular access

Paediatric Nephrology

PO-186

Fludrocortisone- a treatment for tubulopathy post paediatric renal transplantation: A national paediatric nephrology unit experience

S. Ali [1,*], I. Shaheen [1], D. Young [2], I. Ramage [1], H. Maxwell [1], D. Hughes [1], D. Athavale [1], M. G. Shaikh [3]

[1]Paediatric nephrology, Royal Hospital for Children, [2]Mathematics and Statistics, University of Strathclyde, [3]Paediatric endocrinology, Royal Hospital for Children, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Calcineurin inhibitors post renal transplantation have been recognised to cause tubulopathies in the form of hyponatraemia, hyperkalaemia and acidosis[1,2]. Supplementation of sodium bicarbonate and/or sodium chloride may be required, increasing the medication burden post transplantation, potentially resulting in poor compliance. Treatment with fludrocortisone has been beneficial in addressing tubulopathies in adult studies[3] with limited paediatric data available. We report our experience of fludrocortisone as a treatment of tubulopathy post paediatric renal transplantation.

Objectives: 1. To evaluate the efficacy of fludrocortisone as a treatment for tubulopathy post renal transplantation in children.

2. To review the reduction in sodium supplementation in patients commenced on fludrocortisone.

Methods: A retrospective review of data collected from an electronic renal database was undertaken from December 2014 to January 2016. Data was obtained on patient demographics, medication, diet and renal parameters.

Results: 47 post-transplant patients were reviewed in the service between December 2014 and January 2016 with 23 (49%) patients identified as being on sodium chloride or bicarbonate supplements. 9 patients, median age 8.3 years (range 4.9-16.4) were commenced on fludrocortisone. Patients received fludrocortisone 22 months (range 1-80) after transplant and were followed up for 9 months (range 2-20). Following treatment with fludrocortisone, all patients stopped sodium bicarbonate and all patients had a reduction or no increase in the total daily dose of sodium chloride. Serum potassium levels were significantly lower on treatment, 5.2 vs 4.5 mmol/l, p=0.04. No change was noted in renal function in patients on fludrocortisone treatment and those not treated (eGFR 77.8 vs 81.7 ml/min/1.73m^2, p=0.45) with no significant increase in systolic blood pressure (z-scores 0.99 vs 0.85, p=0.92). No side-effects secondary to treatment with fludrocortisone were reported in our cohort.

Conclusion: A significant proportion of our renal transplant patients were on sodium supplementation. With the introduction of fludrocortisone, sodium supplementation requirement reduced, without a significant effect on renal function or blood pressure. In our experience, fludrocortisone appears to be an effective and safe treatment for tubulopathies in children post transplantation, adding to the limited evidence in the literature regarding its benefit post paediatric renal transplantation.

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Disclosure of Interest: None Declared

Keywords: Children, Renal transplant, Sodium

Paediatric Nephrology

PO-187

Twenty years of kidney transplantation in a national programme

C. Williams [1,*], J. McCaughan [2], A. Courtney [2], M. Convery [1]

[1]Paediatric nephrology, ROYAL BELFAST HOSPITAL FOR SICK CHILDREN, [2]Nephrology, Belfast City Hospital, Belfast, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Kidney transplantation is a life transforming procedure for children and their families. However, graft and recipient outcomes can be compromised by early technical difficulties, non-concordance with medication and the side effects of immunosuppression. Knowledge of the clinical course of children who have received kidney transplants is essential to guide practice.

Objectives: 1. To review the demographics of paediatric kidney transplants performed in Northern Ireland over the past 20 years

2. To evaluate the long term graft and recipient outcomes after paediatric kidney transplantation

Methods: All recipients of paediatric kidney transplants performed in Northern Ireland from 1995-2016 were included. Donor and recipient demographics and transplant details are recorded at the time of transplantation. Recipient and donor outcomes are collected prospectively. Recipients were followed up until death or 1st December 2016.

Results: There were 78 transplants performed during the study period; 61% of recipients were male. The median age was 12 years. The median duration of pre-transplant renal replacement therapy was 14 months. Eighteen patients were transplanted pre-emptively; 50% of transplants performed since 2010 have been pre-emptive.

The median donor age was 29 years and kidneys were donated after brain death in 65% of cases. Since 2010, donor demographics have shifted in favour of living donation and the majority of transplants performed in the past five years have been from living donors. The median number of HLA mismatches was two and the ischaemic time ranged from 143-2785 minutes (median 1143 minutes).

71 patients were discharged with a functioning graft and the median follow up time was 9.6 years. Discharge creatinine was available for 66 patients with a median of 60 µmol/L (range 22-197µmol/L). One and two years after transplant, the median creatinine was 76 µmol/L and 87 µmol/L respectively.

The median graft survival was 84.5 months. There were 22 cases of death-censored graft loss in the study period. In five, graft loss was secondary to early technical problems; these all occurred between 1995 and 2005. In the other 17, grafts functioned for 5 – 18 years prior to failure. In multivariate analysis, recipient age, donor age and era of transplantation were associated with graft survival.

Three deaths occurred in the follow up period. Two patients died within the first month and a third died from post-transplant lymphoproliferative disorder 17 years after transplantation.

Conclusion: Outcomes after paediatric kidney transplantation in Northern Ireland have improved over the past twenty years and are now excellent. There have been no early graft losses or deaths in the past decade. The expansion of the living donor programme means that 50% of children are now transplanted pre-emptively, removing the detrimental effect of dialysis therapy on their health and development.

Disclosure of Interest: None Declared

Keywords: Transplant outcome

Paediatric Nephrology

PO-188

Renal blood flow measurements by magnetic resonance imaging using arterial spin labelling as a novel non-invasive biomarker in paediatric renal transplant recipients

S. Marks [1,*], F. Nery [2], M. Cutajar [2], C. Clark [2], D. Thomas [2], I. Gordon [2]

[1]Department of Paediatric Nephrology, Great Ormond Street Hospital for Children NHS Foundation Trust, [2]University College Hospital Great Ormond Street, Institute of Child Health, London, United Kingdom

Preferred Presentation Method: Oral

Introduction: Non-invasive cortical renal blood flow (cRBF) measurements using functional magnetic resonance imaging (MRI) arterial spin labelling (ASL) has not been established in transplanted patients with or without normal renal function. We have previously studied ASL in living kidney donors with current study investigating paediatric renal transplant recipients (pRTR).

Objectives: To investigate our hypothesis that non-invasive cortical renal blood flow (cRBF) measurements using functional magnetic resonance imaging (MRI) arterial spin labelling (ASL) are sensitive biomarkers of early damage of the transplanted kidney in pRTR.

Methods: Prospective study of pRTR undergoing MRI imaging using 1.5T Siemens Avanto system with multi-TI pulsed ASL acquisition performed at 10-20 days, 2 and 12 months with a FAIR labelling scheme and multi-shot 3D grase imaging module with background suppression.

Results: 14 pRTR (50% (7) male) aged 9.2-17.1 (median 13.2) years of whom 64% (9) had ESKD due to CAKUT underwent MRI ASL after transplantation (86% (12) living-related) with eGFR of 41.0-92.0 (median 60.9) mls/min/1.73m^2 at follow-up of 3.5-5.4 (median 4.5) years. 46% (6) were pre-emptive transplants with 7% (1) re-transplanted. Patients had 0-5 (median 1) post-transplant UTI with 50% (7) EBV viraemia and underwent 1-7 (median 2) percutaneous renal transplant biopsies with evidence of steroid-resistant acute rejection episode due to non-adherence and borderline rejection in 7% (1) and 14% (2) pRTR respectively. Baseline MRI ASL at median 10 days showed cRBF of 86-268 (median 198) mls/100g/min with changes at subsequent and latest MRI performed at median 70 and 344 days respectively of -70 to +121 (median 52) and -56 to +147 (median 36) mls/100g/min respectively.

Conclusion: Renal blood flow maximises in the first month after renal transplantation with subsequent reduction in first year in pRTR. There are multiple causes of renal allograft dysfunction in pRTR and associated risks in performing surveillance percutaneous renal transplant biopsies. MRI ASL is a useful and novel non-invasive biomarker of renal allograft function in pRTR.

Disclosure of Interest: None Declared

Keywords: Renal transplant, Transplant outcome

Paediatric Nephrology

PO-189

Asymptomatic bacteriuria in renal transplant patients.

A. M. Price [1,*], L. Foggensteiner [1]

[1]Renal, QUEEN ELIZABETH HOSPITAL BIRMINGHAM, West Midlands, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with renal transplant are vulnerable to post-operative infection, particularly urinary tract infection (UTI). [1,2] UTIs are linked with acute cellular rejection, graft loss, sepsis and death. [1,3] The management of asymptomatic bacteriuria (AB) however, remains a clinical conundrum in these patients. [3,4] The risk of untreated AB vs. the risk of antimicrobial side effects or overuse is unclear. [4]

Objectives: Quantify the frequency and nature of AB amongst renal transplant patients at our unit.
Determine our management of these cases and any adverse outcomes.

Methods: Between 1st January 2013 and 31st December 2013 132 renal transplant patients with AB were identified and followed up for 12 months. Demographic data was collected from electronic patient records. The urinary pathogen, bacterial count and white blood cell count of each AB was recorded from microbiology records. Patient management, admissions and subsequent urine results were retrospectively reviewed.

Results: Of the 132 patients identified, 82 patients met inclusion criteria. There were more females (n=55) than males (n=27). The mean age was 50.8 yrs. (range 17.4-79yrs). All ABs had greater than 80 white blood cells (WBC) or 10^5 bacterial organisms. Most ABs were 'Heavy mixed growth' or E.coli. Only 14 patients had complete resolution, 56 patients had AB reoccurrence and 12 patients had persistent AB throughout follow up. Of the 82 patients, 27 were treated with antibiotics. There were no related deaths or episodes of acute rejection. Only 8 admissions to hospital were associated with AB during follow up (n=1 pyelonephritis, n=4 urosepsis, n=3 symptomatic UTI). All of these patients had previously received antibiotics for AB prior to the admission. A further 12 patients during follow up later developed symptomatic UTI not requiring hospital admission (8 of which were also previously treated for AB).

Conclusion: Asymptomatic bacteriuria led to few admissions and complications. Treating patients did not seem to prevent subsequent admissions. A high proportion of 'Heavy mixed growth' may indicate incorrect collection. Practice varies widely amongst clinicians but the vast majority of ABs are not being treated.

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Disclosure of Interest: None Declared

Keywords: Infection/immunity, Transplant outcome

Paediatric Nephrology

PO-190

Extending the use of bioimpedance spectroscopy and body composition modelling for assessment of fluid status to children

I. Dasgupta [1,*], U. Moissl [2], K. Tyerman [3], I. Shaheen [4], P. Wabel [2], E. Lindley [5]

[1]Renal Medicine, Heartlands Hospital, Birmingham, United Kingdom, [2]Fresenius Medical Care, Bad Homburg, Germany, [3]Paediatric Nephrology, Leeds Teaching Hospitals NHS Trust, Leeds, [4]Paediatric Nephrology, Royal Hospital for Children, Glasgow, [5]Renal Medicine, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Bioimpedance spectroscopy (BIS) together with a whole-body model to distinguish excess fluid from the hydration of major body tissues can provide an objective assessment of fluid status. This technology is integrated into the Body Composition Monitor (BCM, Fresenius) and is increasingly used to assist fluid management in dialysis patients and has been validated in adults. For children to benefit from use of the BCM, paediatric nephrologists need evidence of the applicability of the fluid and body models in their patients.

Objectives: To assess (1) the agreement between total body water (TBW) measured using BIS and a gold standard technique, (2) to look for systematic deviation from zero in the BCM-measured fluid overload (FO) in healthy children, and (3) to compare serial measurements of TBW by BIS with TBW measurements by urea kinetic modelling (UKM, as reference) in children receiving haemodialysis (HD).

Methods: TBW_D2O was determined from the decline in the concentration of deuterium in urine over 5 days following a drink containing 1 mL 7% D2O per kg body weight in a cohort of healthy children aged 6 to 14 years. TBW_BIS and FO was determined from a standard wrist-to-ankle BCM measurement. The agreement between TBW_D2O and TBW_BCM was analysed using Bland- Altman method comparison. FO was also determined from standard BCM measurements in a much larger cohort of children aged 2 to 17 years. TBW_UKM was determined from pre and post-dialysis serum samples using a modified version of the Sargent and Gotch method.

Results: TBW_D2O was measured in sixty healthy children (median age 10.5 years, 29 female) The mean TBW_BIS (±SD) was 21.1±5.6 L and TBW_D2O was 20.5±5.8 L with a good correlation ($R2=0.97$, $p<0.001$). The mean fluid overload (FO) was + 0.21 L (± 0.54 L), FO normalised to extracellular water (ECW) was +2.2% (±5.5%). There was no correlation between age and FO.

In the larger cohort of 574 healthy children (median age 11 years, 286 female), mean (±SD) FO was -0.10 (± 0.68L) which corresponded to - 1.4% (± 6.3%) relative to extra cellular water (ECW, 10th to 90th percentile -8.6% to 5.9%). Again,there was no systematic variation in FO measured by BCM with age.

In 6 HD children (4-13 years, 4 male), 45 concomitant measurements of TBW_BIS and TBW_UKM were made over a 8 month period. There was good correlation between the methods with a mean paired difference (N=45) of -0.6L, 2SD = ±2.7L ($R2=0.97$, $p<0.001$).

Conclusion: Although BCM data should be used with caution in patients that differ significantly from the population used to develop the models, these results suggest that the BCM can be used to help manage fluid status in children on haemodialysis.

Disclosure of Interest: I. Dasgupta: None Declared, U. Moissl Conflict with: Employee of Fresenius Medical Care, K. Tyerman: None Declared, I. Shaheen: None Declared, P. Wabel Conflict with: Employee of Fresenius Medical Care, E. Lindley: None Declared

Keywords: Children, Dialysis

Paediatric Nephrology

PO-191

UK post- transplant virology monitoring study

M. Shenoy [1,*]

[1]Paediatric Nephrology, BAPN, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Opportunistic viral infections are common after renal transplantation (RT) in children. Studies report that up to 50% of recipients develop CMV, EBV or BKV infection in the first year following RT. No previous study has established the incidence of viral infection following RT in the UK.

Objectives: To establish the incidence of EBV, CMV and BKV infection in children following RT in the UK

Methods: Following the British Paediatric Surveillance Unit model, a monthly email was sent to identified clinicians at all of the 13 paediatric nephrology centres in the UK during 2015. Clinicians were asked to report any RT recipient who was positive for EBV, CMV or BKV for the first time in 2015. Any patient who was previously positive for any of the 3 viruses was excluded from the study. If a case was reported, a detailed initial questionnaire was sent followed by a final outcome questionnaire at 6 months.

Results: There was 97% (151/156) response rate to the monthly email and 87 cases were reported. Initial and final questionnaires were returned in 75 (86%) of the reported cases. There were 38 children with EBV infection, 17 with CMV infection and 19 instances of BKV infection. There were 732 children with RT under the age of 18 in the UK at the end of 2015, giving an incidence rate of 5.1% for EBV, 2.3% for CMV and 2.6% for BKV infection. Of the patients 124 patients transplanted in 2015, 8 developed EBV infection, 5 developed CMV infection and 9 were positive for BKV at a mean of 3, 3 and 4 months, respectively following RT. 82% of the infections were detected on routine screening while the remaining patients were screened following a clinical indication; non-specific illness and raised creatinine were the coomon indications. Of the children with EBV infection, 15 were negative and 23 had persistent viraemia at 6 months. With regards to CMV, 14 resolved and 3 had persistent viraemia. 2 children developed invasive disease and 2 additional children had re-infection once valganciclovir was discontinued. Among children with BKV positivity, BKV nephropathy was noted in one child, 14 resolved and 3 have chronic viraemia at 6 months. 4 children developed acute rejection following reduction in immunosuppression (IS). There were no instances of graft loss or post-transplant lympho-proliferative disease during the study period.

Conclusion: In this study the incidence of EBV, CMV or BKV infection in RT recipients was 12%. The incidence of infection in children transplanted in 2015 was 18%. While the majority of the infections resolved following reduction in IS or anti-viral therapy, chronic viraemia was a problem, particularly with EBV infection. Screening practices varied widely across the country and must be taken into consideration when interpreting these results.

Disclosure of Interest: None Declared

Keywords: CMV, EBV, Post-transplant infection

Paediatric Nephrology

PO-192

Postgraduate teaching on Acute Kidney Injury in Children to Level 1 Paediatric Trainees

S. Roy [1,*], R. Holt [1]

[1]Paediatric Nephrology, ALDER HEY CHILDRENS HOSPITAL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute Kidney Injury (AKI) in children is important due its associated morbidity and mortality. To improve recognition and management of AKI in our tertiary paediatric centre we designed and delivered regional teaching for level 1 paediatric trainees (ST1-ST3) based on the current national guidance on AKI in children.

Objectives: To improve recognition and management of AKI in children among level 1 Paediatric trainees and to measure trainees self-assessed knowledge and confidence.

Methods: We designed and delivered regional teaching for level 1 paediatric trainees (ST1-ST3) covering; recognition, prevention and management of AKI. The 3 hour teaching involved a presentation together with interactive discussion and group discussion of cases. It was led by a Consultant Paediatric Nephrologist and Paediatric Registrar. We collected trainee self-assessed data pre and post teaching to measure its effectiveness. Participants were asked the following questions on a scale of 1-10 (1 - completely disagree and 10 -completely agree):

1. I understand the meaning of the term acute kidney injury
2. I feel confident in recognising acute kidney injury
3. I feel confident with initial steps in assessment of a patient with acute kidney injury
4. I feel confident with initial management of a patient with acute kidney injury
5. I feel confident in knowing where to find clinical guidance about acute kidney injury in children

Paired T-Test was used to compare the pre and post teaching responses.

Questions on: teaching structure, delivery and overall usefulness, were asked during the post teaching questionnaire using the same scale. Qualitative comments were also gathered on what made the teaching work well and what could be improved upon for the future.

Table: Table 1: Pre and post teaching responses

Question	**Pre-Teaching Mean (SD)**	**Post-Teaching Mean (SD)**	**P Value**
1	7.68 (1.17)	9.36 (0.79)	<0.001
2	7.27 (1.16)	9.18 (0.79)	<0.001
3	6.59 (1.09)	9.09 (0.81)	<0.001
4	6.50 (1.26)	8.81 (1.26)	<0.001
5	6.14 (1.61)	8.73 (1.20)	<0.001

Results: 22 trainees attended the teaching. Overall usefulness, median score 10 (IQR 9-10). See table 1 for pre and post teaching responses. Areas for improvement included more focus on management of AKI in children and some trainees felt the teaching was too long. Many trainees commented on the teaching structure, finding it helped retain information.

Conclusion: Teaching dedicated to AKI in children significantly increased trainees' self-assessed skills in AKI recognition and management. We intend to share our teaching tools, including teaching material and methods, with other groups undertaking similar sessions. We aim to improve and repeat our teaching based upon the feedback, to provide paediatric trainees in our region with further training on AKI in children to improve patient care.

Disclosure of Interest: None Declared

Keywords: AKI, Children

Paediatric Nephrology

PO-193

LDL apheresis in steroid resistant FSGS

R. Gilbert [1,*], D. Jenner [1], R. Steele [2], K. Robinson [2]

[1]Paediatric Nephrology, [2]Haemodialysis Unit, Southampton Children's hospital, Southampton, United Kingdom

Preferred Presentation Method: Poster

Introduction: Steroid resistant nephrotic syndrome carries significant risk of morbidity. If proteinuria cannot be significantly reduced there is a rapid progression to end stage renal failure and a high risk of recurrence in subsequent transplants.

Objectives: We present a 14 year old female patient with steroid resistant nephrotic syndrome and collapsing focal segmental glomerulosclerosis (FSGS) histology associated with severe hyperlipidaemia (cholesterol 16.3 mmol/L and fasting triglycerides 16.2 mmol/L). We describe the results of a 9 week course comprising 12 sessions of LDL apheresis.

Methods: Twelve sessions of LDL apheresis (Kaneka Liposorber) were given over a 9 week period. Plasma creatinine, albumin and fasting lipid concentrations were regularly monitored.

Results: Drug treatment (bezafibrate, steroids, tacrolimus, mycophenolate and rituximab) produced only modest improvements with the urine protein/creatinine ratio (UPC) falling from 4029 mg/mmol to 1575 mg/mmol. There was no increase in plasma albumin. By the end of the 9 week apheresis therapy the UPC had fallen to 1201 mg/mmol. Steroids and mycophenolate were withdrawn but tacrolimus therapy was continued.

Over the following 8 months there was a steady improvement. Bezafibrate was stopped 5 months after completion of LDL apheresis.

Eight months after completion of the LDL apheresis course, the plasma albumin is 33 g/L, UPC ratio is 94 mg/mmol, cholesterol 5.2 mmol/L and triglygerides 2.0 mmol/L

Conclusion: LDL apheresis may be beneficial in drug resistant nephritic syndrome, possibly by increasing the efficacy of drug treatment.

Disclosure of Interest: None Declared

Keywords: FSGS, Lipids, Nephrotic syndrome

Patient Education, Involvement and Experience

PO-194

ACE: Acceptance, Choice and Empowerment: A Peer Educator based community project that aims to improve choice and quality of life for pre-dialysis kidney patients.

N. Jain [1,*], M. Ali [1], A. Dodds [2], P. Storey [1], J. Baharani [2]

[1]Communications, KI DNEY RESEARCH UK, Peterborough, [2]Glaxo Renal Unit, Heart of England NHS Trust , Birmingham , United Kingdom

Preferred Presentation Method: Oral

Introduction: There is a disproportionate number of patients on dialysis in the UK receiving haemodialysis compared to peritoneal dialysis. Self- care renal replacement especially home –based is associated with improved quality of life and patient outcomes as well as being more cost-effective. The uptake of home dialysis at one renal unit (HEFT) was the lowest of 7 in the West Midlands (Figure 1); moreover it was particularly low in Black, Asian and Minority Ethnic (BAME) patients, who make up 40% of the catchment population, so the low uptake was of concern.

Objectives: To raise awareness about dialysis choices and especially home-based treatments, in order to support and inform patient decision making. Moreover, to eliminate any misconceptions held by patients about dialysis, by involving patients who have first- hand experience of kidney failure and treatment options. We identified a method that appears to support patient decision making and quality of care.

Methods: We are a collaborative team between a renal unit and a national charity. We have recruited 10 volunteers, called Peer Educators (PEs) who have some experience of renal replacement therapy. They are trained to an accredited level (equivalent to a 1st year undergraduate). We adapted a proven model of peer support, working collaboratively with the kidney failure nurse support team to enable patient acceptance, choice and empowerment. PEs are accompanying nursing staff in clinics where patients have the opportunity to talk to them about dialysis options. Home visits have followed to introduce dialysis options to patients in the context of their own lives - directly from a PE. Due to the poor uptake of places by Asian patients at previous patient information days, the team delivered bespoke Asian patient information events.

Image:

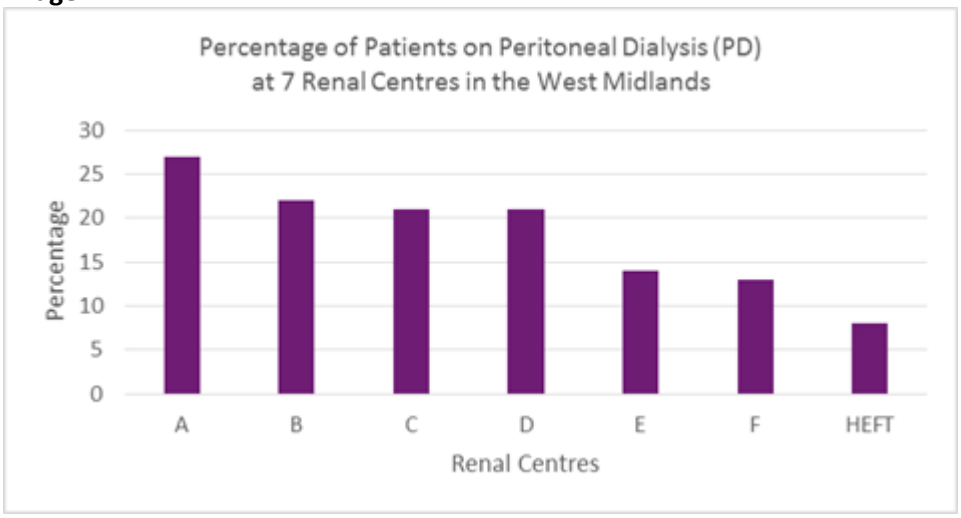

Table:

Results: Evaluation has been quantitative and qualitative including reflective diaries. A mixture of questionnaires and focus groups have been used to measure the impact and results of our initiative on 3 key groups of stakeholders: Patients, PEs, and renal unit staff. All 3 groups confirmed that this new service delivery approach is highly effective – and that there should be more.

Patients and their carers all said that the Information event helped bring them closer to making a decision about dialysis options.

"*Peer education worked very well with this gentleman* [in clinic]. *He was desperate for information and greatly appreciated having the information from an actual patient and a professional together*." (Lead Nurse)

3 Patient Information Days: 17 patients attended. (Previous average: 1); >30 patients seen in clinic; 13 home visits undertaken.

Conclusion: We believe that this partnership working between patients and kidney nurse team is very relevant to all renal units across the UK and indeed beyond; the issue of non -acceptance, denial and therefore lack of empowerment is significant and well documented among recently diagnosed kidney patients.

References:

Disclosure of Interest: None Declared

Keywords: Patient empowerment, Patient/carer involvement, Shared decision making

Patient Education, Involvement and Experience

PO-195

Measurement properties of patient-reported outcome measures (PROMs) used in adult patients with chronic kidney disease: A systematic review

O. L. Aiyegbusi [1,*], D. Kyte [1], P. Cockwell [2], T. Marshall [3], A. Gheorghe [4], T. Keeley [1], A. Slade [1], M. Calvert [1]

[1]Institute of Applied Health Research, Centre for Patient Reported Outcomes Research, UNIVERSITY OF BIRMINGHAM, [2]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital Birmingham, [3]Institute of Applied Health Research, UNIVERSITY OF BIRMINGHAM, Birmingham, [4]Oxford Policy Management Ltd, Oxford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic kidney disease (CKD) is associated with symptoms that can significantly reduce the quality of life (QOL) of patients. Patient-reported outcome measures (PROMs) can provide valuable information which may assist with the care of patients with CKD. However, given the large number of measures available, it is unclear which PROMs are suitable for use in research or clinical practice.

Objectives: To address this we comprehensively evaluated studies that assessed the measurement properties of PROMs in adults with CKD.

Methods: MEDLINE, EMBASE, PsycINFO and CINAHL Plus were searched from inception to 21st December 2015 without language restrictions by two independent reviewers. Reference list and citation searching of included studies was also conducted. Data on study population, questionnaire characteristics and measurement properties were extracted from included papers. The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist was used to appraise the methodological quality of the included studies and to inform a best evidence synthesis for each PROM.

Results: After removing duplicates, 3,414 papers were screened, 47 met the inclusion criteria and 19 articles were found through reference lists and citations search. A total of 66 articles were included in the final analysis.

There was strong evidence supporting internal consistency and moderate evidence supporting construct validity for the Kidney Disease Quality of Life-36 (KDQOL-36) in pre-dialysis patients.

In the dialysis population, the KDQOL-Short Form (KDQOL-SF) had strong evidence for internal consistency and structural validity and moderate evidence for test-retest reliability and construct validity while the KDQOL-36 had moderate evidence of internal consistency, test-retest reliability and construct validity.

The End Stage Renal Disease-Symptom Checklist Transplantation Module (ESRD-SCLTM) demonstrated strong evidence for internal consistency and moderate evidence for test-retest reliability, structural and construct validity in renal transplant recipients.

Conclusion: We suggest considering the KDQOL-36 for use in pre-dialysis patients. We recommend the KDQOL-SF or KDQOL-36 for use in dialysis patients and the ESRD-SCLTM for use in transplant recipients. Further research is required to evaluate the measurement error, structural validity and responsiveness of PROMs used in CKD.

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Patient outcome measures, Quality of life

Patient Education, Involvement and Experience

PO-196

Engaging patients in choosing research priorities – Patient Survey 2016

S.-L. Harwood [1,*], L. Marson [2], P. Storey [3]

[1]Patient Involvement Coordinator, KIDNEY RESEARCH UK, Peterborough, [2]Senior Lecturer and Honorary Consultant Transplant Surgeon, Royal Infirmary Edinburgh, Edinburgh, [3]Director of Communications, KIDNEY RESEARCH UK, Peterborough, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Kidney Research UK is the leading charity dedicated to research into kidney disease in the UK, with the aim of finding better treatments, and ultimately, cures for kidney diseases. In 2016 we completed our third survey asking patients what their research priorities are. A similar survey in 2013 provided evidence to inform the development of the UK Renal Research Strategy (UKRRS).

Objectives: In line with one of the UKRRS Recommendations '*to increase engagement of patients with kidney research'* and with our own strategic aim to fully involve patients in all aspects of research and development, we wanted to listen to the views of patients to help us decide our priorities for funding research to benefit both current and future patients.

Methods: Data was collected from 19/09/2016 to 31/10/2016. There were 20 research topics listed and respondents were asked to pick their top seven priorities and rank them from one (most important) to seven (least important). To understand the results more fully, we asked participants to provide information about their or their child's condition, stage of treatment, age and ethnicity. We emailed patients with a link to complete the survey and sent a hard copy mailout. Copies were also sent to each renal unit including named healthcare professionals who had specifically requested copies to distribute to patients. Use of social media was paramount in reaching a wider audience. Along with Facebook posts and Tweets, we updated our followers on how the survey was progressing, thanking them once the survey was closed. We plan to use all these channels to spread the results of the survey.

Results: There were 2,279 responses of which 2,158 were usable. This represented a major increase in respondents from 2013 (around 1,000). There were some changes in the priorities with *improving methods of transplantation* and *stem cell research* entering the top seven. Further analysis is ongoing; preliminary results show that we had responses from all age groups, with a wide UK spread and across all stages of the disease pathway. We also captured patient comments and feedback through the survey. One of the most powerful comments that came back was "Please find something to help."

Conclusion: The results show that there has been a slight shift in some research priorities and therefore we need to make sure our strategy is in line with this. The high response rate and volume of feedback demonstrates the desire from patients to understand more about and become more involved with research and also demonstrates the charity's effectiveness in communicating and engaging with patients about research.

Disclosure of Interest: None Declared

Keywords: Patient empowerment, Patient/carer involvement

Patient Education, Involvement and Experience

PO-197

Patients' Perspectives of Diabetes Management in the Hameodialysis Unit

K. Atkins [1,*], A. Kirk [1]

[1]Wessex Kidney Centre, PORTSMOUTH HOSPITALS NHS TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with diabetes and established renal failure on haemodialysis pose unique challenges for the nephrologist. Individualised care is recommended with the aim to improve outcomes without added hypoglycaemic risk. Patient understanding will underpin this process.

Objectives: Establish a better understanding of the current practices and opinions of our haemodialysis patients managing diabetes.

Methods: A questionnaire was distributed to all patients with diabetes that are on regular maintenance haemodialysis.

Results: 110 returned questionnaires, 101 in-centre HDF and 9 from the Home HD programme. Of these 20% report having Type 1 diabetes, 73% Type 2 diabetes and 7% were unclear. 97/110 (88%) have had diabetes for over 5 years. 93/110 (84%) of all respondents considered themselves to be either very or quite confident in managing their diabetes. Surprisingly 52/110 (47%) were unaware of the HbA1c test.

85/110 (77%) were on insulin therapy. One person reported having no home monitor. In the 84 remaining 6% did not check their blood sugars, a further 5% did not check on a daily basis.

6/110 respondents had either no access to a home monitor or did not have blood sugar levels checked at dialysis. The remaining 104 provided opinions on glucose control and corrective actions. For some answers more than one response was given, this was reflected in the totals. 29/104 (28%) considered only a reading of ≤ 3 to be low, 8 (8%) did not know what a low reading was. On having a low reading 7/108 (6%) did nothing or did not know what to do, only 2 commented on adjusting medication and 1 on re-checking.

17/104 (16%) did not consider a reading to be high until it was ≥20, 9/104 (9%) did not know what a high reading was. Following a high level 22/110 (20%) of all answers stated they either did nothing or did not know what to do. Of those on insulin 49/85 (58%) adjust insulin dose in their actions. 10/110 (9%) managed hyperglycaemia with water or exercise.

Conclusion: There is significant variation in practices and opinions within the cohort of patients that responded. Despite the high level of perceived confidence many issues with understanding and safety has been highlighted.

Disclosure of Interest: None Declared

Keywords: Diabetes, Haemodialysis, Patient safety

Patient Education, Involvement and Experience

PO-198

Demographic considerations in pain perception for venous preservation

A. Sivaharan [1,*], C. Hall [1], S. Ali [1], J. Corkill [1], J. Crane [1]

[1]Imperial College Healthcare NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with chronic kidney disease (CKD) should preserve key veins in the upper limb in order to facilitate successful arteriovenous fistula (AVF) creation for haemodialysis (HD). The AVF is the gold standard method of vascular access for haemodialysis. Repeated venepuncture results in scarring and thrombosis rendering these veins less suitable for AVF formation. It is therefore advisable for blood to be taken from the dorsum of the hand to preserve key veins in the antecubital fossa and the cephalic vein at wrist level. The Save Your Vein campaign increases knowledge and awareness of vein preservation in renal patients and healthcare professionals aiming to increase AVF prevalence. We observed that many patients and some healthcare staff had negative preconceptions around the level of pain involved in taking blood from the back of the hand.

Objectives: This study aims to quantify this degree of preconception.

Methods: A questionnaire study was conducted on patients attending outpatient appointments or A&E at a university teaching hospital. 442 patients were asked to rate their past experiences of having blood taken from their elbow, wrist, and hand (dorsum) on a Numerical Pain Rating Scale (0-10). If unaware, patients were then educated about vein preservation and the Save Your Vein campaign. They were subsequently asked whether they would be willing to have blood taken from their hands in the future. Demographic data included age, gender, and ethnicity. Binomial logistic regression analysis was used to ascertain which factors predict engagement with vein preservation, and multiple linear regression was used to establish which factors predict higher pain scores.

Results: We found that males were more likely than females to allow future venepuncture from the hand (OR: 2.14, 95% CI: 1.21-3.83, $p<0.01$). Renal patients were less likely than general patients (OR: 0.29, 95% CI: 0.15-0.56, $p<0.001$). The difference between reported pain at the antecubital fossa, and the dorsum of the hand was also predictive (OR: 0.84, 95% CI: 0.75-0.92, $p<0.001$).

Ethnicity was significant in predicting pain levels. Asian and Black patients were more likely to rate their experiences higher on the pain score compared to White patients and those of mixed race.

Conclusion: It was unexpected that renal patients were less likely to allow future venepuncture from the hand. Some expressed they never wanted a fistula. The gender difference is something to be explored further, it might be the case that males take different factors into account than women in healthcare decisions. An observation by the phlebotomists is that perhaps males have more visible veins in the back of the hand which eases the procedure.

The fact that the difference in pain between locations was predictive shows that it is important that we optimise venepuncture experience, perhaps involving the way venepuncture is taught.

The ethnic differences in pain scores is probably due to a combination of cultural and biological factors. It is important for healthcare professionals to identify cultural factors that may be present and to explore them adequately. This study supports the need for the greater provision of patient education allowing for informed choice.

Disclosure of Interest: None Declared

Keywords: Patient experience, Vascular access

Patient Education, Involvement and Experience

PO-199

SHAREHD - Giving haemodialysis patients the opportunity to be active in their own care

S. Ariss [1], T. Barnes [2], J. Fotheringham [3], P. Harriman [4], A. Henwood [5], M. Wilkie [3,*] and The SHAREHD Team

[1]Health Services Research, ScHARR, University of Sheffield, [2]Shared Care Nurse Educator, [3]Nephrology, [4]Assistant Director, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, [5]Kidney patient, York, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: There is considerable evidence that greater patient engagement and helping people to manage their own health, is associated with better outcomes across a range of long-term medical conditions. It is also a key objective of the NHS Five Year Forward View plan. The practice of shared care and its benefits in dialysis patients however is not yet fully established.

Objectives: SHAREHD is a Health Foundation-funded quality improvement (QI) programme to encourage, educate and support unit-based haemodialysis patients to be more independent and confident, giving them the choice to participate in aspects of their own haemodialysis care.

Methods: The haemodialysis process is broken down into 14 tasks such as: preparing equipment, measuring weight and blood pressure and self-cannulation. With the support and supervision of healthcare staff, patients are given the opportunity to take on as many of these tasks as they feel comfortable and able to do, at a pace that suits their individual needs.

Together with our partners, including Kidney Research UK, a collaborative network of dialysis units at 12 NHS Trusts in England has been established, in order to extend the learning from local initiatives and the *Yorkshire and Humber Shared Haemodialysis Care* programme.

Central to the programme are a number of modified breakthrough series collaborative learning events (workshops). These are designed to equip teams of patients and staff from the sites, with a range of QI skills, to help them understand issues that need improvement, and design, deliver and measure multiple small tests of change to increase patient engagement in their dialysis care.

A **SHAREHD** Patient Advisory Group (PAG), ensures greater patient representation both at programme and workstream level as well as providing help to participating hospitals and in particular, patient champions at each site.

Image:

Results: The evaluation includes a 2 year cohort research study (600 patients, 12 sites) exploring dialysis tasks and independent dialysis (at home or in-centre). Additional health economic aspects include patient activation, quality of life and outcomes including hospitalisation. A qualitative component will identify what works, for whom, in what circumstances and why. The Yorkshire and Humber CLAHRC will be evaluating the impact of the programme on patient outcomes.

Conclusion: This work is linked with the UK Renal Registry, KQuIP, the Think Kidneys-Transforming Participation in CKD programme and the BKPA-supported *Shared Haemodialysis Care* course for nurses. Through the SHAREHD programme, it is hoped that we will build a body of evidence that can support a nationwide change towards better patient choice.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient empowerment, Shared decision making

Patient Education, Involvement and Experience

PO-200

Care priorities for haemodialysis patients: a qualitative study of the different perspectives of health professionals and patients.

C. Reid [1,*], J. Seymour [1], C. Jones [2]

[1]Hull York Medical School, [2]York Hospitals NHS Trust, York, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: As health professionals (HPs) are the most frequent source of decisions regarding changes in care processes, treatment regimens and future research focus, it is important to assess whether such choices are based on similar or different care priorities to those of patients.

Objectives: To explore the care priorities of HPs working with haemodialysis patients and compare these with the care priorities of patients and carers.

Methods: We conducted 2 focus groups with HPs at 2 renal centres to ascertain their priorities for haemodialysis care. The 11 participants included dialysis unit nurses, dieticians, social workers, specialist nurses and doctors. Focus groups were recorded, transcribed and analysed using thematic analysis. The data was compared to that collected from independent focus groups conducted with patients and carers at the same units.

Results: HPs shared many care priorities with patients. HPs felt there was a gap between what care they could provide and what they would like to provide. Insufficient staffing, resources and time contributed to this gap and were consequently priorities for HPs. Some patients also felt adequate staff numbers were a priority but focused on nursing staff. The relationships between patients and HPs were important to both groups. Patients wished to get to know staff as a source of emotional support and to build confidence in care. HPs felt these relationships were important to allow them to identify when patients were unwell. HPs also focused on the tensions that could develop within these relationships as a result of differing care priorities. Patients highlighted the importance of maintaining their roles and relationships outside the dialysis as a key priority however this was not discussed by HPs. Emotional coping was another key theme for patients and they identified nursing staff as playing a key role in the provision of emotional support. HPs felt that emotional support was important for some patients and viewed mental health professionals as the source of this support. HPs focused on the practicalities of delivering in-unit dialysis care whereas patients were more likely to discuss the effects of dialysis on their lives outside the unit and the emotional difficulties of coping with dialysis.

Conclusion: Changes to care provision that focus on the relationships between HPs and patients, consider patients social networks and provide emotional support rather than the mechanics of delivering dialysis may lead to greater improvements in patients' experience of care.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient experience

Patient Education, Involvement and Experience

PO-201

Collection and Determinants of Health-Related Quality of Life in Haemodialysis Patients in Scotland

A. Nimmo [1,*], S. Bell [2], C. Brunton [3], J. Campbell [4], A. Doyle [5], B. MacKinnon [6], R. K. Peel [7], S. Robertson [8], I. Shilliday [9], E. Spalding [10], J. P. Traynor [4], W. Metcalfe [4] and Scottish Renal Registry

[1]Royal Infirmary of Edinburgh, Edinburgh, [2]Ninewells Hospital, Dundee, Dundee, [3]Aberdeen Royal Infirmary, Aberdeen, [4]Scottish Renal Registry, Glasgow, [5]Victoria Hospital, Kirkcaldy, [6]Queen Elizabeth University Hospital, Glasgow, [7]Raigmore Hospital, Inverness, [8]Dumfries and Galloway Royal Infirmary, Dumfries, [9]Monklands Hospital, Airdrie, [10]University Hospital Crosshouse, Crosshouse, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patient reported outcome measures (PROMs) are an important metric to evaluate the quality of health and disease burden in patients with chronic kidney disease. There is limited experience of their use within renal registries.[1]

Objectives: We describe the Scottish Renal Registry's (SRR) experience of collecting PROMS in the Scottish haemodialysis population, and correlation of the results with demographic and clinical parameters.

Methods: All adult patients on haemodialysis in Scotland in May 2016 were invited to complete the KDQoL-36 questionnaire on the day of the annual SRR census. If they consented, their questionnaire was identified with their community health index (chi) number to allow linkage to census demographic and clinical variables.

Results: 890 questionnaires were completed (48% response rate). 738 had chi numbers allowing linkage to census data constituting 39% of the prevalent haemodialysis population. Response rate was higher from patients aged ≥ 65 years (42%) compared with those aged < 65 years (36.5%) [$\chi 2$ p=0.01]; those who had been on renal replacement therapy for a shorter period of time (<1 year 46%, ≥1 < 5 years 38%, ≥ 5 years 33%) [$\chi 2$ p=0.002] and those from less deprived areas according to Scottish Index of Multiple Deprivation (SIMD) quintiles [$\chi 2$ p<0.001]. There was no difference in response rate with gender, primary renal disease group nor dialysis location (main versus satellite unit).

Older patients (≥ 65 years) and those from less deprived areas (SIMD quintiles 4+5) reported significantly better health across all five components of the KDQoL-36 questionnaire. Patients reported poorer outcomes in relation to symptoms and effect of kidney disease on daily life if they had hypercalcaemia or if they had a urea reduction ratio of < 65% and poorer outcomes in relation to effects on daily life if they had hyperphosphataemia. Patients with arteriovenous fistulas experienced less disturbance with their access site than those with central venous catheters.

Conclusion: The collection of PROMs alongside census data is a feasible activity, and can help identify potentially under-recognised and treatable determinants to quality of life. Whilst our results should be interpreted with caution as they may not be representative of the haemodialysis population as a whole, the association between attainment of recommended standards of care and improved PROMs is striking and important. The apparent adverse association with social deprivation requires further investigation. Individual and population-wide strategies are required to improve health-related quality of life.

References: 1.Caskey FJ et al. How to routinely collect data on patient-reported outcome and experience measures in renal registries in Europe: an expert consensus meeting. Nephrol. Dial. Transplant. (2015)30 (10): 1605-1614.

Disclosure of Interest: None Declared

Keywords: Patient outcome measures, Quality of life

Patient Education, Involvement and Experience

PO-202

The perceptions and attitudes of health professionals working with haemodialysis patients towards shared haemodialysis care.

C. Reid [1,*], J. Seymour [1], C. Jones [2]

[1]Hull York Medical School, [2]York Hospitals NHS Trust, York, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: There has been growing interest in encouraging patients to become more involved in their haemodialysis through shared and self-care. However many units have struggled to introduce or maintain shared care (SC) programmes.

Objectives: The perceptions and attitudes of health professionals (HPs) working in units with embedded SC were sought to inform the future development of such programmes.

Methods: We conducted 2 focus groups with HPs at 2 renal centres with embedded SC programmes. The 11 participants included dialysis unit nurses, dieticians, social workers, specialist nurses and doctors. Focus groups were recorded, transcribed and analysed using thematic analysis. The data was compared to that from focus groups conducted with patients and carers treated at the same units.

Results: HPs recognized benefits from SC for both patients and staff. They felt patients benefited from a greater sense of control over treatment, a sense of achievement, and more individualized and flexible care. Patients also identified these advantages and additionally highlighted that SC enabled them to help nursing staff. HPs felt staff benefited from improved job satisfaction and a sense of achievement. They suggested increasing self-care could increase capacity at units. HPs felt the encouragement of other patients increased the uptake of SC. It was important that unit managers encouraged staff to utilize SC and used positive nursing staff as 'ambassadors' to encourage others. HPs also identified unit, patient and HP barriers to the uptake of SC. Unit barriers included a lack of education about SC pre-dialysis. Many HPs felt that there was insufficient money and time to support SC. They felt uptake would be greater with dedicated staff and space within units. Barriers identified by patients included the perception that SC was less safe and was being used to save money or to reduce the number of nurses. Some staff were also concerned that the motivation was to reduce staff numbers and that SC required extra work with no personal gain. Training was felt to be limited to motivated staff as they often had to attend in their own time. Patients feared that SC would result in less contact and attention from staff whereas HPs did not discuss this.

Conclusion: An understanding of both HP and patients' beliefs and perceptions of SC is needed in order to define the role of SC within an organisation's dialysis programme. Without this understanding, organisations may not be successful in sustaining SC as a treatment that satisfies patients' needs.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient education , Patient/carer involvement

Patient Education, Involvement and Experience

PO-203

What are the care priorities of patients requiring haemodialysis? A qualitative study of haemodialysis patients at two renal centres.

C. Reid [1,*], J. Seymour [1], C. Jones [2]

[1]Hull York Medical School, [2]York Hospitals NHS Trust, York, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients receiving haemodialysis have a reduced quality of life when compared to the general population and report deficiencies in satisfaction with care. Improving satisfaction with care has the potential to improve patient's quality of life, however data on patients' experiences and priorities for haemodialysis care are lacking.

Objectives: We conducted a qualitative study of patients having in-centre, self-care and home hemodialysis at 2 renal centres and their satellite units to understand patients' care priorities.

Methods: All hemodialysis patients at the 2 renal centres were invited to take part in focus groups. Volunteers were purposefully selected to represent a range of demographics and dialysis vintages. Patients were divided into focus groups by their mode of haemodialysis provision. Group discussions were recorded, transcribed and analysed using thematic analysis.

Results: 29 patients and 3 carers took part in 7 focus groups. Coded data were organized into 3 final themes representing patients' experiences of the aspects of care that are important to them. 'Finding personal control' describes the emotional work and coping strategies utilized by patients as they tried to regain a sense of personal control. Patients wanted health care professionals to understand these strategies and looked for care that helped them cope with dependency and find their own sense of control. 'Maintaining social viability' encapsulates how patients found that dialysis affected their previous social roles and responsibilities. Additionally dialysis required patients to negotiate new relationships with staff and other patients. 'Integrating dialysis into life', describes the physical challenges patients' experienced when trying to live their lives alongside dialysis, and how care provision affected their ability to respond to these challenges.

Conclusion: The interactions patients have with staff and the way that care is provided had significant effects on all three of these themes. The data highlight many ways in which communication, relationships with staff and the way care is organized can both positively and negatively affect patients' experiences of care. Understanding the care priorities of patients is fundamental to making real improvements to care which are of relevance to patients.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient experience

Patient Education, Involvement and Experience

PO-204

Using Patient-Reported Outcome measures (PROMs) to promote quality of care and safety in the management of patients with Advanced Chronic Kidney Disease (PRO-trACK Project) – A mixed-methods project protocol

O. L. Aiyegbusi [1,*], D. Kyte [1], P. Cockwell [2], T. Marshall [3], M. Dutton [4], A. Slade [1], M. Calvert [1]

[1]Institute of Applied Health Research, Centre for Patient Reported Outcomes Research, UNIVERSITY OF BIRMINGHAM, [2]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital Birmingham, [3]Institute of Applied Health Research, UNIVERSITY OF BIRMINGHAM, [4]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Advanced chronic kidney disease (CKD) has a major effect on the quality of life and health status of those affected and requires accurate and responsive management. The use of electronic patient reported outcome measures (ePROMs) could assist patients with advanced pre-dialysis CKD, and the clinicians responsible for their care, by identifying important changes in symptom burden in real time.

Objectives: We report the protocol for Pro-trACK, which will explore the feasibility and validity of an ePROM system for use in patients with advanced CKD.

Methods: The project will utilise a mixed-methods approach in three studies. These will comprise: (i) patient usability testing of the ePROM system focusing on acceptability and technical performance/stability; (ii) ascertaining the views of patient and clinician stakeholders on the optimal use and administration of the CKD ePROM system - this will involve qualitative face-to-face/telephone interviewing and/or focus groups with: patients, clinical staff, management and IT team members; (iii) psychometric assessment of the system, within a cohort of patients with advanced CKD, to establish the measurement properties of the ePROM.

Results: Early qualitative work with a patient advisory group (PAG) indicates that an ePROM system may be acceptable to patients with advanced CKD. The investigators will report on the development of the protocol and the initial approach to establish the system and assessing utility through study (i) and (ii) and the proposed approach to study (iii). The ultimate aim will be to ensure the generalizability of the system for mainstream clinical practice.

Conclusion: The development of an ePROMs system for advanced CKD should enhance accuracy and quality of care and optimise the ability of clinical services to respond to the requirements of patients in this setting.

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Patient outcome measures, Quality of life

Patient Education, Involvement and Experience

PO-205

Addressing concerns of long distance travel to receive haemodialysis treatment for the complex patient – A haemodialysis nurse perspective.

A. Blythin [1,*], S. Huggins [1], K. Atkins [1]

[1]Wessex Kidney Centre, PORTSMOUTH HOSPITAL NHS TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Poster

Introduction: Wessex Kidney Centre (WKC) covers a large geographical area with a population of around 2.5 million. The main haemodialysis (HD) unit is based within Queen Alexandra Hospital and has eight further peripheral HD units managed by WKC. While there is impetus to provide HD in the unit closest to the patients home, due to medical co-morbidities some are considered too complex to dialyse in a peripheral unit. Travelling in excess of 30 minutes from an home address to HD has been demonstrated to increase non-attendance rates and negatively impacts the patient experience(1). Lengthy travelling times are a frequent complaint by many patients attending our main HD unit.

Objectives: Review travelling distances and times for patients receiving HD in the main WKC unit.

Methods: Patient addresses information used with Google Maps 2016(2) to calculate distance and estimated travel time for each patient and Patient Transport Information System reviewed. The demographic and medical history of these patients was reviewed.

Results: During December 2016, there were 112 patients receiving HD treatment at the main unit. 90.7% were reliant on the hospital patient transport service to attend.

The furthest distance was calculated at 45 miles for a single journey, taking approximately 63 minutes, this patient therefore travels 270 miles per week totally over 6 hours to receive dialysis. The time element is an underestimation as is regularly influenced by many other factors such the need to pick up and drop off other patients in a shared transport vehicle, weather condition and traffic delays.

Journey times from residence to main HD unit in excess of 30 minutes were calculated at 21.8%. However, by including patients whose journey time is increased due to picking up other patients on the way this increases to 29.1%. These patients are often late for the timetabled therapy with subsequent impact on the next HD shift for both nurses and patients.

Conclusion: One third of all patients attending our main HD unit travel for over 30 minutes in each direction to attend for treatment. This is reported by patients as a significant issue for them and delays are having a frequent impact on the smooth running of the unit. The development of a shared decision making tool to use for complex patients who have potential to attend a peripheral unit closer to their residential address may improve the patient experience and ease the burden on staff and resources at the main unit.

References: The National Kidney Care Audit, Patient Transport Survey Report 2010(1)

GOOGLE MAPS, 2016. Map of Easterhouse churches. [online]. Google. Available from: https://www.google.co.uk/search?newwindow=1&biw=1408&bih=648&q=easterhouse+churches&npsic=0&rflfq=1&rlha=0&tbm=lcl&sa=X&ved=0ahUKEwiJxsH-ktfLAhWKuxQKHUXYDWEQtgMIHw&gws_rd=ss(2).

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient experience

Patient Education, Involvement and Experience

PO-206

Autosomal Dominant Polycystic Kidney Disease (ADPKD) and untreated pain

T. Harris [1,*], A. Metcalfe [2], E. Rowland [2], A. Adams [2]

[1]Head Office, Polycystic Kidney Disease Charity, [2]Florence Nightingale Faculty of Nursing and Midwifery, King's College London, London, United Kingdom

Preferred Presentation Method: Poster

Introduction: Autosomal Dominant Polycystic Kidney Disease (ADPKD) is the most common inherited kidney disease and fourth leading cause of ESRD in adults(1). A number of international studies have highlighted the poor quality of life(2-6) of ADPKD patients. Notably, high levels of acute and chronic pain were experienced by over 50% of patients in these studies.

Objectives: The Polycystic Kidney Disease Charity conducted a survey of its supporter base to ascertain more about UK patients' experiences of pain in ADPKD (Nov-Dec 2014).

Methods: The survey was promoted by mail, email and social media. Participants entered data directly online or via a postal questionnaire. A trusted volunteer transcribed written data into the online survey. The survey included closed and open questions, with opportunities for participants to provide qualitative feedback. Quantitative data were analysed using descriptive statistics; qualitative data were analysed thematically using Atlas software.

Table:

Results: The questionnaire was completed by 516 ADPKD patients: 61% were female; the mode age group was 45-54 years (33%). 46% reported chronic pain and 43% acute pain. Of those experiencing pain, 42% said they did not receive adequate pain relief. 68% said pain interfered with their daily lives. Emergent themes from the qualitative data showed that participants believed that health professionals did not believe they were in pain and they were offered little advice on how to deal with it. Most participants reported being offered paracetamol, although some were prescribed codeine. However, these types of analgesia were usually ineffective and they tried alternative therapies.

Conclusion: A high proportion of ADPKD patients experienced significant levels of pain affecting their daily lives. Pain was largely not treated effectively. Pain left untreated is likely to impact on quality of life and cause further morbidity such as depression which can have a major effect on socio-psychological and socio-economic well-being. Further studies are required to examine pharmacological and psychological pain management to ascertain the most effective treatments and assist people in coping.

References: [1]Torres et al. (2007) The Lancet , Volume 369 , Issue 9569 , 1287 - 1301

[2]Simms et al., (2016) in Nephrol Dial Transplant 31;1130-1140

[3]Tong et al., (2015) in Nephrol dial Transplant 30:790-800

[4]Miskulin et al., (2014) in Am J Kidney Dis. 63(2):214-226

[5]Suwabe et al., (2013) in BMC Nephrology 14:179

[6]Rizk et al., (2009) in Clin J Am Soc Nephrol 4:560-566

Disclosure of Interest: None Declared

Keywords: ADPKD, Patient experience

Patient Education, Involvement and Experience

PO-207

OUTCOMES IN RENAL WARD PATIENTS: ARE RENAL REPLACEMENT THERAPY PATIENTS SUFFERING HARM AFTER WEEKEND ADMISSION OR DISCHARGE?

S. Duffy [1,*], J. Roberts [1], E. Williams [1], I. Moore [1]

[1]Renal Unit, SOUTH TEES HOSPITALS NHS TRUST, Middlesbrough, United Kingdom

Preferred Presentation Method: Poster

Introduction: This year, there has been much discussion as to the existence of a 'weekend effect' in the NHS[1], following reports of possible increased harm to NHS patients admitted at weekends[2]. We hoped to demonstrate that no such increased risk existed for our renal replacement therapy (RRT) inpatients and that RRT patient outcome was similar following admission to and discharge from our renal ward at the weekend or during the week.

Objectives: To measure readmission and mortality rates in RRT patients following admission to and discharge from the renal ward. To assess whether patients admitted or discharged at the weekend (Saturday and Sunday) were at higher risk of morbidity and mortality compared to admission or discharge during the week (Monday to Friday).

Methods: We analysed readmission and mortality rates in all 54 RRT patients admitted to our 24-bed renal ward in the month of June 2016. We assessed mortality and readmissions at 1, 3 and 6 months following discharge. All-cause mortality and first readmission were adopted as primary outcomes.

Results: Over the course of June 2016, we identified 54 RRT inpatient episodes on the renal ward. Twelve were day cases for dialysis access or renal transplant biopsy and 42 were acute admissions. The most common cause for admission in non-day case patients was sepsis at 23.8% (10/42).

Inpatient mortality during this period was 5.6% (3/54), all of whom were admitted on a weekday. Mortality at 1 month following discharge was 14.8% (8/54), 3 months 18.5% (10/54) and 6 months 22.2% (12/54). Of those who died within 6 months, only 16.7% (2/12) were weekend discharges. Excluding day cases, the findings were similar.

More patients were discharged on a weekday (44/51) and Friday was the most common day for both admission and discharge. Compared with any other weekday, patients admitted or discharged on a Friday carried a higher rate of 6month mortality.

Excluding those who died in hospital (3/54), readmission rates were as follows: 52.9% (27/51) of patients were readmitted within 6 months. 19.6% (10/51) were readmitted at least once within 1 month; 35.3% (18/51) within 3 months.

Of RRT patients discharged at the weekend 28.6% (2/7) had at least 1 readmission within 6 months compared with 54.6% (24/44) of patients discharged on a weekday.

Conclusion: We found RRT patients were much more likely to be discharged during the week than at the weekend (44 vs 7). We did not find an increase in morbidity and mortality in RRT patients discharged from the renal unit at the weekend. We found RRT patients discharged on a weekday were almost twice as likely to be readmitted at least once within 6 months compared to weekend discharges.

Friday, the most common day for discharge, carried a higher rate of mortality at 6 months than any other day of the week. Friday may be the most common day for discharge due to a number of factors: availability of social care, an existing 'Monday to Friday' culture, or patient demand.

We wish to investigate whether these findings are replicated over a 12 month period and hope then to understand if we can improve patient outcome by altering our current discharge patterns.

References: [1]Biases in detection of apparent "weekend effect" on outcome with administrative coding data: population based study of stroke. McKee et al, BMJ 2016;353:i2648

[2]Increased mortality associated with weekend hospital admission: a case for expanded seven day services? Freemantle et al, BMJ 2015;351:h4596

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Patient safety, RRT

Patient Education, Involvement and Experience

PO-208

Association between the impact of commonly reported symptoms and quality of life in patients with non-dialysis Chronic Kidney Disease

F. A. Niyi-Odumosu [1,*], R. Nah [2], A. L. Clarke [3], N. Robertson [2], N. C. Bishop [1], A. C. Smith [3]

[1]SSEHS, Loughborough University, Loughborough, [2]Department of Neuroscience, Psychology and Behaviour, [3]LEICESTER KIDNEY EXERCISE TEAM, UNIVERSITY OF LEICESTER, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients living with non-dialysis CKD suffer compromised health-related quality of life, yet there is a paucity of research investigating the relationship between self-reported quality of life and the perceived impact of commonly reported symptoms. This topic was highlighted as a research priority in the 2013 House of Lords report "Kidney Health: Delivering Excellence".

Objectives: The aim of this study was to investigate whether the patient perception of impact of commonly reported symptoms is associated with quality of life in non-dialysis CKD.

Methods: Seventy non-dialysis CKD patients (42 males, 28 females, mean[SD] eGFR 34.3[21.7] ml/min/1.73m^2, age 60[16] years) were recruited. The most commonly-experienced symptoms and the impact of each were assessed using a self-reported Kidney Symptom Questionnaire (KSQ) with a 5-point impact scale (0=not important to 4=very important). We identified the most commonly reported symptoms (reported by >65% of patients) and the impact score for each. Health-related quality of life was assessed with the European Quality of Life 5 Dimensions (EQ5D), which comprises domains relating to mobility, self-care, usual activities, pain/discomfort and anxiety/depression plus a visual analogue self-rating scale (VAS) which assesses overall perception of health on a scale of 0 (worst imaginable) to 100 (best imaginable).

Results: The most common symptoms experienced were "feeling tired" (92% of participants, mean impact score[SD] 2.8[1.2]), "cramps or muscle stiffness" (80%, 2.8[1.2]), "itching" (67%, 2.2[1.4]) and "pain in bones and joints" (67%, 2.3[1.3]). The EQ5D index scores were calculated using and online tool (http://www.euroqol.org). Negative associations were found between the total EQ5D index score and "feeling tired" (rho = - 0.261, p = 0.034); "cramps or muscle stiffness" (rho = - 0.257, p = 0.035); and "pain in the bones or joints" (rho = - 0.419, p = 0.001), but not with "itching" (rho = - 0.142, p= 0.248). EQ5D VAS scores negatively correlated with "feeling tired" (rho = -0.342, p = 0.005) and "cramp or muscle stiffness" (rho = - 0.335, p = 0.005), but not with "itching" (rho = - 0.154, p = 0.210) or "pain in the bones and joints" (rho = - 0.051, p = 0.689).

Conclusion: Patient-perceived impact of commonly reported symptoms is closely associated with quality of life as assessed by the EQ5D in patients with CKD stages 2-4. Evaluation of symptom experience should be included as part of routine clinical assessment for this patient population. "Feeling tired" and "Cramps or muscle stiffness" were most closely associated with both parts of the EQ5D. Both of these symptoms are related to muscle pathology, which warrants more attention to improve quality of life as well as outcome in non-dialysis CKD.

Disclosure of Interest: None Declared

Keywords: CKD, Patient experience, Patient outcome measures

Patient Education, Involvement and Experience

PO-209

A Patient-Focused Study of the Impact of Retroperitoneal Fibrosis

J. Tomlinson [1,*], J. Mason [2], F. Tam [2] and RPF Rare Diseases Group (RaDaR, Renal Association, UK)

[1]Imperial College London / MRC, [2]Imperial College, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Retroperitoneal fibrosis (RPF) is a rare fibro-inflammatory condition of uncertain aetiology that develops around the abdominal aorta and frequently encapsulates one or both ureter(s) causing obstructive nephropathy. Controversy remains as to the optimal management of RPF and variable outcomes currently result from differences in local expertise and practices. The physical and psychosocial impact of such a complex and rare disease upon patients is likely significant and their perceptions are difficult to ascertain

Objectives: To conduct an international, online patient-focused questionnaire to understand the physical and psychosocial impact that RPF has upon patients' lives

Methods: The questionnaire was designed with input from two patient advocates and agreed by the multi-disciplinary Renal Association Rare Disease Registry (RaDaR) RPF group. It comprises 62 questions/free text options across 8 sections; demographics, symptoms, medical risk factors, medical sequelae, medical/surgical treatments, psychosocial impact and perceptions of care received. The questionnaire is anonymous and freely accessible on a *GOOGLE Form* online platform and advertised through RPF Support Groups and the RaDaR Patient Information page. The questionnaire is currently "live" for 6 months between 30th September 2016 until 31st March 2017

Results: Currently halfway through the six-month study period, 177 patients from 25 countries across 5 continents have completed the questionnaire. Preliminary results reveal 99 (56.5%) respondents were female and 77 (43.5%) male. 140 (79%) received corticosteroid treatment of which 134 (96%) experienced significant side effects including weight gain and sleep disturbance being the most prominent. Despite this and a high mean pill burden (mean number of regular medications >6 per day), reported compliance was high with 160 (90%) missing 0-2 medications per week. 108 (61%) reported low mood, anxiety or depression as a result of their RPF condition and 117 (66%) reported the need to reduce work or hobbies. In addition to categorical, numerical and ordinal data, respondents have supplied extensive free text information

Conclusion: To our knowledge, this is the first large international patient-focused online questionnaire relating to the impact of RPF upon patients' lives. An increasing global usage of online tools and media provides unique opportunities to collect data directly from patients and better inform the medical community of unmet healthcare needs. This study completes on 31st March 2017 and full data analysis will be available for presentation at the 2017 UK Kidney Week

Disclosure of Interest: None Declared

Keywords: Patient experience, Patient/carer involvement, Qualitative study

Patient Education, Involvement and Experience

PO-210

Using Patient Reported Outcome measures (PROMs) to promote quality of care and safety in the management of patients with end stage renal disease requiring treatment with haemodialysis.

N. Anderson [1,*], D. Kyte [2], M. Dutton [1], P. Cockwell [1], M. Calvert [2]

[1]Research and Development, UNIVERSITY HOSPITALS BIRMINGHAM NHS FOUNDATION TRUST, [2]CPROR, University of Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients undergoing long term haemodialysis treatment often report a poor quality of life (QoL) and identify that improving QoL has a higher priority for them than improvements in long term survival[1]. Emerging research suggests that regular collection of PROMs in patients with long-term conditions may reduce hospital admissions and improve patient QoL[2]. Despite this, QoL data in the form of patient reported outcome measures (PROMs) have not been accurately developed or introduced into routine clinical care for patients receiving haemodialysis. Carefully designed studies to maximise the potential of PROMs to optimise quality of life for patients on long-term haemodialysis are needed.

Objectives: To present the methodological basis for using routine PROM assessments in the management of patients with ESRD undergoing haemodialysis.

Methods: The project will utilise a qualitative methodology, semi-structured interviews and focus groups, to explore the experiences and perceptions of patients undergoing haemodialysis, clinicians within the multi-disciplinary team caring for this patient group and family members/carers. Using topic guides to inform the interviews, qualitative data analysis drawing on content analysis methods and principles of grounded theory will be applied to verbatim transcripts of individual interviews/focus groups.

Table:

Results: Initial work with a patient advisory group (PAG) indicates that inclusion of an electronic PROM system may be acceptable to patients with advanced CKD and supports a development and implementation approach using the proposed methodology with workstreams to define: (a) which validated PROMs would be acceptable to patients and clinicians for routine monitoring of health status; (b) the optimal timing/frequency of PROM data collection; (c) the feasibility of PROM collection in different patient groups (older patients, patients of non-white ethnicity) (d) the most effective mode of administration for collection of PROM data i.e. paper, electronic formats or telephone recognition systems. The investigators will report on the design of and early findings from this formal qualitative study conducted with patients undergoing long-term haemodialysis.

Conclusion: This project will contribute to the development and implementation of PROMs that could enhance QoL assessment and hence improve QoL for individual patients with ESRD requiring haemodialysis as well as improving service delivery and overall patient care.

References: 1. Moss A H & Davison S N (2015) *How the ESRD quality incentive program could potentially improve quality of life for patients on dialysis*. Clin J Am Soc Nephrol. 2015 May 7:10(5):888-93. doi: 10.2215/CJN.07410714. Epub 2015 Mar 4.

2. Basch E, Deal A, Kris M, et al (2015). *Symptom Monitoring with Patient-Reported Outcomes During Routine Cancer Treatment* Journal of Clinical Oncology. 2015;10.1200/JCO.2015.63.0830.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Patient outcome measures, Shared decision making

Patient Education, Involvement and Experience

PO-211

A Quality Improvement Project addressing Prescription Discrepancies in Renal Patients

S. Lam [1,*], J. Taylor [1]

[1]renal, DORSET COUNTY HOSPITAL, Dorset, United Kingdom

Preferred Presentation Method: Poster

Introduction: Chronic renal failure is a long term chronic condition often necessitating complex medication regimens to manage hypertension, lipids, diabetes, phosphate, anaemia, and acidosis. Patient engagement in medicines management is essential to avoid clinical error and potential patient harm.

Objectives: We looked at the rate of discrepancies between our recorded list of medications in the patient notes, and what the patient's actual current prescription was. We also looked to see if simple interventions to appointment letters reduced the number of discrepancies found.

Methods: Over the course of 3 years, data was collected on patients attending one renal consultant clinic. We recorded if patients brought a copy of their repeat prescription to clinic, and if they did not, whether they could accurately recall them (as judged by the Physician in clinic – patients on under three drugs). If they did not bring a list and could not recall their medications, the patient's GP surgery was contacted to get an accurate list. The number of discrepancies in prescription only medications between our records and the actual prescription was recorded.

In February 2014 the clinic appointment letters were changed to include a reminder for patients to bring a copy of their repeat prescription, and in August 2014 this reminder was highlighted in bold ink. Because patient follow up varied between bi-weekly to once a year, data was collected over a three year period to determine if appointment letter changes were effective.

Table:

	2014	2015	2016
Number of patients with no list or recall	276	234	144
Discrepancies (number of drugs)	495	402	164
Number of patients with no list or recall who had discrepancies (% of total patients)	208 (10.5%)	170 (8.9%)	73 (3.9%)
Average number of drugs per patient with discrepancies	2.4	2.4	2.2

Results: 1975 patients (271 new/1704 follow ups) were seen in 2014; 1902 (185/1717) in 2015; and 1886 (231/1655) in 2016.

see Table

Conclusion: The number of patients attending renal outpatient clinics who fail to bring a list or cannot easily recall their medications has fallen over a three year period after the introduction of changes to the appointment letters. There are still a small number of patients (< 5%) who fail to engage in medicines management and are potentially at risk of harm.

Disclosure of Interest: None Declared

Keywords: Medicines management, Patient safety

Peritoneal Dialysis

PO-212

Glycaemic Control: Peritoneal Dialysis and Diabetes

K. Atkins [1,*], G. Endall [1], I. Cranston [2], A. Sampson [1], K. Bostock [1], A. Kirk [1]

[1]Wessex Kidney Centre, [2]Department of Diabetes and Endocrinology, PORTSMOUTH HOSPITALS NHS TRUST, Portsmouth, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The management of diabetes in patients receiving peritoneal dialysis (PD) is a significant clinical challenge that cannot be addressed with protocol-driven care. Current monitoring methods do not adequately assess the risk of hyperglycaemia or hypoglycaemia related to the dialysis treatments. Gaining a more in-depth understanding of the glucose variability of individuals in relation to their diabetic and dialysis treatments may help optimise therapies while minimising risks, which may also improve short and long term outcomes.

Objectives: To gain a better understanding of the glucose control in our PD patients' with diabetes through the use of continuous glucose monitoring (CGM).

Methods: All PD patients with insulin treated diabetes were invited to wear a continuous glucose monitor (FreeSytle Libre) for 14 days to capture glucose data for retrospective analysis. The demographic and therapeutic information of these patients was reviewed.

Results: 12 individuals wore a FreeStyle Libre glucose monitor. 7/12 were male, the average age was 53.4 years (ranging 27 to 69 years). 3 undertook CAPD and 9 APD. At similar HbA1c levels, very different average glucose levels were observed, with striking differences in glucose profiles. The time spent in target range (defined at 4-10mmol/L) ran from 33% of the time to 73% of the time. While some individuals spent a significant proportion of their time above target range (maximum 49% of time above 10mmol/L) others experienced hyoglycaemic events (maximum 38% of the time under 4mmol/L). The number of discrete hypoglycaemic episodes observed in individuals over the 14 days ranged from 1 episode to 20 episodes. The particular individual who recorded 20 hypoglycaemic episodes spent on average 6.5 hours each time under 4mmol/L. Some individuals were found to be hyperglycaemic or hypoglycaemic overnight, a previously undetected feature for them.

Repeat monitoring of some, following a change to their insulin regime, resulted in dramatically different glycaemic profiles.

Conclusion: The use of CGM in our PD patients treated with insulin for their diabetes has revealed some unexpected and concerning features. These include asymptomatic nocturnal and prolonged hypoglycaemia and hyperglycaemia. CGM has created an opportunity to observe detailed variations in glycaemic control while undertaking PD. We aim to use this to facilitate individualised management while improving the patient experience and outcomes.

Disclosure of Interest: None Declared

Keywords: Diabetes, Glucose, Peritoneal dialysis

Peritoneal Dialysis

PO-213

Paediatric peritoneal dialysis catheter survival – a 14 year experience

G. Bethell [1,*], F. Horwood [1], T. Gilbert [2], I. Yardley [3], R. Holt [4], C. Baillie [1], S. Kenny [1]

[1]Paediatric Surgery, Alder Hey Children's NHS Foundation Trust, [2]General Surgery, Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, [3]Paediatric Surgery, Evelina London Children's Hospital, London, [4]Paediatric Nephrology, Alder Hey Children's NHS Foundation Trust, Liverpool, United Kingdom

Preferred Presentation Method: Oral

Introduction: Peritoneal dialysis (PD) is usually the preferred method of renal replacement therapy (RRT) in children. Successful PD is dependent on a functioning catheter and failure of this has many reported causes including infection and blockage. There is little consistency in studies reporting the outcomes of PD catheters and there appears to be a lack of relevant outcomes which are useful and understandable to parents.

Objectives: The aim of this study was to collect outcome data which can be used to better inform families regarding catheter complications and longevity at the time of counselling prior to commencing PD and catheter insertion.

Methods: Following local approval, information on all patients undergoing PD catheter placement in our institution between October 2002 and September 2016 was prospectively recorded. Catheter survival was defined as the number of days from insertion to removal due to either complication or the catheter no longer being required. Catheters were inserted under general anaesthesia by either an open or laparoscopic-assisted approach. Data are presented as median unless otherwise stated. The Mann-Whitney U test was performed on continuous data and Fisher's exact test for categorical data.

Table:

Table 1 - Outcomes relevant to counselling pre peritoneal dialysis catheter insertion	
Overall rate of peritonitis at least once per catheter	69.6% (39/56)
Episodes of peritonitis managed conservatively	73.5% (61/83)
Primary PD catheter surviving to transplant	36.1% (13/36)
Only PD used to transplant	58.3% (21/36)

Results: During the study period 64 PD catheters were inserted into 44 children for RRT giving a total of 29,579 catheter days. Ten catheters needed replacement once and five of these catheters required replacement again. A further 13 catheters required revision under general anaesthetic. A total of 83 clinical infections were recorded in 34 (77.3%) children during the period of data collection giving 2.81 infections per 1000 catheter days. Of these infections, 61 (73.5%) resolved satisfactorily following a course of antibiotics however 22 of 64 catheters (34.4%) required removal due to peritonitis. Other reasons for catheter removal were following transplant (21), catheter blockage (7), conversion to HD (5) and catheter displacement (1).

Data were also analysed to determine if the younger patients, less than 2 years of age at PD catheter insertion (n=18), experienced unfavourable outcomes. There was no difference in terms of median length of catheter survival (365 v 327 days, p=0.59), episodes of peritonitis (83.3 v 63.3%, p=0.21) or blockage rate (33.3 v 26.3%, p=0.75) between the younger and older patients at time of catheter insertion. In those patients who had received a renal transplant by the end of the study period the median age at transplant was 10.4 years (3.2-18.6). Outcomes from this study that are felt to be relevant to counselling for PD catheter insertion are shown in table 1.

Conclusion: The use of PD is not trouble free and it is important that parents have the necessary information required prior to starting treatment. The proportion of patients in our study (58.3%) receiving only PD prior to renal transplant is slightly greater (39% and 51%) than reported by others. Core outcome sets should also be agreed on to enable transparent and comparable reporting between different centres.

Disclosure of Interest: None Declared

Keywords

followed by peritonitis (26%). There were less flow or drainage related failures in the weighted group (18%) versus the non-weighted group (25%) (P=0.3). Kaplan-Meir curves revealed overall increased catheter-survival in the weighted catheter group (P=0.02).
Conclusion: The weighted catheter, in this series, has increased survival rates and a low primary failure rate compared with the non-weighted surgical and percutaneously inserted catheters. This is despite its use in a cohort of patients who are at a higher risk of PD catheter failure.
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Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Dialysis, Peritoneal dialysis

Peritoneal Dialysis

PO-215

Increasing Peritoneal Inflammation Over Time Drives Increasing Peritoneal Solute Transport: Results From the Global Fluid Study

V. Zavvos [1,*], E. Elphick [2], N. Topley [3], J. Chess [1], Y.-L. Kim [4], J.-Y. Do [5], B. Lee [6], S. Davison [7], M. Dorval [8], S. Davies [2], D. Fraser [3], M. Lambie [2]

[1]Morriston Hospital, Swansea, [2]Keele University, Stoke on Trent, [3]Cardiff University, Cardiff, United Kingdom, [4]Kyungpook National University Hospital, Daegu, [5]Yeungnam University Hospital, Gyeongsan, [6]Soon Chun Hyang University, Asan, Korea, Republic Of, [7]University of Alberta, Edmonton, [8]Dumont University Hospital Centre, Moncton, Canada

Preferred Presentation Method: Oral

Introduction: Local peritoneal inflammation is a feature of peritoneal dialysis (PD) treatment and high concentrations of dialysate IL-6 (dIL6) are a strong determinant of solute transport (PSTR).

Objectives: PSTR is associated with patient survival and increases during long term PD but it is not known to what extent the rise is driven by increases in dIL-6.

Methods: We conducted a longitudinal analysis of the Global Fluid study, a multinational cohort study from UK, Canada and Korea with repeated measures. All incident patients with 3 or more paired dialysate/plasma samples were assayed for IL-6 by electrochemiluminescence. A linear mixed model with random intercept/slopes was used to assess associations with pIL6. Covariates included time on PD, centre, glucose exposure, icodextrin use, dIL6, gender, baseline age, comorbidity score and urine volume in an adjusted model with backwards selection. pIL6 and dIL6 were log transformed. PSTR was assessed by modified peritoneal equilibration testing to calculate the dialysate to plasma creatinine ratio.

Table:

	Coefficient	p value/95% Confidence Intervals
Centre	χ 2 = 34, d.f. = 5	p =<0.001
Urine Volume	β = 0.018	0.0044 to 0.032
Use of Icodextrin	β = 0.023	0.0031 to 0.041
Time varying dIL6	β = 0.064	0.047 to 0.083

Results: There were 223 patients with 1310 measurements, with a median follow up time of 2.2 years from 6 centres. PSTR increased from a mean value of 0.715 within the first 6 months to 0.741 after 3.5 years, whilst dIL6 increased from 6.0 pg/ml to 12.0 pg/ml over the same period. When adjusted for centre, icodextrin use and urine volume, baseline dIL6 (β=0.064 95% CI 0.047 to 0.082 p<0.001) was a significant predictor of PSTR. Time varying (see table) rather than baseline dIL6 improved the model (AIC -1377 vs. AIC -1342) and time became insignificant with both varying and baseline dIL6 (baseline χ2=1.81 df=1 p=0.40; time varying χ2=2.71 d.f.=1 p=0.26). Random slopes were used for linear time which was significant (LRT 19 d.f.=2 p=<0.0005).

Conclusion: Both dIL6 and PSTR increase with duration of PD. The increase in PSTR over time is mostly accounted for by changes in dIL6 and urine volume.

Disclosure of Interest: None Declared

Keywords: Peritoneal dialysis, Peritoneal inflammation

Peritoneal Dialysis

PO-216

Maintaining a peritoneal dialysis programme – addressing the reasons for therapy drop out – single centre experience from the UK

M. babiker [1,*], H. ali [1], J. baharani [1]

[1]Renal , HEARTOFENGLAND NHS FOUNDATION TRUST , Birmingham , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Peritoneal dialysis (PD) is an underused dialysis modality worldwide. Several studies have demonstrated that PD has higher early survival rates compared to haemodialysis (HD). These favourable outcomes are observed not only in elderly population, but also in patients with unplanned starts on dialysis. Despite this, there has been a constant decline in the rate of peritoneal dialysis utilization. Even in units where the initial rate of PD uptake is high it is difficult to maintain a balance of patients commencing and dropping off therapy.

Objectives: Transfer to HD is thought to be the major consequence of PD dropout and we aimed to identify our local PD dropout rate at 6, 12 and 24 months and to explore the reasons behind this dropout

Methods: All patients who were commenced on PD at our centre between 2008 and 2014 were identified from our local renal data base and were included in this retrospective study. The data include age, sex, and ethnicity, primary renal disease; date of peritoneal dialysis initiation, PD dropout rate at 6, 12 and 24 months after commencing treatment, in addition to the reasons of dropout. The data collected from case notes and electronic database review. Any patients who were transferred to other centres were excluded.

Results: 100 patients were included in the study (Male= 68, Female=32, Caucasians 74% diabetics 31% and mean age 60 years) .At 6 months follow up the total dropout rate was 26% this included: 14% transferred to HD, 5% had renal transplant, 5% died and 2% renal failure recovered. At 12 months follow up the dropout rate doubled to 50%. During that period, patients transferred to HD increased to 27%, patients who had renal transplant were12%, death rate was 6% and patients with recovered renal function were 5%. At 2 years follow up the dropout rate was 74 % (39 patients transferred to HD, 22 patients had renal transplant, 8 patients died, 5 patients became off dialysis). The reasons for PD dropout to HD were multi-factorial, that is, modality related, patient related and system related. The most common reason for modality related drop out was infection (61.5%), ultra filtration failure (20.5%), PD leak (10%) and patient choice (8%).

Conclusion: The incidence of PD dropout rate increased significantly during the period of 6 months to 24 months after treatment initiation. The main reason of PD drop out is transfer to HD because of infection (peritonitis or exit site infection). Strategies to prevent and manage peritonitis, ultra-filtration failure, PD leak and education of patients may all help with maintaining the patient on PD.

Disclosure of Interest: None Declared

Keywords: Peritoneal dialysis

Peritoneal Dialysis

PO-217

One unit experience of using Acute Peritoneal dialysis in patients presenting late with advanced chronic kidney disease.

South West Thames Institute for Renal Research, St Helier Hospital, Carshalton, Surrey, UK

R. Shunmugavelu [1,*], B. Sood [1], M. Steele [1] on behalf of Clinical audit group, R. Calipjo [1] on behalf of Peritoneal dialysis unit, R. Shunmugavelu [1]

[1]RENAL MEDICINE, ST HELIER NHS HOSPITAL,LONDON, LONDON, United Kingdom

Preferred Presentation Method: Poster

Introduction: ***Peritoneal dialysis (PD)*** is an excellent option for long term renal replacement therapy for patients with end stage renal disease wishing to maintain independence and a good quality of life. Lack of choice to start PD is clearly a recognized issue, especially in the patients who present late to renal services.

Objectives: In most centers these patients only have a choice to start ***haemodialysis (HD)*** with venous catheters. In our center we offer acute PD to such patients. There is also concern about complications like peritoneal leak if the PD catheter is used soon after insertion. This study was done to look at the safety and outcome of these patients who started PD acutely.

Methods: This is a retrospective observational single center study of patients started on acute PD between January 2014 to December 2016 at the ***South West Thames Institute for Renal Research, St Helier Hospital***. Data was collected from both paper and electronic patient records. All patients who started PD within two weeks from date of insertion of PD catheter were included.

Results: The total of 21 patients started PD acutely over this period. 11 were men and 10 women, with median age of 57 years (range 25 – 89years). **At presentation, median biochemistry results were urea 31mmol/L (range 12-53 mmol/L), creatinine 714 µmol/L (351-1894 µmol/L), eGFR 6 ml/min (2-16 ml/min) and potassium 4.9 mmol/L (3.2-6.6 mmol/L).** The median time period for start of PD was 2 days (range 0-14 days). 7 patients started acute PD to treat fluid overload, 4 had severe electrolyte disturbance and rest were symptomatic with uraemia.

At the end of study period, 4 patients have had renal transplant, 5 died, while 7 are still on PD. 5 patients had to switch permanently to HD. All of the patients achieved adequate ultrafiltration. 10 patients did not develop any PD related complications since insertion. 1 patient developed leak from PD insertion site due to large volume ascites. 1 patient needed catheter removal due to mechanical drainage problem. One of the patients had to switch to HD for the reasons of inadequate dialysis dose. 9 patients had PD catheter removal due to infection (5- PD peritonitis and 4 - exit site infection). The commonest infection noticed was due to staphylococcus aureus (7/9). 3 patients had successful reinsertion of PD catheter. **None of the deaths were related to complications from PD.**

Conclusion: Our use of PD in patients presenting late with advanced renal impairment has shown the safety and success of this modality. We were able to effectively treat fluid overload and severe biochemical/ electrolyte complications and avoid the use of HD with venous catheters. Our unit maintains very low infection rates amongst PD patients, and higher than usual infection in this cohort might reflect the need for more training for these patients. We are improving our protocol for acute start on PD to see if that could address the issues raised by this study.

Disclosure of Interest: R. Shunmugavelu Conflict with: Clinical fellow, B. Sood Conflict with: Consultant Nephrologist with interest in Peritoneal dialysis, M. Steele Conflict with: Clinical audit staff, R. Calipjo Conflict with: Peritoneal dialysis Staff nurse, R. Shunmugavelu Conflict with: Clinical fellow

Keywords: Dialysis initiation, Dialysis modality choice, Patient safety

Peritoneal Dialysis

PO-218

Exploring predispositions to peritoneal fibrosis in two mouse strains

A. Avrova [1,*]

[1]Institute of Inflammation and Repair, UNIVERSITY OF MANCHESTER, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Introduction: Peritoneal fibrosis (PF) can occur after prolonged exposure to peritoneal dialysis (PD) fluids. The degree of PF can vary from patient to patient suggesting involvement of a genetic component. Previously it has been shown that two genetically different strains of mice respond differently to TGF-β1 in the peritoneum. The SJL strain showed resistance and the C57 strain showed more PF.

Objectives: Aims: The aim of this project was to identify the reason why these two strains showed different degress of fibrosis in response to fibrotic stimuli and whether this leads to the existence of a genetic predisposition to PF.

Methods: Methods: Peritoneal tissue was obtained from control and treated C57 and SJL mice. The treatment consisted of an adenovirus expressing TGF-β1 and mice were euthanised at day 14. mRNA obtained from cultured C57 and SJL cells that were treated with TGF-β1 for 24 and 48hrs was analysed. Histology, protein analysis for E-Cadherin and alpha-smooth muscle actin (αSMA) and gene quantification via real-time PCR for E-Cadherin, αSMA and procollagen type 1 were carried out

Results: Results: H&E and Mason's Trichrome staining of sections of peritoneal tissue showed a marked increase in the thickness of the peritoneum in the C57 mice compared to the SJL. The SJL mesothelial cells showed increased expression of E-cadherin following 24hrs of treatment whereas as there was a decrease in the C57 cells. There was also a reduced expression of αSMA in the SJL cells compared to C57.

Conclusion: Conclusions: The mesothelial cells were very difficult to grow however with more time the method can be optimised for experiments to take place. Using previously obtained tissue and cells the difference between the strains of mice is clearly seen, however the cause of this needs further exploration.

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Disclosure of Interest: None Declared

Keywords: Encapsulating peritoneal sclerosis, Fibrosis, Peritoneal dialysis

Peritoneal Dialysis

PO-219

Buried peritoneal dialysis catheter inserted percutaneously using Seldinger technique with fluoroscopy – the best of all worlds?

C. Brocklehurst [1,*], R. Clark [1], R. Gisby [1], C. Forster [1], S. Ahmed [1]
[1]Nephrology, City Hospitals of Sunderland, Sunderland, United Kingdom

Preferred Presentation Method: Poster

Introduction: The buried or Moncrief-Popovich technique for peritoneal dialysis (PD) catheter insertion offers the opportunity to insert PD catheters well in advance of the need to commence dialysis. When the time comes to commence PD, the catheter is externalised in a short, clinic-based procedure under local anaesthetic. This approach helps to ensure patients get their first choice of RRT, reduces the risk of fluid leak and exit site infection, and ensures efficient use of elective surgical lists.

Objectives: Buried PD catheters have traditionally been inserted under general anaesthetic using a mini-laparotomy or laparoscopic technique, whereas local anaesthetic, percutaneous approaches using Seldinger, trocar or peritoneoscopic approach have usually left the catheter exposed for early start on dialysis.

We now describe our Seldinger, fluoroscopic insertion of a double cuff, pig-tail catheter with the catheter left buried.

Methods: Our centre has previously reported our positive experience of laparoscopic buried PD catheters, which equals all other reported case series internationally.

Other centres have reported favourable outcomes using Seldinger vs trocar, and fluoroscopy vs laparoscopy.

This new approach offers the same benefits of the Moncrief-Popovich catheter to patients who might otherwise be declined PD catheter insertion, e.g. due to higher general anaesthetic risk, and gives the flexibility of being performed by an interventional nephrologist rather than a surgeon.

Results: We have so far successfully employed this technique in 5 patients with no past abdominal surgical history. We are now offering it routinely alongside our existing laparoscopic approach.

Conclusion: We suggest that insertion of a PD catheter left buried with Seldinger technique and fluoroscopy combines the advantages of all insertion techniques and could replace surgical placement in selected patients.

Disclosure of Interest: None Declared

Keywords: Peritoneal dialysis, Vascular access

Peritoneal Dialysis

PO-220

The STOP Study: A prospective, RCT to determine the safety and efficacy of steroid impregnated tape compared to standard therapy with silver nitrate in the treatment of over-granulating peritoneal dialysis catheter exit sites: the challenges of conducting an RCT in UK Peritoneal Dialysis units.

N. Anderson [1,*], M. Dutton [1], L. Foggensteiner [2]

[1]Research and Development, [2]Renal Department, UNIVERSITY HOSPITALS BIRMINGHAM NHS FOUNDATION TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Over-granulating exit sites can be uncomfortable for patients, harbour infection or bleed. Complications can lead to catheter removal and interruption of therapy. Current standard therapy for over-granulating Peritoneal Dialysis (PD) exit sites is the use of chemical cautery with silver nitrate solution. Silver nitrate is known to be associated with side effects that include skin irritation, ulceration and bleeding[1]. Steroid impregnated occlusive tape is licensed for use in over-granulating wounds and anecdotal evidence exists supporting its efficacy in over-granulating PD exit sites. However, steroid treatment may be associated with increased risk of infection. The University Hospitals Birmingham NHS Trust PD Unit previously conducted a pilot study of a fludroxycortide impregnated tape (Haelan Tape*) with favourable results[2]. No other prospective trials of any treatment in this condition have been conducted**,** therefore a prospective RCT comparing a commonly used silver nitrate protocol with the daily application of steroid tape in over-granulating PD exit sites was undertaken.

Objectives: The Objective of this study was to evaluate the safety and efficacy of steroid impregnated tape compared to standard therapy, in the treatment of over granulating PD exit sites.

Methods: This was a multi-centre, prospective, RCT of steroid tape versus silver nitrate therapy. Study participation was for 8 weeks. Randomised therapy was administered, as per standardised SOP, for 2 weeks followed by additional treatment, if clinically indicated, up to Day 56. Study data collected included exit site photographs, standardised exit site assessment, microbiology results and patient assessment pf pain and satisfaction with treatment.The response to treatment of the PD exit sites was assessed by the examination of a series of exit site photographs by 2 independent assessors blinded to the treatment arm. The primary endpoint was complete response rate in over-granulation severity at 14 days. Secondary endpoints included partial response rates, recurrence of over-granulation, infection, pain and satisfaction rates.

Table:

Results: The Investigators will present the data for the 32 patients recruited to the study, 16 patients were randomised to each arm. Preliminary analysis of the data suggests that complete response rates (14%) for both treatments at 14 days were much lower than observed in the pilot study, which was used to derive the study power calculations. Therefore, we were unable to demonstrate a statistically significant difference in the primary outcome between the two arms of the study.

Conclusion: Recruitment was a challenge and lower than anticipated and various measures were taken to increase rates. Whilst we have been unable to demonstrate overall efficacy of one treatment against another, we have gathered valuable data in terms of safety and compliance. This was the first RCT for this indication to be undertaken in PD units within the UK and there is valuable information to share regarding the methodology and experience of undertaking a nurse-led multi-centre interventional study within this clinical environment.

References: *Registered by Typharm Ltd

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Disclosure of Interest: None Declared

Keywords: Peritoneal dialysis, Randomised controlled trial

Peritoneal Dialysis

PO-221

Prescribing Peritoneal Dialysis with days off

A. Navaratnarajah [1,*], M. Clemenger [1], J. Mcgrory [1], N. Hisole [1], T. Chelapurath [1], E. Brown [1]

[1]Renal Medicine, Hammersmith Hospital, Imperial College NHS Healthcare Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The use of peritoneal dialysis (PD) as a home therapy is limited by a significant technique failure requiring patients to transfer to haemodialysis. Burnout from the burden of doing the dialysis procedure every day and loss of ultrafiltration (UF) are two important causes of technique failure. We have therefore developed a policy of tailoring the number of days/week that patients perform PD dependent on residual renal function (RRF) and dialysis clearance, and of introducing the use of a second icodextrin exchange with loss of UF with time on PD.

Objectives: The aim of this study is to determine the safety of this approach on dialysis adequacy and UF.

Methods: This single-centre cohort study analysed retrospectively 95 patients who were on the PD programme on 31st December 2016. Dialysis adequacy is measured regularly (3-6 monthly) using PD Adequest. Patient demographic and clinical data were collected from medical records. Data on dialysis prescription and adequacy were collected for each patient from the time they had started PD.

Table:

Proportion of PD programme (expressed as percentage) by number of days per week of prescribed PD

Dialysis vintage (months)	**0**	**3**	**12**	**36**
[Patients (n)]	[95]	[85]	[52]	[18]
5 days PD	6%	15%	8%	17%
6 days PD	39%	52%	44%	27%
7 days PD	55%	33%	48%	56%
CrCl>50L/week/1.73m^2		96%	92%	94%

Results: 55% patients were male, with mean age 59.6 ±1.8 (range 18-88) years, and mean weight 74.9 ±1.6 (range 41-117.6) kg. As shown in the table, only 55% patients started on PD 7 days/week and this dropped to 33% at 3 months following the first clearance test. Over 90% patients achieved creatinine clearance (CrCl) >50L/week/1.73m^2 at all time periods.

51 (54%) patients had one daily icodextrin exchange, and 9 (9%) patients had two daily icodextrin exchanges. In the latter group, mean CrCl was 81.24(±7.36)L/week and mean UF was 2113 (±314.5)mL/24h.

Conclusion: Our local practice favours a personalised approach to dialysis prescription, involving careful monitoring of residual renal function (RRF), ultrafiltration and dialysis adequacy. We have demonstrated that patients can meet the adequacy targets set by the Renal Association even when having 1-2 days off dialysis. This time off helps patients maintain lifestyle, work and travel, thereby promoting quality of life. We now plan to extend this study to determine the technique survival rate for our PD patient population and compare this to published studies.

Disclosure of Interest: None Declared

Keywords: Dialysis adequacy, Peritoneal dialysis, Quality of life

Peritoneal Dialysis

PO-222

A retrospective study of PD catheter removals: the "pull technique" is simple, safe and frees space in operating theatres

D. Ratnapala [1,*], D. Walbaum [1] and Onwuteaka K, Fyfe R, Keating R, McLaren S, Kane S, Sharp M
[1]RENAL, NHS GRAMPIAN, Aberdeen, United Kingdom

Preferred Presentation Method: Oral

Introduction: In our institution PD catheters are removed either surgically in an operating theatre under general anaesthetic, or by the "pull technique" in the clinic using inhalational analgesia (Entonox). The method of catheter removal is determined by indication, clinical assessment and surgical preference.

Objectives: This study aimed to assess the number of catheters removed by each technique, the indications for catheter removal and the complications of catheter removal by the "pull technique".

Methods: We retrospectively identified all PD catheters removed in Aberdeen Royal Infirmary from 1st January 2010 to 1st August 2016. We used the Clinical Vision Renal electronic patient record, TRAKCare Patient Management System, case note review and patient consultation to identify the technique of catheter removal, reason for catheter removal, patient demographics and complications

Table:

Results: 104 PD catheter removals were identified in 102 patients. 25 patients had either died, moved to another region or had their catheter removed at the time of a transplant. 32 catheters were removed "surgically" and 47 catheters were "pulled". The indications for catheter removal for those who had them pulled were post transplant (19); inadequate dialysis (16): peritonitis/exit site infection (8); and other (4). Two patients who had catheters "pulled" had a complication. One patient required cuff removal by laparotomy under general anaesthetic for unresolved infection; and one patient had to re-attend later the same day due to an ongoing fluid leak but did not require admission.

Conclusion: This is the largest series reporting outcomes after removing PD catheters by the "Pull Technique". It is a simple, safe and efficient method for removal of PD catheters in selected patients. It reduces the number of general anaesthetics required and frees up operating time for other procedures

Disclosure of Interest: None Declared

Keywords: Peritoneal dialysis

Rare Renal Disorders

PO-223

Regional Incidence and Outcomes of Anti-GBM Disease

A. Nixon [1,*], A. Dhaygude [1]

[1]Renal Medicine, LANCASHIRE TEACHING HOSPITALS NHS TRUST, Preston, United Kingdom

Preferred Presentation Method: Poster

Introduction: Anti-glomerular basement membrane (GBM) disease is a rare autoimmune disorder characterised by a rapidly progressive glomerulonephritis.(1) Renal survival is poor in those that present with severe acute kidney injury.(2) The estimated incidence is 1 case per million population.(1) Recent evidence suggests that genetic factors are important in the development of anti-GBM disease.(3,4)

Objectives: Anecdotally the Lancashire Teaching Hospitals NHS Foundation Trust (LTHTR) Renal Department has seen a large number of new patients presenting with anti-GBM disease over recent years. Our objectives were to establish the regional incidence of anti-GBM disease and to assess the clinical outcomes of those presenting with anti-GBM disease.

Methods: A retrospective review was performed. The LTHTR Immunology Department identified all positive anti-GBM results between 1/1/2010 and 11/1/2015. Clinical records were then reviewed to identify all new diagnoses of anti-GBM disease and to assess patient outcomes, specifically renal and patient survival.

Table:

	Patients N (%)	**1 Year Patient Survival N (%)**	**1 Year Renal Survival N (%)**
Creatinine <500µmol/L	4 (22)	3 (75)	1 (25)
Creatinine >500µmol/L	14 (78)	11 (79)	2 (14)
Total	18	14 (78)	3 (17)

Results: Eighteen patients were diagnosed with anti-GBM disease giving a regional annual incidence of 3.4 cases per million population. The median age was 65 years old with an equal male to female ratio. Sixteen patients were Caucasian. Five patients were double positive for both anti-GBM antibody and anti-neutrophil cytoplasmic antibody. Three patients were diagnosed with an associated pulmonary haemorrhage. Fourteen patients had a creatinine >500µmol/L at first presentation. Eight of these patients required dialysis within the first 72 hours of their hospital admission. Seven patients had a renal biopsy performed. The average percentage of crescents on renal biopsy was 94%. Steroids, cyclophosphamide and plasma exchange were administered to twelve patients. Table 1 demonstrates one-year patient and renal survival. There was no significant difference in one-year renal ($P>0.9$) or patient survival ($P>0.9$) for those presenting with a creatinine <500µmol/L and those presenting with a creatinine >500µmol/L. There was also no significant difference in one-year renal ($P>0.9$) or patient survival ($P=0.5$) for patients with a creatinine >500µmol/L that required dialysis within 72 hours and patients with a creatinine >500µmol/L that did not require dialysis within 72 hours.

Conclusion: This retrospective observational review demonstrates that the incidence of anti-GBM disease is over three-fold higher in the North West of England than reported in the literature.(1) This may reflect a regional genetic susceptibility to anti-GBM disease. Additional research is required to further investigate the genetic predisposition to anti-GBM disease.

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Disclosure of Interest: None Declared

Keywords: Anti-GBM disease, Genetic association, Survival

Rare Renal Disorders

PO-224

Outcomes of patients with minimal change disease and primary focal segmental glomerulosclerosis at a UK Renal Centre demonstrate a need for new evidence based treatment regimens

A. Ratnayake [1,*], S. P. Kon [1], R. Elias [1], R. Hull [1]

[1]Department of Renal Medicine, King's College Hospital NHS Foundation Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Minimal change disease (MCD) and primary focal segmental glomerulosclerosis (FSGS) are challenging conditions to treat. High dose steroid regimens are used as first line therapy, but are often associated with relapse.

Objectives: In this study, we evaluated outcomes for our steroid based regimens over the last 5 years in adult patients with MCD and primary FSGS.

Methods: We performed a retrospective review of patients diagnosed with MCD and primary FSGS at our centre between January 2010 and December 2015. Patients were identified and data collected using our Renalware clinical database.

Results: 30 patients were diagnosed with MCD; median age 51 years (range 16-91), 47% were male, 77% Caucasian. Median follow up time was 42 months (range 2-60). By 12 months, 24 patients were in remission, 18 had at least 1 relapse and 4 died. At their last follow up, 20 patients were in sustained remission, of whom 17 were Caucasian. 6 patients (3 were of Black ethnic origin) suffered recurrent relapses. 65% patients who achieved sustained remission relapsed during follow up; 55% of these patients required a second agent to achieve remission, predominantly a calcineurin inhibitor (91%). To-date 40% patients in sustained remission still require immunosuppressant therapy.

23 patients with primary FSGS were identified; median age 54 years (range 19-84), 70% were male, 68% Caucasian. Median follow up time was 36 months (range 1-60). At 12 months, 10 patients were in remission, 2 in partial remission, 6 were nephrotic, 2 died and 3 were on dialysis. At their last follow up, 7 patients were in sustained remission, 1 of whom is currently on Tacrolimus. 8 patients suffered multiple relapses (half were Black). During follow up, 6 patients reached end stage renal failure and 3 of them were Caucasian.

Conclusion: MCD and primary FSGS remain difficult to treat and additional immunosuppressive agents alongside corticosteroids are often required. Our data demonstrates the majority of patients with MCD can achieve full remission, but relapse is common despite use of evidence based regimens. Our data also suggests that a higher proportion of patients than in published data remain dependent on immunosuppression to maintain their remission. FSGS patients have poor renal outcomes and those who do not achieve remission are likely to suffer progressive renal failure. New therapeutic approaches and better randomised controlled trial evidence are needed to deliver better long term outcomes.

Disclosure of Interest: None Declared

Keywords: None

Rare Renal Disorders

PO-225

Overview of Rare Renal Diseases at a Paediatric Renal Center through the National Registry of Rare Kidney Diseases (RaDaR) in the United Kingdom

M. Kokocinska [1,*], L. Kerecuk [1], M. Dillon [2], D. Milford [1], S. Hulton [1], S. Stephens [1]

[1]Nephrology, Birmingham Children's Hospital, [2]RaDaR and Think Kidneys UK Renal Registry, RaDaR and Think Kidneys UK Renal Registry, Birmingham , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Rare kidney disease can affect children in various ways, ranging from treatable disorders without long-term consequences to life-threatening conditions. Some kidney diseases are so rare that very little is known about them. Therefore, understanding and improving management of renal rare diseases is vital, with the ideal starting point being the collection of informative clinical data. However, individual hospitals don't see enough patients with these conditions to develop deep understanding of particular diseases.

For this reason our centre is participating in RaDaR – the Rare Disease Registry - which is a UK Renal Association initiative designed to gather information from patients with rare kidney diseases. We define a medical registry as a systematic collection of a clearly defined set of health and demographic data for patients with specific health characteristics, held in a central database for a predefined purpose (based on Solomon et al.[1]). RaDaR recruitment began in 2010 and now covers more than 50 conditions. There are over 10,000 recruits from 78 UK hospitals. Birmingham Children's Hospital (BCH) is a leading Paediatric recruiting hospital in the UK.

Objectives: To describe the range of conditions and patient numbers recruited to RaDaR at BCH which is a national tertiary renal referral hospital and the only national centre for combined liver kidney transplants in the UK.

Methods: The RaDaR dataset is defined by the UK Renal Registry in association with over 25 Rare Disease Groups, made up of experts in each eligible condition. Data fields include demographics, blood and urine results, medications, transplant and dialysis history, genetics and co-morbidities. Data is entered retrospectively from the patient's medical records following consent.

Results: 319 patients have been consented at BCH to date. The age range is from birth to 16 years with mean of 4.9 years with male to female ratio of 55%:45%. The most common condition is Idiopathic Nephrotic Syndrome (n=128; 39%), followed by Alport Syndrome (n=33; 10%), ARPKD (n=25; 8%), Hyperoxaluria (n=24; 7%) and STEC HUS (n=22; 7%). The other conditions with numbers of patients recruited so far include: ADPKD (n=14), aHUS (n=13); Cystinosis (n=9); Cystinuria (n=3); Dent & Lowe (n=7); HNF1b (n=6); Hypokalaemic Alkalosis (n=8); MPGN (n=14) and Vasculitis (n=7).

Conclusion: RaDaR provides important epidemiology data based which is shared amongst the renal team to develop further research into rare kidney diseases and improve the quality of care for these patients. It also gives an opportunity to define the best treatment practices across the country in the future.

References: [1] Solomon, D.J.et al, 1991 Evaluation and Implementation of Public Health Registries. Public Health Reports Mar-Apr; 106(2): 142–150

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Development, Patient/carer involvement

Rare Renal Disorders

PO-226

A Retrospective Analysis of Retroperitoneal Fibrosis in North West London

J. Tomlinson [1,*], T. Barwick [2], T. Cairns [2], T. Cook [1], N. Gibbons [2], S. Hamdulay [3], D. Hrouda [2], J. Mason [1], S. McAdoo [1], C. Pusey [1], K. Wallitt [2], S. Yusuf [2], F. Tam [1]

[1]Imperial College, [2]Imperial College Healthcare NHS Trust, [3]London North West Healthcare NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Retroperitoneal fibrosis (RPF) is a rare fibro-inflammatory condition that develops around the abdominal aorta and frequently encapsulates one or both ureter(s) causing obstructive nephropathy. The aetiology of RPF is uncertain, the complication rate is high and the management is complex, requiring expertise from multiple specialties

Objectives: We performed a retrospective analysis to describe the clinical characteristics of RPF cases treated at Imperial College Healthcare Trust and referring hospitals across North West London

Methods: RPF cases were identified through International Classification of Disease, Tenth Revision code (ICD-10 N13.5) and specialty databases at Imperial College Healthcare Trust (ICHT) and referring hospitals, recorded between 1st January 2005 and 1st December 2016. Clinical data were extracted from digital and paper records. Duration of follow-up was defined from the date of diagnosis by imaging to the last clinical attendance or death

Results: A total of 72 patients with RPF were identified over a 12-year period. Mean age at diagnosis was 56 years (range 26 – 82 years) and 44 (61%) were male. Black ethnicity was over-represented at 3-fold higher than expected when compared to 2011 census population data for NWL (25 versus 8%). A smoking history was present in 50 patients (63%) and pre-existing cardiovascular risk factors or disease in 39 cases (54%) with autoimmune disease or serum autoantibodies present in 25 patients (35%). At presentation, 50 patients (69%) suffered acute kidney injury (AKI) with 4 patients (6%) requiring emergency renal replacement therapy. Corticosteroids were used in 47 cases (65%) with some receiving alternative immunosuppressive agents including azathioprine (7; 10%), methotrexate (6; 8%), tamoxifen (3; 4%), mycophenolate (3, 4%). Ureteric stents were used in 47 patients (65%) and ureterolysis was performed in 15 (21%). Mean follow-up time was 90 months (range 1 – 468 months). Despite the majority recovering to some degree from initial AKI, significant renal impairment (eGFR <60mL/min/1.73m2) was present in 51 patients (71%) at follow-up and 10 patients (14%) reached end-stage kidney disease. Non-renal complications from RPF or therapy were reported in 41 patients (57%) and included urinary tract infections, cardiovascular events, further surgery, weight gain, diabetes and osteoporosis. There were 8 deaths (11%).

Conclusion: To our knowledge, this is the first large multi-ethnic RPF retrospective study reported from the UK. Our ongoing work to develop understanding of RPF and improve outcomes for patients includes: founding a national RPF rare disease registry (RaDaR, Renal Association and Registry), an ongoing international online patient-focused questionnaire study and formation of an RPF multi-disciplinary clinical and research group at Imperial College Healthcare Trust

Disclosure of Interest: None Declared

Keywords: Fibrosis, Obstruction, Vasculitis

Rare Renal Disorders

PO-227

A Comparison of Circulating Angiogenic Factors with Routine Protein Analytes as Markers of Preeclampsia in Healthy Women

N. Sarween [1,*], J. Hosdon [2], E. Knox [3], T. Plant [4], C. Day [1], M. Drayson [4], G. Lipkin [1]

[1]Renal Medicine, [2]Medical Statistics, University Hospitals Birmingham NHS Foundation Trust , [3]Maternal Medicine, Birmingham Women's Hospital NHS Foundation Trust, [4]Clinical Immunology, University of Birmingham, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: An increase in soluble fms-like tyrosine kinase 1 (sFLT-1) and reduction in placental growth factor (PlGF) concentrations have emerged as strong predictors of pre-eclampsia (PE). The National Institute of Clinical Excellence (NICE) have recently issued clinical guidelines supporting the use of the sFlt-1:PlGF ratio to help exclude PE in the clinical setting. However, this test is expensive and currently not adopted in routine clinical practice. We have recently reported that PE is characterised by changes in a group of serum proteins that are relatively cheaply measured in most hospital laboratory services [1].

Objectives: We sought to relate our earlier study immune system markers; serum free light chains (sFLC), IgG, HS-CRP, complement C3 and C4, creatinine, Beta-2Microglobulin (B2-M), albumin and uric acid (UA) with sFLT-1 and PlGF concentrations and compare their diagnostic capability to identify PE.

Methods: Serum samples were collected from previously healthy pregnant women admitted with PE (BP >140/90 mmHg & urine protein creatinine ratio >30 mg/mmol) and also healthy pregnant controls. Samples were stored at -20ºC and analysed in batch using the Roche Cobas® platform.

Correlations between the markers were assessed with Spearman's (rho) correlations and predictive accuracy using the areas under ROC curves (AUROCs). Multivariable binary logistic regression models were produced, with PE as the outcome and using a stepwise approach, to combine the patient demographic factors and routinely measured tests (B2-M, C3, C4, IgG, CRP, UA and creatinine). These were then expanded to additionally include sFLC with and without the sFLT-1:PlGF ratio and the AUROCs compared between the resulting models.

Results: Samples from 190 women (83 PE & 107 healthy controls) were analysed. The sFLT-1:PlGF ratio was increased in the PE versus control group (median: 68.7 vs. 14.0 $p<0.001$) and was significantly positively correlated with serum creatinine (rho:0.448) and B2-M (rho:0.586) (both $p<0.001$) and negatively correlated with C3 (rho:-0.145, $p=0.046$) and C4 (rho:-0.311, $p=0.001$). No significant correlation was observed between sFLT-1:PlGF ratio and sFLC ($p=0.060$) or IgG ($p=0.475$) levels. The sFLT-1:PlGF ratio was the most predictive of PE (AUROC: 0.81, 95% CI 0.74-0.88), followed by B2-M (0.75, 95% CI 0.69-0.82). Both these markers were also significantly associated with adverse clinical outcome in women with PE ($p<0.001$).

Combining the patient demographic factors and routinely measured tests returned an AUROC for PE of 0.84 which was comparable to that for sFLT-1:PlGF ratio in isolation ($p=0.329$). Adding sFLC to the model caused a non-significant improvement in accuracy (AUROC=0.88, $p=0.080$), whilst a significant improvement resulted from adding both sFLC and sFLT-1:PlGF (0.91, $p=0.003$).

Conclusion: In previously healthy women, PE is associated with an anti-angiogenic profile. We have demonstrated similar diagnostic capability using routinely available laboratory markers compared with the sFLT-1:PlGF ratio in established PE. Further work is required to determine whether predictive capability is also similar between the two sets of markers. The sFLT-1:PlGF ratio was correlated to B2-M, renal function and complement markers but not with antibody markers. sFLC remain independently associated with PE after accounting for anti-angiogenic imbalance, supporting independent disease pathways.

References: 1. Sarween, N et al. FP294Serum Free Light Chains: a Novel Biomarker in Preeclampsia. NDT 2015. **30**(suppl3).

Disclosure of Interest: None Declared

Keywords: Immunoglobulins, Pre-eclampsia, Pregnancy

Rare Renal Disorders

PO-228

Using the General Practice Database CPRD to determine Pregnancy Outcomes in Patients with Granulomatosis with Polyangiitis (GPA)

S. Elsaesser [1,*], L. Chadwick [2], M. Venning [3], N. Brown [4]

[1]Acute Medicine, Weston Area Health Trust, Severn Foundation Deanery, Weston-Super-Mare, [2]Aintree University Hospital, Liverpool, [3]University of Manchester, [4]Salford Royal Foundation Trust, University of Manchester, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Granulomatosis with Polyangiitis (GPA) is a rare small blood vessel vasculitis, which may cause multi-organ inflammation, damage and even failure. Although GPA predominantly affects older patients, it can and does affect women of child-bearing age. Pregnancy outcome data for those affected is scarce (with the largest cohort described being 26 pregnancies in 16 women[1]) and solely from specialist centres.

Objectives: The aim of our study was to determine pregnancy outcomes for a larger and UK-wide distributed cohort of GPA patients and provide novel information on foetal and maternal outcomes through use of a primary-care database.

Methods: All pregnancies with a new diagnosis of GPA between 1987 and June 2015 were identified using the Clinical Practice Research Database (CPRD). Additional data was obtained from Hospital Episode Statistics (HES) data, Office of National Statistics (ONS) mortality data and the mother-baby linkage (CPRD provided).

Results: 25 live births, 4 pregnancy losses and 2 unknown outcomes were recorded in 21 patients. Of the 4 losses, increased disease activity was evident either in the 12 months preceding or during pregnancy. Immunosuppression history was available for 19 pregnancies with 11 exposed at 12 months prior to pregnancy (agents including tacrolimus, azathioprine, methotrexate, mycophenolate, prednisolone and cotrimoxazole), 5 had a change in the 12 months prior to conception and 8 were exposed during pregnancy (agents including tacrolimus, prednisolone, azathioprine, mycophenolate and cotrimoxazole). Gestations and birthweights were recorded for 10 of the babies. 2 were preterm and none small for gestational age. Disease flares were identified in 12 pregnancies during and in 10 in the 12 months after pregnancy. More flares during pregnancy were identified in those not on immunosuppression than those on. Recorded infection rates were increased in the 12 months postpartum in comparison to during pregnancy, with no relationship to immunosuppression use identified. No significant conditions were identified from the 12 neonatal primary-care records available with follow up ranging from 1 month to 14 years.

Conclusion: In this study the live birth rate was good. Increased disease activity preceding or during pregnancy may be associated with adverse pregnancy outcomes including pregnancy loss, low birth weight and preterm birth. Flare risk during pregnancy may be increased for patients not on immunosuppression There should be an awareness of the risk of infection postpartum (generally ENT or urinary infections). Long-term foetal outcomes appear promising but further study in this area is needed. However, in general this largest series of pregnancy outcomes to date in patients with GPA, provides data suggesting that good pregnancy outcomes are achievable in this population.

References: 1. Clowse ME, Richeson RL, Pieper C, Merkel PA, Consortium VCR. Pregnancy outcomes among patients with vasculitis. Arthritis Care Res (Hoboken). 2013;65(8):1370-4.

Disclosure of Interest: None Declared

Keywords: Immunosuppression, Pregnancy, Renovascular disease

Rare Renal Disorders

PO-229

Characteristics, outcomes and prognostic factors of patients with acute manifestation of small vessel vasculitis admitted to intensive care: a 16-year single-centre experience

Y. Xu [1,*], R. B. Jones [2], J. Varley [3], L. Willcocks [2], D. R. Jayne [2]

[1]School of Clinical Medicine, University of Cambridge, [2]Vasculitis and Lupus Clinic, [3]Intensive Care Unit, Addenbrooke's Hospital, Cambridge, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with fulminant small-vessel vasculitis (SVV), particularly pulmonary haemorrhage, frequently require intensive care (ICU) support. Mortality rates up to 52% have been reported for this patient group[1].

Objectives: We report mortality and renal survival in a single centre ICU study of patients with ANCA-associated vasculitis (AAV) and anti-glomerular basement membrane (anti-GBM) disease at Addenbrooke's Hospital, Cambridge.

Methods: Patients requiring ICU treatment from 2000-2016 were identified from multiple databases. Inclusion criteria were (1) acute presentation of new or flaring AAV or anti-GBM disease; (2) admission to ICU. Those requiring high dependency support only were excluded. Patient demographics, clinical and laboratory data were collected. Primary outcomes were mortality and dialysis dependence.

Results: Forty-six patients were studied (88% newly diagnosed, 53% granulomatosis with polyangiitis, 22% anti-GBM disease, 19% microscopic polyangiitis and 6% eosinophilic granulomatosis with polyangiitis). Median follow up period was 41 months (range 2-105). 72% had pulmonary haemorrhage (87% mechanically ventilated). 83% had nephritis (70% requiring renal replacement therapy) on ICU. ICU, 90-day and overall mortality was 15%, 26% and 39%. 50% required renal replacement therapy at last follow-up. ICU survival from 2009-2016 was 95% versus 65% from 2000-2008; improved ICU care, extra-corporeal membrane oxygenation and rituximab may have contributed to improved outcomes.

Conclusion: This is the largest tertiary centre case series reporting ICU outcomes for patients with fulminant small vessel vasculitis. The majority of patients had newly diagnosed disease, required mechanical ventilation and renal replacement therapy. The 15% ICU mortality was better than historical reports, and improved over the 16-year follow-up period.

References: 1. Befort P, Corne P, Filleron T, Jung B, Bengler C, Jonquet O, et al. Prognosis and ICU outcome of systemic vasculitis. BMC Anesthesiol. 2013;13(1):27

Disclosure of Interest: None Declared

Keywords: ANCA, Rituximab, Vasculitis

Rare Renal Disorders

PO-230

Successful use of endovascular ablation of renal nerves (RDN) in patients with loin pain hematuria syndrome (LPHS): Prairie LPS study.

B. Prasad [1,*], S. Giebel [1], K. Goyal [2], F. Garcia [3], M. McCarron [4]

[1]Nephrology, [2]Radiology, Regina General Hospital, Regina, [3]Urology, Cypress Regional Hospital, Swift Current, [4]Research and Performance Support, Regina Qu'Appelle Health Region, Regina, Canada

Preferred Presentation Method: Oral

Introduction: Loin Pain Hematuria Syndrome (LPHS) is characterized by severe unilateral or bilateral loin pain that suggests a renal origin but occurs in the absence of identifiable or relevant urinary tract disease[1-3]. Hematuria can be microscopic or macroscopic, and the renal abnormalities responsible for the hematuria are often unexplained. Debilitating pain refractory to conventional pain medications is the main cause of morbidity in this patient group. Treatment options are either opiates and/or surgical denervation of the renal nerves that includes auto transplantation or even nephrectomy with varying success.

Objectives: The primary objective was to achieve 30% reduction in subjective pain ratings using a Visual Analog Scale (VAS). The secondary objectives were: a) changes in self-reported pain (McGill Pain Questionnaire), changes in self-reported disability (Oswestry Disability Index [ODI]), changes in Quality of Life (EQ-5D, Short Form Health Survey [SF-36]) and changes in mood (Geriatric Depression Score) at 3 and 6 months compared to baseline.

Methods: We conducted a single center, single-arm study. Ten patients between the ages of 28-62 years (nine female, one male) with LPHS underwent endovascular ablation of the renal nerves between July2015 and November 2016 using the Vessix ™renal denervation system. Secondary causes of flank pain were excluded with cystoscopy, triphasic CT of the abdomen and pelvis with delayed images, CT angiogram to look at the vasculature and MAG3 split function renogram. RDN was performed after seeking Health Canada approval for this indication. Individual patient consent was obtained prior to the procedure. The number and frequency of pain medications, EQ-5D, McGill Pain Questionnaire, Geriatric Depression Score, SF-36, and ODI were measured at baseline and at 3 months post-procedure to evaluate changes in pain, disability, quality of life and mood.

Results: 4/10 patients were off all medications at 3 months and 6/10 patients had a 70% reduction in the dose of opiates. There were consistent improvements in pain (McGill Pain Questionnaire), disability (ODI), mood (Geriatric Depression Score) and quality of life (EQ-5D and SF-36) from baseline to 6 months post-procedure.

Conclusion: This is the first reported study that shows successful outcomes post RDN in patients with LPHS. We conclude that RDN is associated with decline in the number of pain medications and considerable improvement in quality of life and pain. These results suggest that percutaneous catheter-based delivery of radiofrequency energy is a safe, rapid treatment option that should be considered in all patients with LPHS.

References: 1. Burke JR, Hardie IR. Loin pain haematuria syndrome. *Pediatr Nephrol*. 1996;10(2):216-220.

2. Leaker BR, Gordge MP, Patel A, Neild GH. Haemostatic changes in the loin pain and haematuria syndrome: Secondary to renal vasospasm? *Q J Med*. 1990;76(281):969-979.

3. Little PJ, Sloper JS, de Wardener HE. A syndrome of loin pain and haematuria associated with disease of peripheral renal arteries. *Q J Med*. 1967;36(142):253-259.

Disclosure of Interest: None Declared

Keywords: Inflammation, Patient experience, Patient outcome measures

Rare Renal Disorders

PO-231

Using a Patient Survey to Shape the Service Provided to Patients Diagnosed with aHUS

A. Watt [1,*], J. Stout [1]

[1]National aHUS Service, NUTH NHS TRUST, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Poster

Introduction: Patients with a rare disease can feel a sense of isolation in addition to the usual fears experienced by all those with a long-term condition. The National Service for Atypical Haemolytic Uraemic Syndrome recently appointed 2 nurse specialists and part of their role is to establish links with patients and ensure that they received the information required to deal with their diagnosis.

Objectives: In order to establish the knowledge patients with aHUS had about their condition and the information they felt they required in order to deal with it.

Methods: We sent a qualitative survey to 119 patients in England under the care of the National Service. As well as collecting demographic data and assessing the current situation, the results would be used to shape the service provided in the future.

Results: The majority of respondents were women but as >60% of those treated under the National Service are female this was not unexpected. Most were currently receiving Eculizumab and around 50% received their infusions using the homecare service.

Less than 50% of respondents were aware of the National aHUS Service and only a minority had had any direct contact with the team.

The majority of respondents felt that they had sufficient knowledge of their condition. Of those that did not, most expressed a wish to know more although some made comments such as ‘my lack of knowledge is due to my lack of looking’ and ‘I don’t really bother about medical things’. The most popular sources of knowledge were their local team and the internet. Local nephrologists’ knowledge of aHUS was rated highly. However, the perceived knowledge of other healthcare professionals varied greatly with comments such as ‘my GP had never heard of it’ and ‘it’s a rare disease, I don’t expect them to know’. Most expressed an interest in learning more about genetics and future research. With regard to future contact with the National Service, the majority favoured a patient information pack and/or a newsletter.

Conclusion: The setting up of the National service provides the ideal opportunity to improve the experiences of patients with this rare disease. The results of this survey show a difference in the experience and knowledge of these patients. A number of tools are already in development that we hope will provide us with improved outcomes in the future.

Disclosure of Interest: None Declared

Keywords: Haemolytic uraemic syndrome, Patient experience, Renal service planning

Rare Renal Disorders

PO-232

Glucose 6 Phosphate Deficiency Masquerading as Atypical Hemolytic Uremic Syndrome

P. Walsh [1,*], V. Brocklebank [1], S. Johnson [2], M. Christian [3], D. Kavanagh [1]

[1]National Renal Complement Therapeutics Centre , Newcastle University, [2]Dept. of Paediatric Nephrology, Great North Children's Hospital, Newcastle, [3]Dept. of Paediatric Nephrology, Queen's Medical Centre, Nottingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Atypical Haemolytic Uraemic syndrome is the triad of microangiopathic haemolytic anaemia, thrombocytopenia and acute renal failure. Around 50% of cases carry mutations in the complement regulatory genes [factor H (*CFH*); membrane cofactor protein (*MCP; CD46*) or factor I (*CFI*)] and the complement component genes [factor B (*CFB*) & *C3*]. This discovery ultimately resulted in the successful introduction of the complement inhibitor Eculizumab into clinical practice.

Objectives: A 4 year old boy presented with non-immune haemolytic anaemia, thrombocytopenia and acute kidney injury (AKI); he was treated with plasma exchange and subsequently eculizumab. His renal function rapidly improved but there was evidence of continuing haemolysis. He represented twice whilst on eculizumab, despite adequate complement blockade, with hemolytic anemia and thrombocytopenia, but on these occasions without renal involvement. Eculizumab was withdrawn, after 6 months, due to non-efficacy.

Methods: At presentation, routine investigations for aHUS were performed, including aHUS related genes (*CFH, CFI, CFB, C3, CD46, THBD, DGKE*); factor H autoantibodies and the C5 polymorphism known to predict eculizumab non-response. Investigations were negative and the failure to respond to eculizumab led us to undertake whole exome sequencing.

Results: A pathogenic variant in *G6PD* (Glucose 6 Phosphate Dehydrogenase) was identified; this was confirmed by functional analysis demonstrating decreased erythrocyte G6PD activity levels ($0.4 iU/10^{12}$ erythrocytes (normal 4.5-13.5)).

Conclusion: The pathogenic variant in *G6PD* identified in this child has previously been shown to result in chronic haemolytic anaemia, with acute exacerbation following periods of oxidative stress. The AKI seen at presentation is likely due to heme-induced acute tubular necrosis. This case highlights the remaining diagnostic uncertainty in aHUS and the value of utilizing next generation sequencing techniques in cases where the aetiology is unclear. We recommend G6PD deficiency is included in the differential diagnosis of patients presenting with aHUS and measuring erythrocyte G6PD levels in children presenting with aHUS.

Disclosure of Interest: P. Walsh: None Declared, V. Brocklebank Conflict with: Northern Counties Kidney Research Fund, S. Johnson Conflict with: Alexion Global aHUS Registry Scientific Advisory Board, M. Christian: None Declared, D. Kavanagh Conflict with: Gyroscope Therapeutics, Conflict with: Alexion Pharmaceuticals

Keywords: None

Rare Renal Disorders

PO-233

Non-complement causes of atypical haemolytic uraemic syndrome: implications for treatment

V. Brocklebank [1,*], P. Walsh [1], R. Challis [2], S. Johnson [3], N. Sheerin [3], D. Kavanagh [3]

[1]INSTITUTE OF GENETIC MEDICINE, NEWCASTLE UNIVERSITY, Newcastle upon Tyne, [2]Centre for Genomic and Experimental Medicine, Edinburgh University, Edinburgh, [3]National Renal Complement Therapeutics Centre, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Genetic and molecular studies have defined the role of hereditary (mutations in the genes encoding the complement components C3 and factor B, and the regulators factor H, factor I and CD46) and acquired (autoantibodies against factor H) complement defects in the pathogenesis of atypical haemolytic uraemic syndrome (aHUS), and the subsequent introduction of the complement inhibitor eculizumab has transformed the prognosis. However, not all aHUS is complement mediated.

Objectives: A mutation in a complement gene has been identified in only ~70% of familial cases referred to the National Renal Complement Therapeutics Centre (NRCTC). Additionally not all patients respond to eculizumab treatment. Our objective was to establish the pathogenic mechanisms in these cases.

Methods: We undertook whole exome sequencing in all families referred to the NRCTC with a clinical diagnosis of aHUS in whom no hereditary or acquired complement defect was identified.

Results: We identified patients with mutations in the non-complement genes *DGKE* and *INF2* in the UK aHUS cohort. We describe the genetic and phenotypic characteristics of these patients. We highlight a dichotomy in response to eculizumab.

Conclusion: Eculizumab is currently the first-line treatment for aHUS. However, some individuals will not respond and are therefore exposed unnecessarily to the potential risks of terminal pathway complement inhibition, primarily increased susceptibility to infections with encapsulated organisms. Identifying complement independent mechanisms of disease will enable the management of aHUS to be personalised such that we can predict who will not respond to eculizumab and recommend alternative treatment strategies.

Disclosure of Interest: V. Brocklebank Conflict with: Northern Counties Kidney Research Fund, P. Walsh: None Declared, R. Challis: None Declared, S. Johnson Conflict with: Alexion Global aHUS Registry Scientific Advisory Board, N. Sheerin: None Declared, D. Kavanagh Conflict with: Gyroscope Therapeutics, Conflict with: Alexion Pharmaceuticals

Keywords: Complement , Genomics, Haemolytic uraemic syndrome

Rare Renal Disorders

PO-234

Massive diffuse alveolar haemorrhage in a haemodialysis patient with ESRD secondary to IgA nephropathy: a unique case report of a rare pulmonary renal syndrome with response to Plasmapheresis & Mycophenolate Mofetil

S. Pickles [1,*], R. Clark [1], R. Davison [1], S. Fenwick [1], H. Mansy [1], M. Jain [2], S. Ahmed [1]

[1]Nephrology, City Hospitals of Sunderland, Sunderland, [2]Histopathology, Queen Elizabeth II Hospital, Gateshead, United Kingdom

Preferred Presentation Method: Poster

Introduction: IgA nephropathy is the commonest glomerulonephritis worldwide, but diffuse alveolar haemorrhage (DAH) has been reported in only 15 patients since 1978. Outcome is variable, ranging from resolution of both renal & pulmonary manifestations to death in 26% of cases.

Objectives: We describe a 31y man who presented with glomerular-origin haematuria & AKI (Cr 176). Biopsy showed crescentic IgA nephropathy with >50% crescents & mild chronic damage. IV Methylprednisolone, PO Prednisolone & IV Cyclophosphamide were commenced. Despite immunosuppression, he was haemodialysis-dependent (Cr 900, refractory volume overload) within 1 month.

4 days after starting dialysis, he developed massive haemoptysis & expectorated several litres of blood. Chest radiograph (CXR) was consistent with DAH.

Methods: He was intubated & ventilated for 5 days, & completed 7 sessions of plasma exchange with CXR improvements. He received 2 further doses of IV Cyclophosphamide (month 2 & 3).

1 month after the 3rd Cyclophosphamide dose he again developed DAH requiring intubation for 5 days. He completed a further 7 sessions of plasma exchange & received 2 doses of Rituximab (month 4 & 5 post-presentation).

1 month later he developed further small volume pulmonary haemorrhage. Mycophenolate mofetil 500mg bd was commenced alongside Prednisolone 5mg od. He remained dialysis-dependent but experienced no further pulmonary haemorrhage.

Immunosuppression-related complications included one episode of neutropaenia (1 month after his 3rd dose of Cyclophosphamide) & probable viral cardiomyopathy 24 months following presentation (fever & new onset severe LV dysfunction) which improved with conservative measures.

Results: He underwent live-related renal transplantation 27 months after his initial presentation. His day 7 biopsy showed no evidence of recurrent IgA nephropathy & at 6 months post-transplant he has no haematoproteinuria & stable graft function (Cr 100).

Conclusion: DAH is a rare association with IgA nephropathy. This case is unique in that the onset was post-dialysis-dependency, the DAH was severe & recurrent, & is the first time that Rituximab & MMF were used in its treatment.

Disclosure of Interest: None Declared

Keywords: IgA Nephropathy, MMF, Plasma exchange

Rare Renal Disorders

PO-235

Predictors of long term renal outcome in pregnant women with chronic kidney disease attending a combined regional renal obstetric service

J. Proudfoot-Jones [1,*], N. Sarween [2], R. Clements [1], M. Chakravorty [1], E. Knox [3], C. Day [2], G. Lipkin [2]

[1]College of Medical and Dental Sciences, University of Birmingham, [2]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, [3]Maternal Medicine, Birmingham Women's Hospital NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: CKD in pregnancy is associated with increased maternal and fetal morbidity.(1) However, understanding of the impact of pregnancy on long-term maternal renal function is limited.

Objectives: To perform a retrospective study exploring long term renal outcomes in a cohort of women with CKD who attended a regional combined renal obstetric clinic and identify independent predictors of CKD progression.

Methods: Hospital informatics data identified women who attended the renal obstetric clinic over 6 years (2010 to 2015 inclusive). Baseline demographic data, pre-pregnancy and current renal function (serum creatinine, eGFR(MDRD), albumin creatinine ratio (ACR) and form of renal replacement therapy) were identified from hospital records and Prescribing Information and Communications System (PICS). Logistic regression analysis was used to identify independent demographic and clinical predictors of ≥50% increase in creatinine and CKD stage shift.

Results: A total of 210 women with CKD, experiencing 246 pregnancies, were identified during the study period. Age at time of pregnancy ranged from 17-46 (mean and median=30.5) and 50% (n=122) were White ethnicity.

Follow-up data was available for 78% (n=192) of pregnancies at median 53 months (6-131). 88% (n=169) of the follow-up group had recorded pre-pregnancy baseline renal function. Median baseline creatinine was 82µmol/L (range 37-644) and ACR was 6.2µg/mg (range 0.2-1029.6). When split by CKD stage pre-pregnancy, 33.7% (n=57) were CKD stage 1, 29.6% (n=50) stage 2, 11.2% (n=19) stage 3a, 9.5% (n=16) stage 3b, 1.8% (n=3) stage 4 and 14.2% (n=24) stage 5. 2 pregnancies occurred in women on dialysis and 22 in women with functioning transplants.

Following pregnancy just under a third declined CKD stage or required renal replacement therapy (28.4%), with 7.1% declining more than one CKD stage, while most patients (71.6%) remained stable. 45% of women with pre-pregnancy stage 3a-4 showed disease progression compared to 27% of stage 1-2. 3.6% (n=6) women started dialysis post-pregnancy and 2 of 22 transplants failed.

Excluding women on dialysis, on multivariable analysis pre-pregnancy creatinine was found to be an independent predictor of ≥50% creatinine increase (OR 1.017 [1.002-1.033], p=0.022). Pre-pregnancy ACR (p=0.295), patient age (p=0.058) and ethnicity (p=0.240) were not. Of the CKD causes, primary glomerulonephropathy carried a particularly high risk for ≥50% creatinine increase (OR 4.167, p=0.075) although not reaching statistical significance. Excluding all CKD stage 5 women, who could not show further stage decline, pre-pregnancy creatinine was found to be an independent predictor of CKD stage shift (OR 1.017 [1.002-1.032], p=0.022). Pre-pregnancy ACR (p=0.620), age (p=0.511) and ethnicity (p=0.599) were not associated with decline in renal function.

Conclusion: Our data suggests that women with worse baseline renal function have increased rates of progression but earlier CKD stages are not risk free, in keeping with previous literature. In contrast, demographic characteristics appear not to be predictors of progression. Identification of high risk women allows targeting of pre-pregnancy counseling, close monitoring pre and post-pregnancy and may help inform guidelines. Future prospective studies are required to support these findings.

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Disclosure of Interest: None Declared

Keywords: CKD Progression, Pregnancy

Rare Renal Disorders
PO-236

to be fully supressed. A diagnosis of Type 4 RTA was made and treatment with fludrocortisone subsequently stabilised the patient's potassium.
Conclusion: Despite RTA 4 being a relatively common cause of refractory hyperkalaemia, this diagnosis was missed for a prolonged period of time and the patient's potassium was not controlled until treatment was initiated with fludrocortisone. This missed diagnosis may have been due to a perceived non-association between Alport's and RTA 4. This case adds to the evidence that RTA 4 may in fact be associated with Alport's syndrome and also highlights the importance of considering this diagnosis in patients with refractory hyperkalaemia.
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Disclosure of Interest: None Declared

Keywords: Alport, Renal tubular acidosis

Rare Renal Disorders

PO-237

Adenine phosphoribosyltransferase (APRT) Deficiency

M. Lowe [1,*], G. Lipkin [1]

[1]Renal Medicine, QUEEN ELIZABETH HOSPITAL BIRMINGHAM, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Adenine phosphoribosyltransferase deficiency is an under recognized, autosomal recessive disorder of adenine metabolism, leading to 2,8-dihydroxyadeninuria that causes nephrolithiasis and kidney failure in a significant proportion of untreated patients. Allopurinol, is used for the treatment of APRT deficiency, it effectively prevents 2,8-DHA crystalluria.

Objectives: To compare the differences in presentation of one disease to assist with better recognition and diagnosis of this rare but under-reported condition. Recent literature suggests lack of awareness and under-reporting of a disease that can lead to end stage renal failure and reoccur in transplant grafts.

Methods: Case 1 is of a 60 year old Asian male who was referred to be considered for kidney transplantation in 2010. The patient had a background of kidney stones and background of CKD of unknown cause. The patient reached end stage by November 2009 and was commenced on haemodialysis. There was no concerning travel history, no concerning medicines/drugs history but a family history of kidney stones. The patient was transplanted in November 2015, and proceeded to have delayed graft function. In March the patient found the patient to have APRT deficiency and was started on Allopurinol and then februxostat.

Case 2 is a 57 year old Caucasian female, who was referred from the GP, with unexplained deteriorating renal function. The patient had a recorded normal e-GFR of 63 ml/min, in February 2016. In May 2016, she presented at the GP for well women check, and had some mild symptoms of lethargy and nausea. Bloods were taken and it was found that her e-GFR had deteriorated to 15ml/min. There was no apparent acute illness or cause for this. There was no pertinent medical or medication history. Biospy showed severe ATN and oxalate crystals. By June, renal function continued to deteriorate. In July the patient was commenced on peritoneal dialysis. In August 2016, a positive result for APRT deficiency was made. Patient was commenced on Allopurinol. In November, patient was taken off diaysis therapy.

Results: Both cases have demonstrated oxalate and crystals on biopsy with negative testing for primary hyperoxaluria. Only case 1 had a stone history. Both cases had unknown causes for their renal dysfunction. Both patients were started on Allopurinol. Case one still requires renal replacement therapy, however case two is currently off diaylsis.

Conclusion: Early identification and diagnosis appears key to the treatment and reversibility of renal dysfunction. Prompt initiation of treatment in case 2 provided positive results and the patient is no longer dialysis dependant. Patients require higher doses of Allopurinol than usual accepted dose ranges in patients with compromised renal function.

When considering a patient for transplantation, it may be pertinent to consider further investigation if there is a stone history.

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Disclosure of Interest: None Declared

Keywords: None

Regenerative Medicine

PO-238

Transplantation of kidney precursor cells derived from human pluripotent stem cells

I. Bantounas [1,*], P. Ranjzad [1], F. Tengku [1], E. Silajdzic [1], D. Forster [1], M.-C. Asselin [1], R. Lennon [1], P. Lewis [1], A. Plagge [2], Q. Wang [1], A. Woolf [1], S. Kimber [1]

[1]FBMH, UNIVERSITY OF MANCHESTER, Manchester, [2]University of Liverpool, Liverpool, United Kingdom

Preferred Presentation Method: Oral

Introduction: Chronic kidney disease prevalence has increased by 30% in the last decade. Kidney transplants are in short supply and life expectancy on dialysis is less than that for many cancer patients. By combining human pluripotent stem cell (hPSC) technology with knowledge of kidney development, we envisage that regenerative medicine strategies will revolutionise our understanding of kidney disease and provide novel therapies for kidney failure.

Objectives: To determine differentiation potential of kidney precursors derived from hPSCs.

Methods: We followed cell fates *in vitro*, using both 2D and 3D/organ cultures, and after subcutaneous transplantation into *beige/severe combined immunodeficiency* mice.

Results: We used an *in vitro* differentiation-protocol (CHIR99021, a GSK-3α/β inhibitor, followed by FGF9) to reproducibly drive three wild-type hPSC lines to nephrogenic mesoderm (expressing *OSR1*, *WT1* & *PAX2*) and subsequently to metanephric mesenchyme/nephron (*WT1*, *SIX2* & *AQP1*) and ureteric bud/collecting duct (*HOXB7*, *GATA3*, *ECAD* & *AQP2*) lineages. Even starting in monolayer culture, cells underwent morphogenesis, forming primitive nephrons arranged around branching collecting ducts. These tissues, therefore, both molecularly and anatomically resembled normal kidneys from six week human embryos. When kidney precursor cells were grown in 3D, the organs that formed each comprised a cortex rich in glomeruli around a tubule rich medulla; although interstitial capillaries formed, glomeruli remained avascular. Next, we used lentiviruses to transduce hPSCs with a luciferase reporter gene and showed this did not perturb the cells' pluripotency nor their capacity to from mini-kidneys in culture. After transplantation into immunodeficient mice, labelled kidney progenitor cells survived and were readily detected in live animals using non-invasive imaging by their bioluminescence after administering luciferin substrate. Unlike undifferentiated hPSCs that formed teratomas containing ectodermal, mesodermal and endodermal derivatives, transplanted kidney precursor cells formed only mesodermal structures. These comprised both highly differentiated kidney tissues as well as immature renal mesenchyme and ducts, and occasional islands of cartilage. The most mature components comprised glomeruli with mature (alpha3) collagen IV in their glomerular basement membranes. Glomerular tufts contained WT1+ podocytes adjacent to PECAM+ capillary loops perfused with red cells. Bowman capsules were continuous with cubulin+ proximal tubules, and uromodulin+ loops of Henle and ECAD+ collecting ducts were also detected. The implanted origin of these epithelial and capillary derivatives was proven by their reactivity to anti-luciferase and anti-human specific mitochondial antibodies. Transplant rejection was absent up to three months, the limit of this study.

Conclusion: We generated kidneys from hPSCs, with a range of differentiation potentials that were highly context-dependent. Studies are now needed to optimise normal morphogenesis and test the physiological functions of these newly created human organs

Disclosure of Interest: I. Bantounas Conflict with: MRC, KRUK, Kidneys for Life, P. Ranjzad Conflict with: MRC, KRUK, Kidneys for Life, F. Tengku Conflict with: MRC, KRUK, Kidneys for Life, E. Silajdzic Conflict with: MRC, KRUK, Kidneys for Life, D. Forster Conflict with: MRC, KRUK, Kidneys for Life, M.-C. Asselin Conflict with: MRC, KRUK, Kidneys for Life, R. Lennon Conflict with: Wellcome Trust, MRC, P. Lewis Conflict with: MRC, KRUK, Kidneys for Life, A. Plagge Conflict with: MRC, Q. Wang Conflict with: MRC, KRUK, Kidneys for Life, A. Woolf Conflict with: MRC, KRUK, Kidneys for Life, S. Kimber Conflict with: MRC, KRUK, Kidneys for Life

Keywords: Development, Epithelium, Stem cell

Regenerative Medicine

PO-239

LRIG2, mutated in urofacial syndrome, mediates differentiation of bladder nerves in mice and humans

N. Roberts [1,*], E. Hilton [2], M. Randles [2], K. Chopra [2], R. Coletta [2], N. Gardiner [2], R. Henriksson [3], H. Hedman [4], S. Weber [5], H. Stuart [6], W. Newman [6], A. Woolf [6]

[1]School of Bioloigcal Sciences, [2]THE UNIVERSITY OF MANCHESTER, Manchester, United Kingdom, [3]Institutionen för strålningsvetenskaper, [4]Department of Radiation Sciences Oncology, Umeå University, Umeå, Sweden, [5]University of Marburg, Marburg, Germany, [6]Faculty of Biology, Medicine and Health , The University of Manchester, Manchester, United Kingdom

Preferred Presentation Method: Oral

Introduction: The LRIG (leucine-rich-repeats and immunoglobulin-like-domains) family comprises three plasma membrane proteins. The most studied is LRIG1, a tumour suppressor modulating receptor tyrosine kinase (RTK) signaling. We reported biallelic *LRIG2* mutations in a subset of people with urofacial syndrome (UFS), a congenital disease featuring functional bladder outlet obstruction and a grimace upon smiling. The molecular pathobiology underlying UFS bladder disease, and a potential role for *LRIG2* in other urinary tract diseases, is currently unclear.
Objectives: To understand the role of Lrig2 in the pathobiology of UFS using a knockout mouse model, and seek *LRIG2* mutations in non-syndromic urinary tract disease.
Methods: We defined the transcriptosome of *Lrig2* targeted mutant mice and sequenced *LRIG2* mutations in patients.
Results: In wild-type mice, we immunodetected LRIG2 in autonomic ganglia flanking the bladder outlet, from their embryonic inception as migrating neural crest to postnatal maturation. LRIG2 and heparanase 2 were immunodetected in axons and glial-like cells regenerating from explanted embryonic pelvic ganglia. The latter protein is encoded by *HPSE2* which is mutated in UFS patients lacking *LRIG2* mutations. *Lrig2* homozygous mutant mice displayed impaired bladder emptying, as evidenced by abberant urinary voiding in life and bladder distention at autopsy. RNAseq of *Lrig2* homozygous mutant neonatal bladders and associated pelvic ganglia revealed downregulation of *Sox10*, *Ascl1* and *Foxd3*, transcription factors implicated in neurogenesis. *Nos1* transcripts were also decreased and the encoded neuronal nitric oxide synthase, previously implicated in bladder voiding, was significantly depleted in mutant pelvic ganglia. Pathway analysis showed that global RNA changes were consistent with altered RTK signaling mediated by fibroblast and epidermal growth factors. Wholemount immunostaining for neural filaments revealed an increased density of nerves in the body of *Lrig2* mutant bladders. In two children with severe non-syndromic bladder disease and renal failure we identified homozygous missense *LRIG2* variants:Arg650Cys, likely to abolish a salt bridge, and Leu446Pro, likely to disturb S-S bonds. Conversely, we failed to detect overt pathogenic *LRIG2* variants in probands from 192 non-syndromic primary vesicoureteric reflux families.
Conclusion: LRIG2 mediates functional, molecular and anatomical differentiation of bladder nerves and *LRIG2* mutations occur in both syndromic (UFS) and rarely in non-syndromic bladder disease.

Disclosure of Interest: N. Roberts Conflict with: MRC, Newlife, NIHR, Kidney Research UK, E. Hilton Conflict with: MRC, Newlife, NIHR, Kidney Research UK, M. Randles Conflict with: MRC, Newlife, NIHR, Kidney Research UK, K. Chopra Conflict with: MRC, Newlife, NIHR, Kidney Research UK, R. Coletta Conflict with: MRC, Newlife, NIHR, Kidney Research UK, N. Gardiner Conflict with: MRC, Newlife, NIHR, Kidney Research UK, R. Henriksson Conflict with: MRC, Newlife, NIHR, Kidney Research UK, H. Hedman Conflict with: MRC, Newlife, NIHR, Kidney Research UK, S. Weber Conflict with: MRC, Newlife, NIHR, Kidney Research UK, H. Stuart Conflict with: MRC, Newlife, NIHR, Kidney Research UK, W. Newman Conflict with: MRC, Newlife, NIHR, Kidney Research UK, A. Woolf Conflict with: MRC, Newlife, NIHR, Kidney Research UK

Keywords: Animal model, Genomics, Proteomics

Regenerative Medicine

PO-240

Evaluating the therapeutic potential of human kidney-derived cells in the acute and chronic stages of adriamycin-induced kidney injury

L. Scarfe [1,*], I. Santeramo [1], J. Sharkey [1], A. Taylor [1], P. Murray [1], B. Wilm [1]

[1]Cellular and Molecular Physiology, UNIVERSITY OF LIVERPOOL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The efficacy of cell therapies in pre-clinical disease models is commonly tested by administering the cells shortly after injury induction. This experimental design fails to accurately recapitulate the clinical scenario for chronic kidney disease (CKD), where the disease is already well established in patients before a therapy can be undertaken.

Objectives: To more accurately replicate the clinical situation, we tested the therapeutic potential of human kidney-derived cells (hKCs) administered in a mouse model of CKD after overt proteinuria had been established (chronic study, CS), and compared this to early administration of cell therapy (acute study, AS).

Methods: Adriamycin (ADR) nephropathy (6.3mg/kg; IV) was induced in female BALB/c SCID mice age 6-7 weeks. $7.5x10^5$ $ZsGreen^+/Luciferase^+$ hKCs were administered IV on days 1 and 5 (AS) or 15 (CS). Control mice received saline. Kidney function was monitored by urinary albumin (both studies) and transcutaneous assessment of FITC-sinistrin clearance (CS only), and cell biodistribution was tracked *in vivo* by bioluminescence imaging (BLI). Mice were culled on day 11 (AS) or week 6 (CS), and organs imaged *ex vivo*. Histological analysis of glomerular injury was performed on picro-sirius red-stained sections.

Results: When administered on day 1 after ADR, hKC therapy resulted in a decrease in urinary albumin levels at day 10 when compared with controls. However, control mice showed considerable variability in urinary albumin levels, affecting statements of significance. The expression of the stem cell marker CD133 on hKCs was not relevant for the efficacy of hKCs. Histological changes were not evident by light microscopy at this time point. When administered on day 15 when overt proteinuria had been established, hKC therapy had no effect on kidney function as assessed by urinary albumin, FITC-sinistrin clearance, or histological evaluation of glomerulosclerosis, when compared to control mice. Both studies revealed that hKCs became trapped in the lungs after IV administration, where they subsequently died, and failed to migrate to the kidneys at any time point.

Conclusion: hKC therapy had a beneficial effect on kidney function when administered early, before the onset of significant changes in kidney function, but not when administered late, after kidney disease was established. Efficacy of hKC therapy was likely due to paracrine effects since the cells never reached the kidneys.

Disclosure of Interest: None Declared

Keywords: None

Regenerative Medicine

PO-241

Developing and Characterising an Ischaemia Reperfusion Injury Model of Acute Kidney Injury

L. Beeken [1,*], L. Scarfe [2], L. Ressel [3], P. Murray [3], B. Wilm [1]

[1]Department of Cellular and Molecular Physiology, University of Liverpool, [2]Department of Cellular and Molecular Physiology, Institute of Translational Medicine, [3]Department of Veterinary Science, University of Liverpool, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute kidney injury (AKI) occurs in many hospitalised patients and can lead to end-stage kidney disease. Specifically, ischaemic AKI is frequently associated with cardiopulmonary bypass surgery and kidney transplantation. Regenerative medicine therapies (RMTs) may have the potential to limit ischaemia-induced damage, but thorough safety and efficacy evaluation must be carried out in preclinical models prior to their clinical translation. A well-characterised model of renal ischaemia reperfusion injury (IRI) is therefore essential for the assessment of RMTs in ischaemic AKI.

Objectives: We aimed to develop a mouse model of ischaemia-reperfusion induced AKI, to and characterise the injury levels using transcutaneous measurements of FITC-sinistrin clearance, histopathology, and tissue and serum biomarkers.

Methods: Ischaemic injury was induced in male BALB/c mice by unilateral clamping of the renal pedicle, with contralateral nephrectomy. Kidney function was assessed *in vivo* by transcutaneous assessment of FITC-sinistrin clearance at baseline and days 1, 2, and 4 after surgery. Mice were culled on day 4, and blood was collected for blood urea nitrogen (BUN) and serum creatinine (SCr) measurements. Tubular injury was scored on periodic acid-schiff-stained kidney sections, and megalin and Ki67 expression were assessed by immunofluorescence on kidney sections.

Results: A clamp time of 34 min produced high levels of renal injury with minimal mortality. FITC-sinistrin clearance was severely delayed one day after surgery, indicating impaired kidney function. Clearance then improved on days 2 and 4, returning towards baseline levels, while in sham-operated mice clearance was minimally changed throughout all time points. Tubular injury scores, and expression of tubular megalin and Ki67 were all significantly elevated in injured mice. BUN and SCr levels were higher in injured mice, but only significantly so for BUN. We observed strong correlation of histopathology scoring with FITC-sinistrin clearance data, and megalin and Ki67 expression levels.

Conclusion: We established a model for renal IRI and confirmed AKI onset and progression using FITC-sinistrin clearance, histology and expression of injury markers. In future RMT safety and efficacy studies, these tools will allow assessment of the pathophysiology of IRI and provide insight into possible repair mechanisms.

Disclosure of Interest: None Declared

Keywords: None

Regenerative Medicine

PO-242

Tracking the biodistribution and fate of kidney-derived stem cells over different time scales using genetic reporters and imaging probes in combination with a multi-modal imaging strategy.

J. Zeguer [1], J. Comenge [2], J. Sharkey [3], B. Wilm [1], R. Levy [2], P. Murray [3], A. Plagge [1,*]

[1]Cellular and Molecular Physiology, [2]Institute of Integrative Biology, [3]Centre for Preclinical Imaging, UNIVERSITY OF LIVERPOOL, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: To assess the safety of stem cell-based regenerative medicine therapies (RMTs) it is essential to track the distribution and fate of administered cells. This requires novel imaging strategies that permit whole-body and intra-renal distribution to be monitored over the short and long-term.

Objectives: To facilitate this we have developed a bi-cistronic vector comprising luciferase and a near infrared fluorescent protein (iRFP720) for long-term tracking, along with novel imaging probes (gold nanorods, GNRs) for short-term tracking, so that cells can be monitored in vivo over different time scales using bioluminescence imaging (BLI) (for whole body distribution) and multispectral optoacoustic tomography (MSOT) (for organ-focussed imaging).

Methods: Bi-cistronic lentivirus vectors were developed to express iRFP720 and firefly luciferase (Luc) in mouse kidney-derived stem cells (mKSCs) and mesenchymal stromal cells (MSCs). Additionally, silica coated gold nanorods (GNRs) with intense and tuneable near-infrared absorption were developed as sensitive photoacoustic reporters. Labelled cells were administered to mice for BLI and MSOT imaging.

Results: Bi-cistronic expression of iRFP720 and the second reporter gene Luc from the constitutive EF1α promoter was achieved via an internal ribosome entry site (IRES) or an E2A element. When comparing the expression efficiency of the 2nd reporter gene after IRES and E2A vector transfections into mKSCs, we found a 5-fold higher level of Luc activity produced from the E2A vector. iRFP+ Luc+ mKSCs were then labelled with GNRs and administered into the left cardiac ventricle under ultrasound guidance. Biodistribution was monitored using BLI (luciferase) and MSOT (GNRs and iRFP). The unique photoacoustic signal of GNRs enabled the detection of small clusters of cells. Thus, initial biodistribution of cells after intracardiac injection was assessed with a spatial resolution not achievable with BLI. We observed a broad distribution of cells with some accumulation in kidneys followed by clearance over subsequent days. We were also able to monitor cell viability and detect any potential tumour formation thanks to the expression of luciferase and iRFP720. The advantage of the bi-cistronic reporter vector is that it enabled the early stage tumours to be detected with both BLI (Luc) and MSOT (iRFP), the latter modality allowing the tumours to be precisely localised with great anatomical resolution (150 µm).

Conclusion: The superior photoacoustic contrast of GNRs enabled the monitoring of initial cell distribution with great sensitivity and resolution, luciferase and iRFP720 expression provided evidence of cell viability, whilst iRFP720 additionally allowed spatial detection of early stage tumours. Thus, the combination of reporter gene and GNR labelling techniques is an efficient strategy to monitor cell fate from initial biodistribution to detection of early stage tumours with great anatomical resolution.

Disclosure of Interest: None Declared

Keywords: Animal model, Imaging, Stem cell

Regenerative Medicine

PO-243

Bioluminescence imaging reveals preferential homing of macrophages, but not mesenchymal stem/stromal cells (MSCs) to an injured kidney over a healthy kidney in the same animal

L. Scarfe [1,*], J. Sharkey [1], A. Taylor [1], P. Murray [1], B. Wilm [1]

[1]Cellular and Molecular Physiology, UNIVERSITY OF LIVERPOOL, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Cell tracking is a key component of the assessment of regenerative medicine therapies, and can provide valuable insights into the mechanism of action of a therapy. Using imaging technologies to track labelled cells *in vivo*, we can assess the temporal dynamics of cell biodistribution, and determine whether it is necessary for cells to be physically present in the organ of interest to have a beneficial effect.

Objectives: To use bioluminescence imaging (BLI) to track cells *in vivo* and determine whether cells home preferentially to an injured kidney over a healthy kidney.

Methods: Unilateral ischemia/reperfusion injury was induced in male BALB/c mice by clamping the renal pedicle of one kidney for 40 minutes. 24h after reperfusion, mice received $1x10^6$ $ZsGreen^+/Luciferase^+$ mouse mesenchymal stem cells (MSCs) by intracardiac (IC) injection, or $1x10^7$ $ZsGreen^+/Luciferase^+$ RAW macrophages (Mϕ) by intravenous (IV) administration. BLI was performed to track the cells *in vivo* at 0h, 4h and 24h. BLI signals were quantified by drawing regions of interest (ROIs) around the approximate location of the kidneys (*in vivo*) or around the individual organs (*ex vivo*). Following BLI at 24h, mice were sacrificed and organs imaged *ex vivo*. Data from healthy and injured kidneys were compared with a paired t-test.

Results: Mϕ were located in the lungs at 0h. By 4h, some bioluminescence signals could be detected in regions corresponding to the kidneys, and by 24h signals had spread through the abdomen, likely to the kidneys, liver, and spleen. *Ex vivo* analysis of organs revealed that there was 3.14 times more signal in the injured than in the healthy kidney ($p=0.001$). MSCs showed a typical whole-body distribution immediately following IC administration, and at 24h appeared to persist in the kidneys for longer than in other organs. BLI image analysis *ex vivo* showed that there was 1.88 times more signal in the injured than in the healthy kidney, but this difference was not statistically significant ($p=0.078$). For both groups, *in vivo* quantification of luminescence intensity in the healthy and injured kidney were complicated by the close proximity of signals coming from the liver and spleen.

Conclusion: While IV-administered Mϕ home preferentially to an injured kidney over a healthy kidney in the same animal, IC-injected MSCs failed to display such a clear propensity. Although there was a slight tendency for MSCs to preferentially localise to the injured kidney, there was no significant difference in luminescence intensity between the injured and uninjured kidneys. This suggests that unlike macrophages, MSCs may not 'home' to injured kidneys in this model.

Disclosure of Interest: None Declared

Keywords: Animal model, Imaging, Macrophage

Rehabilitation & Exercise

PO-244

Peak aerobic capacity estimated from incremental shuttle walking test in non-dialysis CKD

S. Xenophontos [1,*], D. W. Gould [1], T. J. Wilkinson [1], E. L. Watson [1], J. L. Viana [2], A. C. Smith [1]

[1]Leicester Kidney Exercise Team, Department of Infection, Immunity and Inflammation, University of Leicester and John Walls Renal Unit, University Hospitals of Leicester, Leicester, United Kingdom, [2]Research Center in Sports Sciences, Health Sciences and Human Development, CIDESD, University Institute of Maia, ISMAI, Maia, Portugal

Preferred Presentation Method: Oral or Poster

Introduction: Low cardiorespiratory fitness is a greater indicator of all-cause mortality than any other traditional risk factor. Peak oxygen uptake (VO_{2peak}) represents the cardiovascular system's ability to take up, distribute and utilise oxygen during increased metabolic demand. Therefore VO_{2peak} is a good indicator of cardiovascular health and aerobic capacity, and can be used to prescribe suitable rehabilitation programmes. The gold standard measurement of VO_{2peak} is analysis of expired air during an incremental cardiopulmonary exercise test (CPET); however, such tests require specialist skills and equipment, and are poorly tolerated by some subjects. The incremental shuttle walking test (ISWT) is a simple field test of exercise capacity and has been used as a surrogate measure of VO_{2peak} in clinical populations, but it has never been validated in CKD.

Objectives: We aimed to develop a predictive equation to estimate VO_{2peak} ($ml.min^{-1}.kg^{-1}$) as measured by CPET from distance walked (DW) during an ISWT in non-dialysis CKD.

Methods: 36 patients with established CKD (17 male, mean age 61 (27–80) years, eGFR 25 (9–41) $ml.min^{-1}.1.73m^{-2}$, body mass 85 (42-116) kg, BMI 30 (18-41) kg/m^2) took part. After separate familiarisation sessions, all participants completed a CPET on a cycle ergometer and an ISWT, no more than a week apart. VO_{2peak} was measured over a rolling 20-second average using breath-by-breath measurement of O_2 consumption. The ISWT involved walking around 2 cones, placed 9 metres apart. The test was maximal and progressive and stopped when patients could no longer keep pace with an auditory tone. Results were reported as DW in metres.

Results: Simple linear regression revealed that DW during the ISWT was a significant contributor to the prediction of VO_{2peak} ($r^2 = 0.55$) eliciting the following equation: VO_{2peak} ($ml.min^{-1}.kg^{-1}$) = (0.0216 x DW) + 10.66. Wilcoxon analysis revealed no significant ($p = 0.660$) difference between VO_{2peak} measured by CPET (19.89 ± 5.45 $ml.min^{-1}.kg^{-1}$) and estimated VO_{2peak} (19.87 ± 4.03 $ml.min^{-1}.kg^{-1}$) using the formula. Bland and Altman analysis revealed good agreement between methods with a mean difference of 0.01 $ml.min^{-1}.kg^{-1}$ (95% CI 7.299- -7.263).

Conclusion: Our results show minimal differences between VO_{2peak} measured by CPET and estimated by DW during the ISWT. Therefore, the ISWT is a valid means to estimate VO_{2peak} in a non-dialysis population and can be used as a simple, cost effective means to assess aerobic capacity.

Disclosure of Interest: None Declared

Keywords: CKD, Exercise

Rehabilitation & Exercise

PO-245

Poor exercise capacity in non-dialysis chronic kidney disease is associated with rapid skeletal muscle oxygen desaturation and slow muscle re-oxygenation

A. White [1,*], T. O'Sullivan [1], D. Gould [1], E. Watson [1], A. Smith [1], T. Wilkinson [1]

[1]LEICESTER KIDNEY EXERCISE TEAM, UNIVERSITY OF LEICESTER, Leicester, United Kingdom

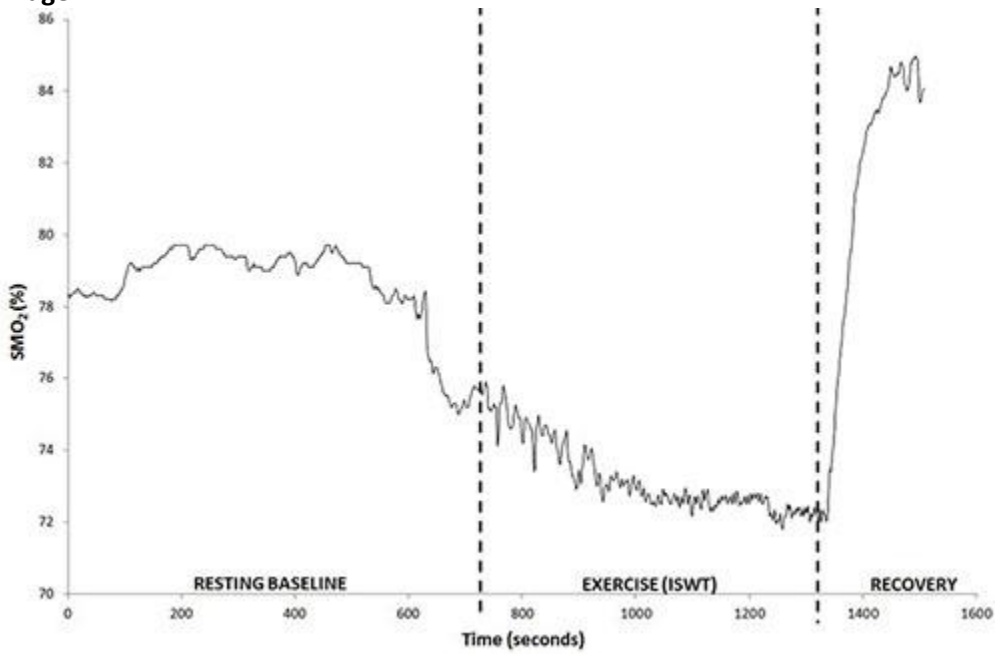
Preferred Presentation Method: Oral or Poster

Introduction: Chronic kidney disease (CKD) is associated with a reduction in exercise capacity and an increase in exertional fatigue. Possible mechanisms include inflammation, muscle wasting, anaemia, and changes to supply/utilisation of oxygen (O_2) in the skeletal muscle (SM). Oxyhaemoglobin and oxymyoglobin within SM capillaries can be determined by transcutaneous near-infrared spectroscopy (NIRS).

Objectives: In this study we explored SM oxygenation during incremental exercise in non-dialysis CKD.

Methods: 11 non-anaemic CKD patients (5 females, mean age: 55 ±16 yrs, eGFR: 62±21 ml/min/1.73m^2, BMI: 27±6 kg/m^2, VO_2 peak: 23±4 ml/min/kg) were tested. Patients wore a NIRS device (BSXInsight) at the widest point of the gastro-soleus complex in line with the Achilles tendon on the dominant leg. Muscle O_2 saturation (mO_2sat) was continuously measured every second. An averaged 3min baseline recording was acquired at rest in a seated upright position, before patients completed the Incremental Shuttle Walk Test (ISWT) to estimate VO_2 peak. Upon finishing the ISWT, patients were immediately rested and a 3min post value obtained. Statistical analysis was performed by linear regression and Pearsons correlation. Results shown as mean ± standard deviation.

Image:



Results: During the ISWT, mO_2sat decreased from a 3min baseline mO_2sat (72±5%) to a minimum value (63±8%): this was calculated as a percentage change from baseline (12±6%). The time to reach this minimum value differed widely between patients (435±135 sec, range: 125-633). Regression analysis showed the number of seconds to reach minimum saturation was a strong predictor of VO_2 peak (β= .910, p= <.001, R^2= .810). Upon completion of the ISWT mO_2sat sharply increased, with recovery to baseline mO_2sat ranging between 22-244 seconds (83±70 sec). Time to recovery

correlated with VO_2 peak (*r*= -.742, p= .014) and baseline mO_2sat (r= -.680, p= .03). The figure shows mO_2sat kinetics in a typical patient.
Conclusion: Patients with a lower VO_2 peak displayed a more rapid drop in mO_2sat and slower recovery to baseline mO_2sat following exercise. Consequently the faster utilisation of SM O_2 and slower re-oxygenation may possibly be attributed to the reduced number and oxidative phosphorylation function of SM mitochondria. This may result in lactic acidosis and inhibited SM contractibility. Our results reveal a possible mechanism for reduced exercise capacity and increased exertional fatigue, which are known to be associated with poor outcome in CKD.

Disclosure of Interest: None Declared

Keywords: CKD, Exercise

Rehabilitation & Exercise

PO-246

SELF-PERCEIVED BENEFITS AND BARRIERS OF EXERCISE IN UNIT-BASED MAINTENANCE HAEMODIALYSIS PATIENTS IN THE UK AND CHINA

Y. Song [1,*], P. J. Highton [2], A. L. Clarke [1], X. Wang [3], W. Liang [3], X. Chen [3], Y. Guo [4], J. O. Burton [1], A. C. Smith [1]

[1]LEICESTER KIDNEY EXERCISE TEAM, UNIVERSITY OF LEICESTER, Leicester, [2]SSEHS, Loughborough University, Loughborough, United Kingdom, [3]Affiliated Hospital of Nantong University, [4]Nantong University, Nantong, China

Preferred Presentation Method: Oral or Poster

Introduction: Regular exercise is recommended for dialysis patients to optimize health, physical function and quality of life, but the majority of HD patients lead very sedentary lives. To design realistic, effective and person-centred interventions to promote exercise behaviour, a thorough understanding of attitudes and habits is required. Lifestyle perspectives and choices may be influenced by ethnicity and culture.

Objectives: The aim of this study was to explore self-perceived benefits and barriers of exercise in HD patients from the UK and China using the Dialysis Patient-perceived Exercise Benefits and Barriers Scale (DPEBBS) which is validated in both English and Chinese. The DPEBBS consists of 24 statements categorized into 12 'benefits' and 12 'barriers' of exercise, with answers presented on a 4-point Likert-type scale.

Methods: The DPEBBS was administered to 759 patients at UK and Chinese HD units (UK : n=257; M:F 1.9:1; median (IQR) age 65 (21) years. China: n=502; M:F 1.4:1; age 52(19) years.

Results: Both UK and Chinese patients recognised significantly more exercise benefits than barriers (mean±SD % participants reporting each benefit/barrier: UK - benefits 73±10 vs barriers 43±19, China - benefits 74±14 vs barriers 44±15, both $p<0.001$). There were no differences between the groups in the % participants reporting any of the individual exercise benefits ($Z=0.406$, $P=0.685$). Improving physical function, body composition, mood and quality of life were all highly-rated motivating factors. However, UK HD patients reported significantly more exercise barriers than Chinese patients ($Z=2.398$, $P=0.016$). The most commonly reported barriers in both populations were predominantly physical: tiredness, muscle fatigue and pain. However, more UK HD patients were concerned about falling and thought that comorbidities limited their ability to exercise, while more Chinese patients reported a lack of knowledge about how to carry out suitable exercise.

Conclusion: Both cohorts recognized a range of potential exercise benefits, suggesting openness to an appropriate exercise behaviour change intervention. UK HD patients reported more exercise barriers than the Chinese HD cohort, which may be cultural or related to the different age profile and the number and types of comorbidities in the two populations. The findings indicate that an exercise behaviour intervention for HD should focus on enhancing physical and functional self-efficacy, including management of the risk of falling. Setting goals relating to physical and psychosocial parameters and self-monitoring to recognise improvements may be important to elicit and sustain behaviour change. For Chinese HD patients in particular, education to enhance knowledge and reinforce confidence may promote exercise uptake and adherence.

Disclosure of Interest: None Declared

Keywords: Communication techniques, Dialysis, Physical exercise

Rehabilitation & Exercise

PO-247

Comparison of resting energy expenditure equations in haemodialysis patients and body composition measured by dual energy X ray absorptiometry (DXA).

R. Hung [1,*], S. Sridharan [2], K. Farrington [2], A. Davenport [1]

[1]Royal Free Hospital NHS Foundation Trust, London, [2]Renal Unit, Lister Hospital, Stevenage, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Waste products of metabolism accumulate in patients with chronic kidney disease, and require clearance by haemodialysis (HD). Total energy expenditure (TEE) depends upon both resting energy expenditure (REE) and activity associated energy expenditure (AEE). There are a number of equations that have been developed over the years to estimate REE, with a few equations specifically designed for use in CKD patients. However, to date there is no validation of these equations.

Objectives: We therefore wished to compare a recently developed equation with other equations estimating REE, in a cohort of HD patients with corresponding body composition measured by dual energy X-ray absorptiometry (DXA).

Methods: Adult CKD patients under the care of the Royal Free Hospital treated by HD were recruited when attending for routine outpatient dialysis treatments. We determined REE by recently validated equations (CKD equation)[1] and compared REE with that estimated by standard equations for REE, and TEE calculated from patient reported physical activity, in HD patients with corresponding body composition measured by dual energy X-ray absorptiometry (DXA) scanning. Statistical analysis was students' t tests, or Mann Whitney U test, Annova, or Kruskal Wallis test , with appropriate post hoc correction for multiple testing, Pearson or Spearman's correlation.

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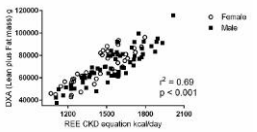

Results: We studied 107 patients, 69 male (64.5%), mean age 62.7±15.1 years. The CKD equation REE was 1498±274 kcal/day and TEE 1720 ±201 kcal/day.There was a strong association between REE with body surface area (BSA) (r^2 =0.80), total soft lean and fat lean tissue mass (r^2 =0.69), body mass index (BMI) (r^2 =0.34), all p<0.001.REE estimated using the modified Harris Benedict[2], Mifflin St Joer [3], Katch McArdle[4] , Bernstein[5] and Robertson equations[6] underestimated REE compared to the CKD equation.TEE was more strongly associated with BSA (r^2= 0.51), appendicular muscle mass (r^2= 0.42), than BMI (r^2=0.15) all p<0.001. TEE was greater for those employed (2167 ±222 vs 1716 ±256 kcal/day, p<0.001), and with no co-morbidity (1832 ±306 vs 1708 ±255 kcal/day, p<0.05).

Conclusion: Standard equations underestimate REE in HD patients compared to the CKD equation. TEE was greater in those with more skeletal muscle mass, in those in employment and in those with the least co-morbidity. More metabolically active patients may well require greater dialytic clearances.

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Disclosure of Interest: None Declared

Keywords: Exercise, Haemodialysis, Nutrition

Rehabilitation & Exercise

PO-248

Acidosis does not increase protein degradation in cultured skeletal muscle cells from human patients with CKD

D. W. Gould [1], A. C. Smith [1], E. Watson [1,*]

[1]Infection, Immunity and Inflammation, Leicester Kidney Exercise Team, UNIVERSITY OF LEICESTER, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with advanced Chronic Kidney Disease (CKD) experience significant muscle wasting that negatively impacts upon quality of life, morbidity and mortality, but the causes of this muscle wasting are poorly understood. Previous studies have shown that acidosis may play a role by increasing protein degradation (PD) rates that over time result in muscle loss and is a commonly cited contributing factor to muscle wasting in CKD. However, this effect has not been studied directly in the skeletal muscle of human CKD patients. Therefore we investigated the effect of pH7.1 (acidic conditions) compared to pH7.4 (physiological conditions) on PD rates in primary skeletal muscle cells from patients with CKD not yet requiring dialysis.

Objectives: To investigate the effect of pH7.1 (acidic conditions) compared to pH7.4 (physiological conditions) on PD rates in primary skeletal muscle cells from patients with CKD not yet requiring dialysis.

Methods: Vastus lateralis muscle biopsies were collected from 4 CKD patients (mean eGFR 23, range 14-29ml/min/1.73m^2; mean age 57, range 42-68 years). Muscle tissue was homogenised and satellite cells isolated and grown to confluence in HamsF10 medium with 20% serum. Experiments were carried out in MEM with 2% serum. To study protein degradation primary cultures were first prelabelled with 2uci/mL ^{3}H-L-Phe for 72h and then incubated with respective test media also containing unlabelled Phe. The effectiveness of MG132 (proteasome inhibitor) to block protein degradation in these samples was also investigated. Rates of PD were measured from the release of ^{3}H into the medium at 9h, 24h and 48h and are expressed as $\log_{10}$ of the % of initial cellular ^{3}H.

Results: There were no differences in the rates of PD after incubation in pH 7.4 (7.3±2.0 $\log_{10}$% / h x10^3) compared to pH 7.1 (5.6±1.4 $\log_{10}$% / h x10^3; P=0.09). The addition of MG132 at pH 7.4 significantly reduced PD rates to 3.4±1.9 $\log_{10}$% / h x10^3 (P<0.001), a reduction of 47%.

Conclusion: These preliminary results suggest that in human primary muscle cells from CKD patients, acidosis does not increase the rate of muscle PD and they may actually show a slight trend for acidosis to reduce protein degradation. This is in contradiction with previous studies that have been carried out using animal models and the L6 cell line which have shown that acidosis is catabolic and induces PD. This may reflect an adaptation of the patients to long-term acidosis exposure, or more simply a species variation. More experimentation is require to confirm these results and the addition of a healthy control group.

Disclosure of Interest: None Declared

Keywords: Acid-base, CKD

Rehabilitation & Exercise

PO-249

The Influence of Acute Aerobic Exercise on Microparticle Phenotype Counts in Renal Transplant Recipients

P. J. Highton [1,*], N. Martin [2], N. C. Bishop [1], A. C. Smith [3]

[1]School of Sport, Exercise and Health Sciences, LOUGHBOROUGH UNIVERSITY, [2]School of Allied Health Sciences, De Montfort University, [3]Leicester Kidney Exercise Team, University of Leicester, Leicester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Chronic kidney disease patients display elevated microparticle (MP) counts, which may promote thrombosis and enhance cardiovascular (CV) risk. Whilst renal transplant recipients (RTRs) display a reduction in circulating MPs after transplantation, they may still be elevated compared to the general population. Regular aerobic exercise has many health benefits, but each acute bout involves episodes of intravascular shear stress which may stimulate MP generation. Guidelines for safe and effective exercise for the RTR population are lacking.

Objectives: In this study, we investigated the impact of acute exercise on MP phenotype counts in RTRs.

Methods: 15 RTRs (13 male; age 53±15 years) and 12 Healthy Controls (HC; 8 male; age 50±19 years) completed 20 mins of continuous shuttle walking at 85% VO_2peak defined at a previous visit. Blood samples were obtained before (BL), immediately after (PE) and 1 hour after (1hPE) this standardised walk. MP phenotypes were analysed by flow cytometry.

Results: Flow cytometry results are expressed as mean±SEM count $x10^8$/L. Platelet ($CD42b^+$) MP counts were higher in RTRs than HCs at BL (1.49±0.19 vs 0.88 ±0.11, p=.013) and PE (1.15±0.16 vs 0.70±0.10, p=.023) but not 1hPE. Exercise elicited a significant decrease in platelet MP counts in both groups from BL to PE (1.22±0.13 vs 0.95±0.11, p=.004), which remained significant at 1hPE (0.90±0.10, p=.047). Neutrophil-derived ($CD66b^+$), monocyte-derived ($CD14^+$) and endothelial cell-derived ($CD144^+$) MP counts were higher in RTRs than HCs at all time-points ($CD66b^+$: 1.03±0.13 vs 0.52±0.10, p≤.009; $CD14^+$: 1.17±0.13 vs 0.63±0.10, p≤.007; $CD144^+$: 0.99±0.19 vs 0.37±0.08, p≤.005) but were unaffected by exercise.

Conclusion: MP counts of several phenotypes were elevated in RTRs compared to HCs which may increase susceptibility to CVD via stimulation of thrombosis, endothelial dysfunction and vascular calcification. An acute bout of moderate intensity aerobic exercise elicited a reduction in platelet-derived MPs, but had no effect on other MP phenotypes. Therefore, moderate exercise does not appear to be associated with undesirable MP generation in RTRs. Platelet MPs express high levels of tissue factor and are pro-thrombotic, so the exercise-induced reduction may be beneficially anti-thrombotic. Furthermore, repeated bouts of acute aerobic exercise may lead to a persistent reduction in platelet-derived MPs and thereby reduce CV risk.

Disclosure of Interest: None Declared

Keywords: Cardiovascular Disease, Exercise, Transplant immunology

Renal Physiology

PO-250

Tissue sodium distribution in relation to hydration status in advanced chronic kidney disease

N. Mitsides [1,*], D. McHugh [2], J. Alderdice [1], A. Swiecicka [1], P. Brenchley [1], G. Parker [2], S. Mitra [1]

[1]Manchester Academic Health Science Centre, Manchester, United Kingdom, [2]Centre of Imaging Science, University of Manchester , Manchester Academic Health Science Centre, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Body sodium (Na) excess is an important determinant of cardiovascular risk in chronic kidney disease (CKD). Its effect is presumed to be mediated, predominantly, through extracellular fluid volume (ECW) expansion. ECW expansion in overhydration (OH) is traditionally considered to maintain an isotonic environment. However, the relative proportions of water and Na distribution in hydrated tissue compartments is unclear in CKD.

Objectives: This study aims to quantify tissue Na concentration in relation to hydration states in advanced CKD and control subjects.

Methods: The relationship of tissue Na concentrations to hydration was investigated using a 3T MRI scanner and a dual-tuned $^{1}H/^{23}Na$ coil. We acquired Na MR images of the lower legs of 7 healthy volunteers (HV) & 10 CKD 5 patients (eGFR<15 ml/min, not yet on dialysis). The Na concentrations in the muscle & subcutaneous (SC) tissue were derived using calibration saline phantoms placed under the leg. The method CV was 14±7.5%, mean inter-reader variation was 0.62±3.1mmol/L (muscle) & 2.36±4.2mmol/L (SC). Participants underwent simultaneous assessment of their hydration status using multifrequency bioimpedance (BCM, Fresenius, Germany) to measure Total Body Water (TBW), ECW, Intracellular Water (ICW), OH index and ECW/ICW ratio. Salt balance was calculated using 3 day food diary and 24 hr urine Na measurements.

Results: The 2 study cohort did not vary significantly in age (HV: 47.9±14.0yr; CKD: 55.1±10.6yr; p=0.24) and sex (HV: 43% male; CKD: 60% male; p=0.49) but the CKD cohort had significantly higher comorbidity (Charlson Comorbidity Index: HV 1.0 vs CKD 3.5; p=0.02). Mean Na intake was 100.4±45.8mmol/24hr for CKD and 113.1±46.9mmol/24hr for HV (p=0.62) while urine Na excretion was 115.4±57.3 and 185.8±181.6 mmol/24hr respectively (p=0.32). Median net Na balance was 7.9 mmol/24hr (range -152.1- 48.6) for CKD and 14.1 mmol/24hr (range -364.2-56.2) for HV (p=0.78).

ECW (r=0.617, p=0.01), TBW (r=0.493, p=0.04) and OH index (r=0.666, p<0.01) correlated strongly with measured SC tissue Na concentration in all subjects. ECW/ICW showed a strong association with muscle Na concentration (r=0.761, p<0.01). The MR derived muscle Na concentrations were not different between the 2 groups (CKD 24.6±3.1mmol/L; HV 22.8±2.7mmo/L, p=0.23). However, CKD participants had higher SC Na concentration than HV (CKD 24.8±7.0mmol/L; HV 17.8±1.9mmol/L, p=0.01).

Conclusion: Advanced CKD is associated with higher SC Na accumulation. The direct relationship of higher MR derived SC Na concentrations with bioimpedance derived volumes indicate that Na accumulation may not always be in an isotonic state. Muscle Na concentrations also seem to be determined by changes in body composition or ECW/ICW ratio. These findings suggest that salt distribution in body tissues may be governed by factors other than osmotic shifts.

Disclosure of Interest: None Declared

Keywords: Bioimpedance, Sodium, Volume status

Renal Physiology

PO-251

The role of Ankyrin repeat and Single KH Domain-1 (ANKHD1) protein in kidney disease

M. Fragiadaki [1,*], M. Zeidler [2]

[1]Dept of Infection, Immunity and Cardiovascular Disease, [2]Department of Biomedical Science, UNIVERSITY OF SHEFFIELD, Sheffield, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Irrespective of the primary cause, chronic kidney disease is characterized by the development and progression of renal tubulo-interstitial fibrosis (TIF), associated with loss of tubules and associated capillaries leading to end-stage renal disease. Several signalling pathways contribute to TIF, including the evolutionarily-conserved Janus Kinase and Signal Transducers and Activators of Transcription (JAK-STAT) and growth controlling HIPPO/YAP pathways. A protein called ankyrin repeat and Single KH domain protein 1 (ANKHD1) has previously been shown to regulate both the JAK-STAT and HIPPO/YAP pathways in *Drosophila*, but its role in the mammalian kidney is currently unknown.

Objectives: We aim to understand where and when ANKHD1 is expressed in kidneys and how its dysregulation may contribute to renal disease.

Methods: Expression of ANKHD1 in mouse and human kidney tissues was assessed by immunohistochemistry. The function of ANKHD1 was studied by siRNA-based silencing in cultured proximal tubular epithelial cells (PTEC). JAK-STAT activity was measured by Western blotting using antibodies that recognize phosphorylated STAT3 and by qPCR analysis of target genes. Cell proliferation was assessed by staining of PCNA and apoptosis was determined by measurement of cleaved caspase-3.

Results: Immunohistochemical staining of kidney tissues revealed that ANKHD1 is expressed by tubular and parietal epithelial cells. Of note, ANKHD1 expression was dysregulated in experimental mouse models of TIF. Silencing of ANKHD1 in PTEC resulted in a marked reduction in proliferation and enhanced apoptosis. To understand how ANKHD1 controls survival, we studied whether it regulates either the levels or transcriptional activity of the JAK-STAT pathway. Gene silencing revealed that ANKHD1 positively regulated STAT3 phosphorylation and expression of cyclin D1 and JunB genes, indicating that ANKHD1 drives
pro-survival STAT3 pathway activity.

Conclusion: ANKHD1 is an essential regulator of renal epithelial cell viability via constitutive activation of pro-survival STAT3 signalling. In vivo studies revealed that ANKHD1 is dysregulated in murine TIF. Thus reduced survival in TIF may result from altered expression of ANKHD1. Therapeutic manipulation of ANKHD1, a regulator of JAK-STAT, may prove to be important for future therapies to treat TIF.

Disclosure of Interest: None Declared

Keywords: None

Service Delivery, Quality & Innovation

PO-252

Comparison of three models of renal patient transfers

C. Chukwu [1,*], C. Thangavelu [1], R. Brown [2], T. Ledson [3], K. Abdulnabi [3], K. A. Abraham [1]

[1]Department of Nephrology, Aintree University Hospital NHS Foundation trust, [2]Department of Nephrology, Royal Liverpool and Broadgreen University Hospital NHS trust, [3]Department of Nephrology, Wirral University Teaching Hospital NHS Foundation trust, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The transfer of patients to renal units is often complex

Objectives: The purpose of this study was to determine if patients are transferred safely without delays and the reasons for exceptions.

Methods: The audit was carried out in 3 large north-west inner city nephrology centres. Hospital A's [850 beds renal referrals from 5 other hospitals] renal bed base consists of a dedicated renal HDU and a stepdown ward for both renal and general medical patients. Hospital B's [712 beds, renal referrals from 4 hospitals] renal beds are in one mixed medical and renal ward. Hospital C [749 beds, renal referrals from 2 hospitals] has one mixed renal and medical ward. A retrospective review of all inter-hospital and intra-hospital referrals, actual transfers and clinical notes of referred patients were carried out.

Hospital C has an arrangement with its spoke hospitals and ambulance service to transfer any known renal patient in their region requiring admission directly to Hospital C and admit to the ward or via Accident and emergency department. (AED).Hospital B struggled with timely transfers because of the competing pressures of medical admissions. This was partly remedied by an agreement with the trust to prioritise renal patients. Any beds not allocated by midday would be released to medical admissions. Hospital A used its renal High Dependency Unit to admit such transfers but was impacted by having limited stepdown options due to medical admissions onto the renal ward.

Table: 1 Comparison of 3 models renal patient transfer

	Hospital A	**Hospital B**	**Hospital C**
Mean transfer/day	1.56(1-4)	1.78(1-4)	0
Mean delay in days	0.88	0.95	0
Required RRT	41.2%	31.8%	NA
Mortality	2.9%	0%	NA

RRT-renal replacement therapy; NA- not applicable

Results: 30 patients were transferred to hospital A, 40 patients were transferred to hospital B while Hospital C had no transfer requests .The indications for referral to hospital A vs hospital B respectively were Severe Acute kidney injury 8/30 vs 15/40, complications of dialysis 9/30 vs 10/40, complications of Chronic kidney disease 4/30 vs 16/40, Kidney biopsy 4/30 vs 1/40, End stage renal disease requiring dialysis 1/40 vs 1/30, critical care stepdown 2/30 vs 0/40. 100% of the transfers to hospital A was recorded as safe transfer however, 1 patient had a MET-call shortly after arrival. 60% of the transfers to hospital B was recorded safe transfer with no records found for the remaining 40%.

Table 1 above compares the average daily patient transfer and delays in transfer amongst the 3 nephrology centers

Conclusion: While direct admission using the hospital C model appear to incur the least delays, our study did not assess the impact this model had on hospital C's AED admission pressures or trolley waits. Dedicated renal beds and active management of admissions/ transfers appear to be the only safe and effective option to provide a regional service.

Disclosure of Interest: None Declared

Keywords: AKI, Patient experience, Patient safety

Service Delivery, Quality & Innovation

PO-253

Considerations to enhance peritoneal dialysis uptake in late presenters- a nationwide survey and West Midlands initiative

T. Cairns [1,*], J. Baharani [1], A. Kurien [1]

[1]Renal directorate, HEART OF ENGLAND NHS TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Despite good evidence that acute start peritoneal dialysis (PD) is a safe and efficient option for late presenters with AKI or CKD, in our experience most of these patients are started on haemodialysis when they present acutely.

Besides lifestyle benefits of PD and its cost-effectiveness, using this modality as initial renal replacement therapy avoids the insertion of a central venous line – and precludes the associated risks of infection/central venous stenosis as well as helping to preserve veins for future vascular access.

Objectives: The aim of this study was to evaluate the current practice of how late presenters start dialysis in the UK and perceived barriers to offering patients peritoneal dialysis as initial therapy.

We also designed an in-house middle grade led late presenter education program aimed at delivery of information and to facilitate acute start PD in suitable patients.

Methods: A survey monkey link was distributed with a 10 point questionnaire regarding current practice. We invited consultant and specialist trainee colleagues to participate via email (distributed to 7 centres), the Renal SpR Club website and twitter.

A multidisciplinary structured inpatient program was designed to identify suitable patients who then benefited from 2 education sessions whilst inpatients. Once a modality of choice was established, the team facilitated medical or surgical PD catheter insertion and immediate dialysis start on the ward with subsequent training for discharge home.

Results: : Our survey yielded 29 responses.

48% of respondents confirmed they had no structured education program for late presenters and 62% of centres were unable to offer immediate start PD.

Interestingly, 13% of clinicians indicated that they would not advocate acute start PD. Most centres (79%) had trained staff on site to provide PD 24/7. 17% responders indicated that there was no provision for urgent catheter placement (medical or surgical).

The main barrier for commencing PD for late presenters appeared to be lack of ability to discharge into the community safely at short notice which constituted more than half of the responses. Other concerns were immediate complications such as leaks or unsuitability of patients. Many respondents quoted staff "unwillingness" or the presence of a “haemodialysis culture" in the acute setting.

The multi-disciplinary team at or centre facilitated education for 21 late presenters over a period of 6 months. 11 patients chose to have PD as their preferred option. Of those that commenced on PD, none experienced any immediate complications. All of those starting PD were discharged home following a period of training or the involvement of an external source to provide an assisted service.

Conclusion: Even in the acute setting, patient involvement in decision making for dialysis modality is feasible. Informed choice should be encouraged and incorporated into standard practice to achieve greater patient satisfaction and clinical outcomes. Acute PD at our centre is associated with few immediate or late complications and we are able to facilitate early discharge via expedited training or involvement of a commercial assisted service.

The main barriers to providing late presenters access to PD for immediate start are lack of resources, staff awareness as well as need to shift the culture towards offering peritoneal dialysis. Haemodialysis should not be the default modality for late presenters who present acutely.

Disclosure of Interest: None Declared

Keywords: Dialysis initiation, Patient/carer involvement, Peritoneal dialysis

Service Delivery, Quality & Innovation

PO-254

An electronic track and trigger system for patients discharged from the renal clinic

C. Mallett [1,*], G. Roberts [1]

[1]Nephrology, C&VUHB, cardiff, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Concerns that patients may not get appropriate follow up in primary care may deter nephrolgists from discharging patients with stable CKD. This may lead to increased waiting times and inefficient use of specialist renal clinic slots.

Objectives: We aimed to develop an electronic track and trigger system that would monitor the progress of discharged patients and highlight patients who had failed to have bloods in a timely manner or whose most recent eGFR was below a defined threshold. Such a system would enable real time monitoring of discharged patients and facilitate safe discharge from the clinic.

Methods: Our unit has a catchment population of 1.4 million. In 2013, a code was developed for our units bespoke vitaldata renal database. This enabled clinicians to electronically record that a patient had been discharged. A subsequent extraction query was developed so that at any point in time a clinician is able to retrieve data on their discharged cohort including relevant information such as demographic data, primary diagnosis, eGFR (latest/previous and fall) and date of blood tests. As such it provides an at a glance real time view of all discharged patients, and furthermore (utilising pre set criteria) enables clinicians to focus only patients whose results (or lack of timely blood tests) in the community are triggering concern based on pre set criteria (e.g. all patients whose eGFR has dropped by more than 25% since discharge or all patients who have not had an eGFR in the last 6 months). These patients can then either be re-reviewed in the clinic or an advice letter can be sent to their primary care team.

Results: By January 2017, data on 1,011 discharged patients was recorded on the database. Median age at time of discharge was 75 (IQR,63-83), mean eGFR at time of discharge was 49.8(SD 23.4). The commonest diagnosis amongst discharged pateints was ischaemic nephropathy (35%) . 71% of patients had stable eGFR since time of discharge, 19% of patients had dropped to a lower CKD stage since D/C. The majority of those whose eGFR had droppped had moved from stage 3a to 3b or from 3b to 4. Overall 11% of patients had died since discharge; none of the deaths were directly attributable to AKI/ESRD. One of the discharged patients "crash landed" onto RRT, however this was due to an unpredictable episode of AKI. Based on most recent results, 3% of patients were deemed to require re-review in the renal clinic.

Since the introduction of the database, the number of discharges has increased by 25% year on year, this is likely to increase as clinicians familiarise themselves with the system. Together with the introduction of a virtual clinic follow up system this has resulted in freeing up clinic capacity and a significant drop in the number of new patients waiting to be seen.

Conclusion: We have developed a robust track and trigger system that acts as a "safety net" enabling clinicians to discharge patients from clinic knowing that the system will at any point in time rapidly identify and highlight results that suggest that the patient needs to be reviewed again in the clinic.

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement

Service Delivery, Quality & Innovation

PO-255

Who choses what and why - electronic recording of pre dialysis shared decision making

G. Roberts [1,*], J. Chess [2] and on behalf of the Welsh Renal Clinical Network

[1]Nephrology, C&VUHB, Cardiff, [2]Nephrology, ABMUHB, Swansea, United Kingdom

Preferred Presentation Method: Oral

Introduction: Despite most renal units having pre-dialysis education programmes, treatment discussions and choices are not generally recorded in a readily accessible format. When units seek to understand variation in uptake of therapies, manual review of notes is often required.

Objectives: Our aim was to develop an all-Wales electronic audit tool that would prospectively record the pre-dialysis decision making process in a structured format which enables comparison between units, allowing recording of treatments discussed, modality chosen and why. The audit tool would also record important case mix variables including patient frailty and QOL.

Methods: New screens were developed in the national renal database. The first records the treatments discussed (PD/HD/HHD/transplant/MCM). Dropdown menus enabled recording of the reasons why treatments were/were not discussed. The second screen records data on frailty (Clinical frailty scale score) and QOL at time of making the decision (EQ5DL). A bespoke extraction query was written allowing real time review of data.

Results: Between Feb 2016 and Jan 2017,643 patients underwent pre dialysis education - median age 70 (IQR 58-79), median eGFR 17 (IQR 13-19). There was a high prevalence of frailty – only 43% described as being fit /well (CFS 1-3). PD was discussed with 63% of patients, considered a viable option by 42% and chosen by 20%.Corresponding figures for HHD were 52%,30% and 4%.

Commonest reasons for not discussing PD included physical acopia (35%), previous surgery (25%) , high BMI(20%). Commonest reasons given for not discussing HHD were –lack ability (23%), not medically suitable (20%), no carer (20%). There was considerable variation in discussion/choice of home therapies between units. Units where home therapy was discussed had correspondingly higher numbers choosing a home therapy. Degree of frailty (rather than age) was the strongest predictor of whether home therapy was discussed/chosen. Transplantation was discussed with 38%, with clear correlation between age and if discussed. Of note, 48% of patients aged >60 with no reported frailty did not have discussions about transplantation. MCM was discussed with 36% of patients and considered a viable option by 20%, with 13% choosing it. Median age of those choosing MCM were 83years - 86% having some degree of frailty. There was little correlation between QOL scores and age; however QOL was strongly correlated with frailty- patients reporting a low QOL were also more likely to choose unit based HD.

Conclusion: We have developed a robust electronic audit tool that gives a real time snapshot of current pre dialysis education across Wales. Feedback from units using the system has been positive and has led to changes in the way units structure their pre-dialysis education. The tool enables us to rapidly assess whether change in process has led to changes in information delivered/ choices made. Prospective data will now be collected to assess the impact of treatment choices on baseline quality of life and frailty once on RRT. Once available, this data will be used to underpin the shared decision making process by providing patients with more bespoke outcome data.

Disclosure of Interest: None Declared

Keywords: None

Service Delivery, Quality & Innovation

PO-256

How accurately is renal telephone advice recorded by referring doctors?

V. Li [1,*], F. Hong [1], C. Geddes [1]

[1]Renal, NHS GREATER GLASGOW AND CLYDE, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: A substantial proportion of nephrology work involves giving telephone advice about patients with in-patient nephrology problems to non-nephrologist clinical teams. This could be a potential risk for error as there could be important discrepancies between what advice is given and what is recorded.

Objectives: The aim of this study was to deteming how accurately telephone advice is recorded in the in-patient medical record by referring doctors.

Methods: We identified in-patients in our health board who had received nephrology telephone advice, using the west of Scotland electronic renal patient record (SERPR), between 01/01/2016 and 31/01/2016. There were 2 data collectors who assessed the correlation between the first advice recorded by the on-call nephrologist in SERPR and the corresponding entry by the referring clinician in the scanned in-patient handwritten medical record, using pre-defined advice categories (investigations, medications, fluid management, follow-up arrangement and other). The correlation was classified as accurate, inaccurate with minor clinical implications, inaccurate with major clinical implications, not documented in scanned medical notes or not documented in SERPR.

Table:

Results: During the period of study 108 patients were referred for telephone advice from 16 specialities in 8 hospitals: 52 had acute kidney injury (AKI) previously not under nephrology follow-up, 27 were patients already on renal replacement therapy (15 on hospital haemodialysis, 2 on peritoneal dialysis, 10 with a functioning transplant), 12 were known low clearance patients and 14 were under renal out-patient care before their inpatient admission. 3 other patients were not previously known to nephrology but referred for reasons other than AKI. Overall the handwritten record by the referring clinician was felt to be an accurate reflection of the recording in SERPR in 71/108 (65.7%) patients. 20/108 (18.5%) patients were felt to have minor inaccuracies and 16/108 (14.8%) major inaccuracies. There was one patient who did not have the renal referral documented in the handwritten medical notes. The accuracy of recording of investigations, medications, fluid management, follow-up arrangement and other advice specifically was 62.7%, 64.4%, 64.1%, 51.7% and 69.1 % respectively.

Conclusion: Obtaining telephone advice from nephrology is a common method of making decisions about patient management. Our data highlight that this method of communication is a potential risk for patient care in that there are sometimes important differences between the record of advice given and advice received. In 16 cases (14.8%), there were major inaccuracies, and in 1 case, there was no documentation of the referral in the clinical notes. This could potentially have major implications in patient care and this observation is likely to apply to telephone referrals in all specialities.

References:

Disclosure of Interest: None Declared

Keywords: Communication techniques

Service Delivery, Quality & Innovation

PO-257

Nurses experiences of using haemodialysis clinical competencies

P. Lamb [1,*], C. Norton [2]

[1]Faculty of Health, Social Care and Education, Kingston University and St George's University, London, [2]School of Nursing, King's College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: In the UK patients receive haemodialysis treatment at haemodialysis units situated in hospitals, satellite units or in their own homes. Satellite haemodialysis units are nurse led, resulting in nurses delivering the majority of care (Bennett 2011). Nurses working in haemodialysis units are expected to demonstrate competency and understanding of the technical processes involved in supporting patients undergoing haemodialysis treatment and be competent in delivering patient care. In 2012 a large acute hospital Renal Nursing Education Team updated and standardised haemodialysis clinical competencies to assist band 5 junior haemodialysis nurses develop their clinical skills and knowledge in delivering nursing care to patients receiving haemodialysis treatment. The lived experience of novice haemodialysis nurses and mentors using these competencies was investigated in this study.

Objectives: The aim of this study was to understand of the lived experiences of novice nurses and mentors using haemodialysis clinical competencies. It was hoped that the study would highlight ways in which haemodialysis clinical competencies could be used to enhance the development of knowledge, skills and performance of novice haemodialysis nurses.

Methods: A qualitative interpretive phenomenological approach using semi-structured interviews.

Participants: Nineteen participants including ten novice haemodialysis nurses and nine mentors were recruited from six National Health Service (NHS) haemodialysis units within an acute London NHS Trust.

Results: Novice haemodialysis nurses experienced stress and anxiety, particularly when they were faced with new and unfamiliar situations. Nevertheless, they expressed the support of their mentors and peers as extremely positive and rewarding in adjusting to their new role. All participants in this study indicated that the haemodialysis clinical competencies were beneficial in developing novice nurses' haemodialysis skills and knowledge. Furthermore the competencies provided them with a structured framework for assessing knowledge, skills and competence.

Conclusion: The results obtained have indicated the crucial role of expert haemodialysis nurses in mentoring and training novice nurses. Moreover, the importance of competent and skilled nurses in providing holistic care to patients receiving haemodialysis treatment has been strongly emphasised.

References: Bennett P.N (2011) Technological intimacy in haemodialysis nursing. *Nursing Inquiry* **18**(3), 247–252.

Renal Association (2013) *Clinical Practice Guidelines for Haemodialysis: UK Renal Association.* 5th ed. NHS Commissioning Board, 2013. Accessed on 08.01.2017 from http://www.england.nhs.uk/wp-content/uploads/2013/06/a06-renal-dia-hosp-sat-ad.pdf.

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Haemodialysis, Staff training

Service Delivery, Quality & Innovation

PO-258

How do we support transplanted patients who receive organs from deceased donors to acknowledge their gift of life?

M. Willcox [1,*] and L Armstrong; L Welsh; S Holmes; J Galloway; SJ Mead-Regan; H Tincknell; G Mathews; J Stockdale; L Tresnan-Bruce;

[1]Organ Donation and Transplant, NHS BLOOD AND TRANSPLANT, Oxford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Taking Organ Transplantation into 2020 A UK strategy (2013) aims for the UK to match world-class performance in organ donation and transplantation detailing four outcomes. One of these outcomes is to get attitudes to organ donation to change so that people will be proud to donate, when and if they can. Currently consent rates are a little over 60% and have remained almost static since the introduction of the Organ Donation Taskforce recommendations in 2008. Our aim is to achieve an 80% consent rate by 2020. This means that opportunity to positively promote organ donation and transplantation should be taken at every opportunity. In an audit of one of the 12 regional organ donation teams presented at the National Organ Donation and Transplantation Congress 2016 (willcox 2016) it was identified that less than 20% of recipients of organs from deceased donors acknowledge to the donor family the gift of a life saving organ via a letter. The same audit identified that over 80% of the donor families said they would like to receive communication from recipients of the gifted organ(s). NHSBT held an improvement event with specialists from all aspects of donation and transplantation to increase the numbers of recipients acknowledging the gift and the ways they may be supported to do this

Objectives: To increase the number of recipients acknowledging the gift of life they have received to their donor family, to equal or exceed consent rates.

Methods: Supporting and encouraging recipients to communicate to donor families can have many benefits to both donor families and recipients. This is also an opportunity to spread the positive messages of donation through communities, helping to support efforts in the continual process of changing attitudes to organ donation so that people will be proud to donate, when and if they can, whilst their anonymity to each other can still be maintained by processes in place that are managed by the transplant co-ordinators and Specialist Nurses in Organ Donation.

Following the improvement event, an action plan was agreed in order support more recipients to acknowledge the donation they have received and further understand and continue to support recipients to acknowledge donor families. The actions fall broadly into the following themes:

Supporting a recipient to write.

Patient and staff education/empowerment.

Practice development.

Managing the workloads and communication

Results: NA

Conclusion: We recognise that every transplanted patient has many challenges to face and that some will not want to make any acknowledgement to the donor family and this is to be respected. However, we believe that if we wish to match world class performance and become world leaders we must make sure that we do our very best to ensure that attitudes to organ donation change so that people are proud to donate. This is currently a work in progress…help and support is welcomed.

References:

Department of Health (2013) Taking Organ Transplantation into 2020: A UK Strategy. London.

Department of Health (2008) Organs for Transplant – A report from the organ donation taskforce. London.

Willcox M (2016) Recognising the special gift of organ donation. A retrospective audit of recipient letters presented at National Organ Donation and Transplantation Congress: Warwick 21st September 2016.

Disclosure of Interest: None Declared

Keywords: Deceased donor, Patient education , Patient empowerment

Service Delivery, Quality & Innovation

PO-259

Early evaluation of ASSIST-CKD: an intervention to improve the management of progressive chronic kidney disease.

N. Thomas [1], I. Stott [2], D. Starbuck [2], S. Methven [3], H. Gallagher [4,*] and ASSIST-CKD project group

[1]School of Health and Social Care, LONDON SOUTH BANK UNIVERSITY, London, [2]Department of Renal Medicine, Doncaster Royal Infirmary, Doncaster, [3]UK Renal Registry, Bristol, [4]SW Thames Renal Unit, St Helier Hospital, Carshalton, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: A community-wide CKD management system (Rayner et al 2014) which commenced in 2012 has led to the lowest percentage of patients in the UK presenting within 90 days of starting RRT.

Objectives: The ASSIST-CKD quality improvement project aims to scale-up and evaluate this intervention in up to 20 other sites in England, Scotland, Northern Ireland and Wales.

Methods: An off-line SQL database integrates laboratory results from blood samples relating to one patient taken in all clinical settings. Graphs of eGFR over time are generated for patients <65 years with eGFR <50ml/min/1.73m^2 and patients >65 years with eGFR <40ml/min/1.73m^2. Graphs where kidney function is deteriorating are flagged by a laboratory scientist or renal nurse and sent to the primary care team with a prompt that further action may be needed. The qualitative evaluation aims to understand the experiences of those directly involved in the intervention, through face-to-face interviews with laboratory staff/renal nurses, nephrologists and focus groups with general practice staff. The interviews explore the drivers and barriers to successful implementation and sustainability of the intervention.

Results: The experiences are from one site, which commenced the intervention in late 2015. On average a renal nurse at this site reviews 370 graphs per week, with 1991 graphs sent out to the GPs by end 2016. The main drivers to sustaining the intervention were identified as: (i) Benefits for existing patients: the flagged eGFR graphs are cross-checked with renal data systems, so patients known to nephrology are identified "*it has highlighted patients who have had a declining function that we would not have known about prior to the next appointment - we have brought their appointments forward….*" (ii) identification of patients with AKI: "*there have been about 10 that we have urgently rung the GP about.*" Barriers to sustaining the project in primary care were identified as: (i) pre-existing systems to identify patients at risk of progressive CKD "*we have a Practice pharmacist who is very pro-active - she also does an audit at regular intervals and she organises the CKD Register*." (ii) primary care systems are already able to generate graphs "*System 1 generates the eGFR graph - it is not difficult to show the graph (to patients) and I always do that*."

Conclusion: Early qualitative evaluation of this scaling-up project in one site has shown some unanticipated benefits, particularly due to the embedding of the graph interpretation within the renal service. These findings will inform implementation at other sites.

References: Rayner HC, Baharani J, Dasgupta I, et al. SA. Does community-wide chronic kidney disease management improve patient outcomes? *Nephrol Dial Transplant* 2014; 29(3): 644–9.

Disclosure of Interest: None Declared

Keywords: CKD, CKD Progression, Qualitative study

Service Delivery, Quality & Innovation

PO-260

Cross-sectional Study of Lupus Nephritis Patients Highlights Proportion in Sustained Remission and Need for Evaluation of Strategies for Appropriate Immunosuppression Withdrawal

R. Penfold [1,*], L. Lightstone [2]

[1]Department of Renal Medicine, [2]Imperial College Lupus Centre, Imperial College Healthcare NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Lupus nephritis (LN) is a relapsing-remitting disease associated with considerable morbidity. Treatment aims to induce sustained remission whilst minimising toxicity. Many studies evaluate strategies for inducing remission, some suggesting maintenance therapy for 2-3 years; however, very few explore when/how to wean immunosuppression. Individual practices vary; in this study we evaluated practice at a large tertiary centre

Objectives: To determine the prevalence of sustained remission in LN patients and proportion maintained on different immunosuppression regimens

Methods: Cross-sectional audit of LN outpatients attending a tertiary Lupus Centre over 4 weeks (Oct-Nov2016) to determine clinical/serological disease activity, current immunosuppression and duration of renal remission.

Remission:Complete(CR):uPCR≤50mg/mmol, eGFR≥60 or ↓by≤20% if <60 at baseline**. Partial(PR)**:uPCR<300 and ↓in uPCR>50% and eGFR↓by≤20% from baseline. **Relapse:**uPCR>100 +≥50% from CR/PR±eGFR↓to≤20% from baseline.

Active:<6mths since relapse, **non-responder(NR):**>6mths since relapse

Table:

	CR	**PR**	**Active**	**NR**
No (% of total) **n=120**	68 (56.7)	27 (22.5)	17 (14.1)	8 (6.7)
Of which:				
ANA+	51	19	16	6
dsDNA+(>30 units/ml)	24	11	11	3
Low C3(<0.7g/L) +/or C4 (<0.16g/L)	17	9	4	2

Results: Of 120 patients, 33(27.5%) were in induction phase with either Rituximab+MMF ± steroids or Eurolupus regimen. Of those in maintenance phase, 27(22.5%) were <3 years from induction during which maintenance generally appropriate – 25/27 patients were on maintenance therapy. Of 60 patients>3 years from relapse: 7(11.7%) were on hydroxychloroquine alone, 11(18.3%) other single agent: 1(1.7%) steroid, 7(11.7%) MMF & 3(5%) azathioprine. 31(51.7%) were on dual/multiple therapy and just 11(18.3%) off all immunosuppression. Only 7(26%) patients <3years from relapse & 12(20%) patients >3 years from relapse were on steroids. Those off immunosuppression were more likely to have normal serology and longer time since relapse

Conclusion: The benefits of maintenance therapy have to be balanced against treatment-related toxicity, especially from steroids. It is critical to identify those in whom immunosuppression can be safely withdrawn. In this tertiary centre study, we have shown that a significant proportion of patients can be maintained long-term without steroids. However, many are on multi-agents and only a small proportion come off all immunosuppression. There is urgent need for trials evaluating when & how to safely withdraw immunosuppression and to define biomarkers which predict success

Disclosure of Interest: None Declared

Keywords: Corticosteroids, Immunosuppression, Lupus

Service Delivery, Quality & Innovation

PO-261

Measuring resilience in Scottish vascular access services

S. Oliver [1,*], D. Kingsmore [1], R. Kasthuri [2], W. Metcalfe [3], J. Traynor [3], P. Thomson [1]

[1]Glasgow Renal and Transplant Unit, [2]Radiology Department, NHS Greater Glasgow & Clyde, [3]Scottish Renal Registry, Glasgow, United Kingdom

Preferred Presentation Method: Oral

Introduction: The 2015 Scottish Haemodialysis Vascular Access Appraisal (SHVAA) studied the configuration and workings of Scottish haemodialysis vascular access (VA) services (1). Differing concerns and vulnerabilities were used to generate recommendations highlighting the attributes considered most strongly associated with the provision of safe, effective, person-centred VA care. 'Resilience Grids' were generated to help units apply these recommendations to their own services.

Objectives: This follow-up study reports initial results from the 'Resilience Grid' exercise – their content, how individual units and staff groups differed, and where common vulnerabilities lie.

Methods: The SHVAA recommendations, and some background participant demographics, were distilled into 68 short questions spanning nine domains of interest. Using an online questionnaire these were sent to nurses, nephrologists, surgeons, radiologists, sonographers and managers in all nine Scottish renal units. Each question required a simple "yes", "no" or "don't know" answer to indicate the presence, absence or uncertainty regarding each recommendation. The full dataset was analysed, with subgroup analyses performed overall for each centre and each respondent professional group.

Results: 42 responses were received, representing all nine (adult) renal units in Scotland.

All units had implemented some of the recommendations, but nowhere had implemented every recommendation, and no single recommendation was adopted universally. A median of 22.5 recommendations had been implemented, and 23 had not been implemented across Scotland (with a median of 9.5 "don't know" responses). For most service components within a given centre, there was disagreement between respondents as to whether that recommendation had or had not been implemented.

Within each category (clinical processes, service performance, governance, job planning, service performance, education, patient experience) units varied as to the specific measure that had been adopted. Recommendations relating to clinical processes and education were most likely to have been implemented, while those related to governance and service performance measurement were least likely to be in place.

The unit with the consistently highest published prevalent AV access rate had the most "yes" responses, while the unit with consistently lowest published prevalent AV access rate had the most "no" responses. The relationship between AV access use and questionnaire response was less apparent in the other units.

Conclusion: The data suggests potential areas of resilience and vulnerability in Scottish VA services. Insights are provided into areas of each service where clinician and management engagement could be improved. Our study provides a starting point for defining 'resilience' in VA services; further work is required to establish the most important elements.

References: (1) Oliver SW et al; A national appraisal of haemodialysis vascular access provision in Scotland; J Vasc Access 2017 (in press)

Disclosure of Interest: None Declared

Keywords: Patient experience, Qualitative study, Vascular access

Service Delivery, Quality & Innovation

PO-262

DIRECT COMMUNICATION FROM CRITICAL CARE CAN POSITIVELY INFLUENCE THE FOLLOW-UP OF AKI IN PRIMARY CARE

M. Varrier [1,*], N. Read [1], L. Tovey [1], H. Dickie [1], M. Ostermann [1]

[1]Intensive Care, Guy's and St.Thomas' NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Acute kidney injury (AKI) is recognized as a risk factor for chronic kidney disease (CKD), premature death and further AKI. The majority of AKI requiring renal replacement therapy (RRT) occurs in critical care without direct input from nephrologists. Appropriate follow-up in primary care is dependent on the information conveyed in hospital discharge summaries.

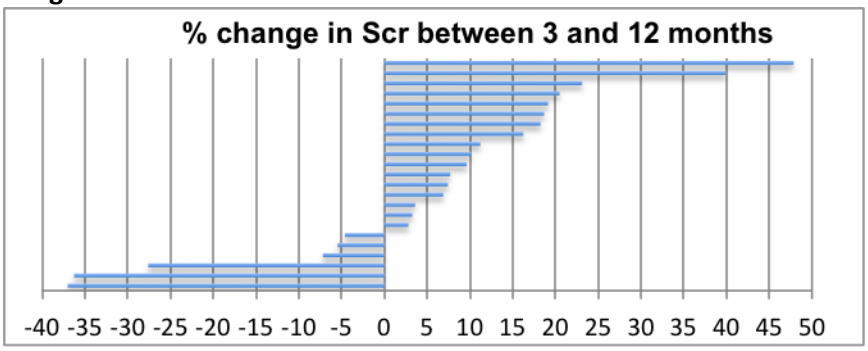
Objectives: To investigate whether direct communication from critical care to a patient's general practioner (GP) assists the follow-up of severe AKI in primary care.

Methods: We prospectively analysed all critical care admissions in 2014 and identified 408 patients who received RRT during their stay. We excluded patients with end-stage renal failure (CKD 5, chronic dialysis, renal transplant), patients who did not recover dialysis independence or survive to a non-palliative hospital discharge. For the remaining 91 patients we sent their community general practitioner (GP):

1. A copy of the ICU discharge summary
2. The hospital discharge serum creatinine (Scr) and estimated glomerular filtration rate (eGFR).
3. Advice to a) measure the Scr, eGFR and urine albumin creatinine ratio (ACR) at 1-3 months and 1 year post discharge, b) perform a medications reconciliation/review, c) arrange follow-up according to UK national CKD guidelines.

We contacted the GP with a questionnaire after one year to see if this was helpful and collate information on outcomes. Mortality information was cross-referenced via hospital episode statistics (HES) data.

Image:



Results: - Only 67% of (non-ICU) hospital discharge summaries mentioned AKI and 50% referenced the need for RRT specifically.

- Mortality post-discharge from hospital was high, 18.6% at 12 months and 22.0% at 18 months.
- 45/91 (49.5%) GPs responded. 4 indicated the patient moved GP leaving 41 with data.
- At 3 months 38/41 (92.7%) had a Scr/eGFR and 19.5% had an ACR recorded.
- 27/34 (79.4%) that survived to one year had follow-up bloods at one year and 14.7% had an ACR.
- When specifically asked, the GPs indicated that:

1. 97.3% found it helpful to receive the ICU discharge summary.
2. 94.7% would prefer to receive ICU discharge summaries for all their patients.
3. 95% felt that this intervention could have a positive influence on your management.

23 patients had complete Scr data with recordings at 3 and 12 months. Almost 3/4 had a rise in Scr in this interval (see graph).
Conclusion: Hospital discharge summaries frequently omit information regarding even severe AKI. Direct communication from critical care to primary care was a simple, helpful and welcomed intervention. Rates of follow-up Scr/eGFR were high amongst questionnaire returners (although this may represent selection bias). High mortality and frequent rise in Scr during this time-frame justifies close follow-up of this vulnerable group.

Disclosure of Interest: None Declared

Keywords: Management of AKI, Patient safety, Survival

Service Delivery, Quality & Innovation

PO-263

An audit on safety of day case percutaneous kidney biopsy : Single centre experience of consecutive 4 years (2012-2015)

A. Stott [1,*], A. Khan [1], L. Kinsella [1], L. Taha [1], S. Ahmed [1], H. Anijeet [1]

[1]Nephrology, ROYAL LIVERPOOL BROADGREEN HOSPITAL, Merseyside, United Kingdom

Preferred Presentation Method: Poster

Introduction: Day case renal biopsy represents a valuable and cost effective method of obtaining diagnostic tissue when performed in a protocol driven day case setting. However there are no approved national practical guidelines for day case renal biopsy (1). Day case biopsy protocol with nurse- led pre assessment and discharge (as opposed to medic-led) can be viewed as a trend for service innovation, workforce re-structuring, improving patient flow and patient experience. Making such workforce changes generally requires developing effective protocols to ensure best safe practice.

Objectives: Our renal unit introduced a protocol in 2011 for day case renal biopsy .To audit our current service for day case percutaneous renal biopsy and to ensure that it is used on appropriate patients and carries no increased risks of complications.

Methods: We reviewed retrospectively case notes for consecutive 391 patients who underwent day case percutaneous renal biopsy during period May 2012-Dec 2015.

Results: Total of 391 patients underwent renal biopsy as a day case between 2012-2015. In all patients we used the BioPince full core biopsy instrument 18ga x 15 cm. Majority were male (181 patients) and just over 40 % of patients were of age above 60 years. Proteinuria remained the most common indication for renal biopsy. IgA nephropathy remains the most common histological diagnosis in about 105 patients (26.8%) followed by FSGS (16.8%) and DM nephropathy (7.9%).

Out of 391 patients, vast majority (365 patients) went home same day after the procedure. 4 patients stayed overnight due to logistical issues. 22 patients (5.6%) stayed overnight for reasons related to the procedure. Out of these 22 patients, 8 patients (2.0%) had visible haematuria, 7 patients (1.7%) had high BP, 4 patients (1.0%) had haematoma on ultrasound scan, 2 patients had loin pain. Only one patient was readmitted at a later date with haematuria. Tissue sample was not sufficient in only 5 % of patients.

Conclusion: Day case percutaneous renal biopsy remains a valuable and cost-effective way of obtaining renal tissue in a selected group of patients. Our data suggests that in a protocol driven renal unit, outpatient renal biopsy remains the safe option and carries no major complication. Day case renal biopsy can help address the workforce development and restructuring of services with improved patient outcome.

References: 1. Fraser IR, Fairley KF: Renal biopsy as an outpatient procedure.Am J Kidney Dis 25:876-878, 1995

Disclosure of Interest: None Declared

Keywords: None

Service Delivery, Quality & Innovation

PO-264

Can a simple change improve the management of renal patients on immunosuppressive therapy?

T. McDonnell [1,*], C. Chukwu [1], A. Nache [1]

[1]Aintree University Hospital NHS Foundation Trust, NHS, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: Management of glomerulonephritis and vasculitis involves the use of immunosuppression where patients need regular follow up to anticipate and prevent complications of therapy. Despite the introduction of nurse led immunosuppression clinics, our unit has persistently had issues with clinic pressure. The creation of immunosuppression streams may allow rapid access to consultant clinics and prevent problems with clinic cancellation.

Objectives: The purpose of the study was to assess the impact of the newly introduced protected immunosuppression stream on the management of renal patients requiring immunosuppression. Clarity of treatment plan, frequency of medical follow up and prevention of side effects with prophylactic medications were measured.

Methods: A single centre study of 2 cohorts of patients who received immuno-suppression treatment before (12 patients) and after (13 patients) the introduction of immunosuppression clinic was carried out. Case notes and clinic letters were reviewed.

Table: Table 1 Quality of care before and after the introduction of a separate immunosuppression clinic

	Clear documentation treatment plan	Adequate Prophylaxis	Time until Consultant review	Adverse Events
Before (n =12)	**35.70%**	**85.7%**	**50 days**	**3 admissions 6 leucopoenia 4 urinary infection 2 chest infection**
After (n =13)	**100%**	**100%**	**30.1 days (p<0.05)**	**2 readmission 1 leucopoenia 1 urinary infection 1 chest infection**

Results: In the pre intervention cohort, 3 patients had ANCA vasculitis, 2 lupus nephritis, 2 IgA nephropathy, 2 membranous nephropathy and 3 other conditions. 6 patients received cyclophosphamide (with subsequent azathioprine), 2 received mycophenolate, 1 ciclosporin and 3 steroid only regime. In the post intervention cohort, 6 had ANCA vasculitis, 2 IgA nephropathy, 2 membranous nephropathy and 3 other conditions, where 8 received cyclophosphamide (with subsequent azathioprine), 1 ciclosporin and 4 steroid only regime.

Patients were seen on average 20 days quicker. Post intervention, all patients had a clear immunosuppression plan and were on adequate prophylaxis. The number of adverse events was lower.

Conclusion: This small study shows that the simple change of introducing a protected immunosuppression clinic is associated with improved clarity of individualised management plans, earlier consultant follow up, adequate prophylaxis and a reduction in the number of adverse events (particularly leucopoenia). A protected immunosuppression stream is a simple, useful strategy to mitigate risks of clinic delay due to size burden and clinic cancellation. Although the study is small, it allowed us to justify the protected clinic and further develop our immunosuppression service. The next steps will be the creation of an immunosuppression multidisciplinary meeting with nurse and pharmacist led reviews.

Disclosure of Interest: None Declared

Keywords: Audit, Immunosuppression

Service Delivery, Quality & Innovation

PO-265

Immunosuppression dose adjustment using SMS via Florence Telehealth: proof of principle of a novel service for renal transplant recipients in the North East of England

H. Crook [1,*], R. Clark [2], J. Andrews [3], R. Fraser [2], R. Hogarth [2], C. Brocklehurst [1], R. Davison [1], S. Ahmed [1], R. Forbister [4], I. Moore [3], A. Brown [2], K. Jones [2]

[1]Nephrology, City Hospitals of Sunderland, Sunderland, [2]Nephrology, Freeman Hospital, Newcastle upon Tyne, [3]Nephrology, James Cook University Hospital, Middlesbrough, [4]Telehealth, NHS Sunderland CCG, Sunderland, United Kingdom

Preferred Presentation Method: Poster

Introduction: Clinical administration after renal transplant clinics can be time-consuming with biochemistry and toxicology results become available separately or even on different days.

Tacrolimus & Ciclosporin (CNI) dose changes are typically made by telephone after clinic. The safety of this has not been studied, but potential errors include instructions being misheard, recalled inaccurately or transcribed incorrectly. Voicemail use is generally prohibited due to concern of non-receipt or confidentiality breach, & repeated attempts to make contact may be required. Lack of access to paper notes after clinic makes documentation difficult and increases the risk of dose errors in future clinics.

Objectives: Florence is a national computer-based mobile phone text message (SMS) system designed to support remote interactions with patients. It is free for patients to use. Patients are enrolled following verbal consent in a rapid process requiring input of their name, NHS & mobile telephone numbers.

We hoped that Florence would provide a novel method of communicating with patients after clinic to make the process safer, more time efficient for clinicians, & more convenient for patients.

Methods: We developed a simple template SMS for CNI dose changes. This includes the date, CNI level & new dose. It asks the patient to text back to confirm they understand. If there is no reply within 24hrs, the clinician & administration team receive an email to prompt alternative communication. Florence automatically logs all sent & received SMS.

We have also used Florence in changing Tacrolimus preparations & in repatriating immunosuppression prescribing. After face-to-face consultation & provision of a prescription for the new brand, an SMS is sent on the appropriate date to prompt the patient to change brand & return for monitoring 1 week later.

There is scope to use Florence for all patients under renal follow-up, with applications including recall for repeat biochemistry, (e.g. for creatinine rise, hyperkalaemia), collation of home BP readings, BP medication adjustment, & medication prompting to aid concordance.

Florence has been rolled out to three renal units in the region. This has been cost neutral, as each Trust had a pre-existing license.

Results: In a small proof of principle pilot study in 10 patients in the acute post-transplant period, compared with telephone calls, Florence halved the minimum time to contact a patient from 90 to 45 seconds.

In 6 months since launching the service, we have enrolled 192 patients in the acute transplant centre, & a further 50 in 2 other regional units.

Informal feedback from patients & clinicians has been positive.

Florence does require knowledge of the current CNI dose and there is a risk of typographical error, although we know of no occurrences of this so far.

Conclusion: Florence meets the objectives of making clinic follow-up administration more time-efficient for clinicians & administrative staff, & more convenient for patients. It reduces the risk inherent in verbal telephone communication & may reduce costs by reducing outbound telephone calls.

Disclosure of Interest: None Declared

Keywords: Patient experience, Patient safety, Transplant IS

Service Delivery, Quality & Innovation
PO-266
A Service Evaluation of a Regional Renal-Obstetric Clinic

R. Clements [1,*], N. Sarween [2], M. Chakravorty [1], J. Proudfoot-Jones [1], E. Knox [3], C. Day [2], G. Lipkin [2]
[1]College of Medical & Dental Sciences, University of Birmingham, [2]Renal Medicine, University Hospitals Birmingham NHS Foundation Trust, [3]Maternal Medicine, Birmingham Women's Hospital NHS Foundation Trust, Birmingham, United Kingdom

Preferred Presentation Method: Oral or Poster
Introduction: Royal College of Obstetricians & Gynaecologists (RCOG) guidelines, recommend that antenatal care of women with chronic kidney disease (CKD) should be in multidisciplinary renal/obstetric clinics. Women with CKD should also be offered pre-pregnancy counselling (PPC) and post-partum follow up.
Objectives: The Queen Elizabeth Hospital Birmingham (QEHB) and Birmingham Women's Hospital (BWH) have been running a combined renal-obstetric service for over 20 years. We review the demographic make-up, renal disease profile and post-natal review over the past 6 years.
Methods: Clinic activity (January 2010-December 2015) was provided by hospital informatics. The first appointment for any pregnancy was identified as baseline visit. The Excel MATCH function was used to exclude duplication. For women who had multiple pregnancies, each distinct pregnancy was included. Electronic hospital records were used to collate demographics, baseline pre-pregnancy renal function (creatinine, albumin creatinine ratio (ACR), estimated GFR (MDRD)) and cause of CKD. PPC and follow-up rates were assessed in 3 patient groups, chosen for their distinct disease aetiologies: Polycystic kidneys (ADPKD), Chronic Pyelonephritis/Reflux Nephropathy (RN) and Lupus (SLE).
Results: Over a 6-year period there were 1196 consultations comprising 346 individual pregnancies for whom there was follow-up information. Of these, there were 246 pregnancies in 210 women with documented evidence of CKD. Average age was 30 years (range 17-46). This did not change significantly over the 6 years. Activity was stable over the 6 years, however the ethnic mix and CKD aetiology changed slightly. In 2010 and 2015 the ethnic mix respectively was as follows: White 49% vs 41%, South Asian 29% vs 33%, Black 8% vs 2% with the remainder being other ethnicity or unknown. Whilst chronic pyelonephritis (19%), primary glomerulonephritis (18%) and glomerulonephritis secondary to systemic illness (17%) made up the largest groups of patients overall, the cumulative proportions of these 3 diagnoses reduced from 59% in 2010 to 39% in 2015. This is partially explained by a large increase in the proportion of women seen with hereditary CKD (8% in 2010 to 31% in 2015). Pre-pregnancy CKD stages were: 34% Stage 1, 30% Stage 2, 11% Stage 3A, 9% Stage 3B, 2% Stage 4 and 14% Stage 5. Formal PPC rates (<1 year pre-natal) were: ADPKD = 48%, SLE = 46%, RN = 24%. The following proportions had follow up within 4 weeks of delivery: SLE = 50%, RN = 31%, ADPKD = 29%.
Conclusion: This retrospective survey supports the need for combined renal-obstetric clinics, given the large number of patients seen with complex renal pathologies, diverse ethnic origins and a significant proportion having moderate to severe renal impairment. Our pre-pregnancy figures identified differing rates according to disease pathology but did not account for women who were diagnosed with CKD during pregnancy. Sharing of data may help service planning across other regions currently without a formal combined renal-obstetric service.
References: Davison JM, Nelson-Piercy C, Kehoe S, Baker P. *Consensus views arising from 54th RCOG Study Group: Renal Disease in Pregnancy;* 2008 [www.rcog.org.uk]

Disclosure of Interest: None Declared

Keywords: CKD, Pregnancy

Service Delivery, Quality & Innovation

PO-267

Patient Attendance Alert to Speciality System (PAASS): An automatic alert to identify patients admitted with advanced kidney disease for early speciality input.

B. Pandya [1,*], S. Dolan [2], J. Aslan [3], L. Havard [4], J. Mcharron [5], A. Whittaker [6], J. Speight [4], S. Brandreth [5], J. Somers [7], C. Goldsmith [8], G. Wright [5], P. Duddley [9]

[1]Consultatnts Departmenet of Nephrology, AINTREE UNIVERSITY HOSPITAL NHS FOUNDATION TRUST, [2]University of Liverpool, Liverpool, United Kingdom, [3]Medical Student, University of Liverpool, [4]informatics, [5]Business Intelligence, [6]AINTREE UNIVERSITY HOSPITAL NHS FOUNDATION TRUST, Liverpool, United Kingdom, [7]Finance, [8]Consusltants Department of Nephrology, [9]4Business Intelligence, AINTREE UNIVERSITY HOSPITAL NHS FOUNDATION TRUST, Liverpool, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with chronic diseases like kidney patients on maintenance dialysis when admitted require specific management plans. This could be to reduce the drug dose or to give extra dose post dialysis, for careful fluid administration to avoid fluid overload, organise dialysis treatment at the scheduled time, or to have their dialysis access protected during any intervention like venous cannula insertion to avoid complications. Following admission these patients are referred by the admitting team when they feel the need for speciality input. It is not uncommon that the renal team are notified after a few days of admission or when complications had already occurred which many times result in incidence reporting.

To avoid this delay, we designed an automatic alert system via e-mail and SMS message to notify the attendance of these patients to the designated key worker.

Objectives: To set up a real time automatic e-mail and SMS alert sent to speciality worker/s to notify attendance of a patient with known LTC.

Methods: An initial audit identified the delay in referrals for renal input. Following this we consulted our coding team to identify codes for specific condition. Coding criteria for CKD patients include: HD (Haemodialysis), CKD (Chronic kidney Disease) 5, CKD 5D (5 Dialysis), CKD 5T (5 Transplant).

On the base of coding diagnosis embedded in our system we set up an automated alert e-mail and SMS message to send to speciality workers. The secure e-mail alert includes name, hospital number, NHS number, admission date and time, ward and bay area, and coding diagnosis. The SMS message includes NHS number, hospital number, area where patient is attending and the detail of the speciality. The alert time and frequency is modifiable. It carries out hourly search for new admissions.

Once established we carried out preliminary audit of kidney patient alert details over the period of 1 week to see the alert set up and compared with referral data.

Image:

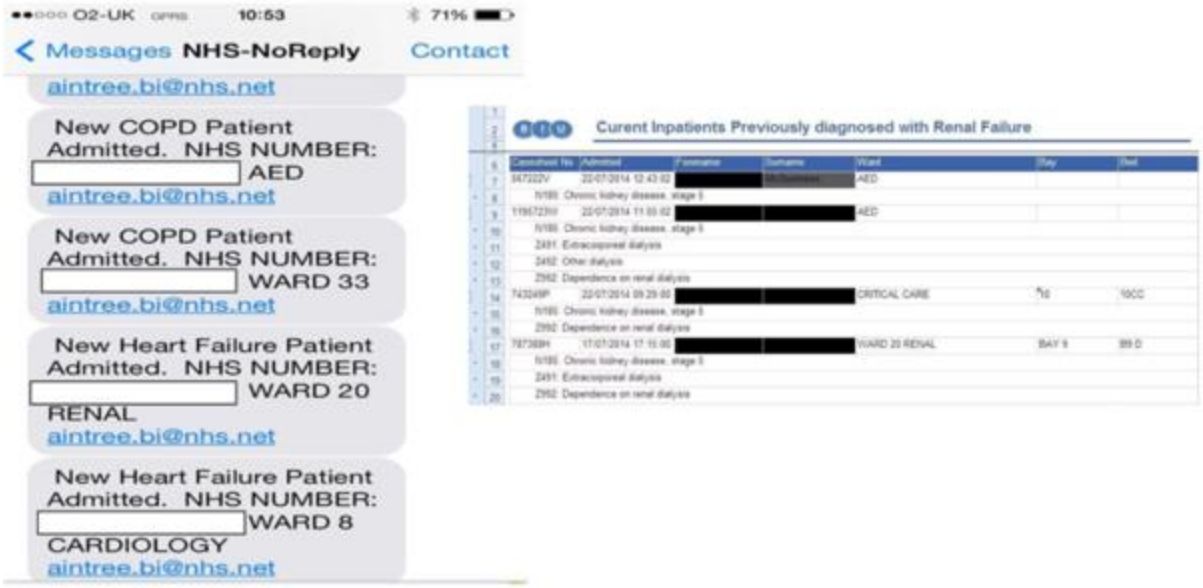


Table:

Results: We found that 24 patients were alerted during the period of one week. Twelve were alerted from the renal ward. Out of remaining 12 from non-renal ward 4 had been incorrectly coded and therefore inappropriately alerted. Eight out of 12 patients were Correctly coded. The details of these 8 patients showed: 1 had previous AKI and dialysis therapy, 2 patients were transplant recipients, 1 had previous HD following paracetamol overdose, another one with CKD 5 and hyperkalaemia, 2 known on maintenance Haemodialysis and 1 on dialysis had AED discharge.
None of these patients were referred to nephrology.
When compared with actual referrals for that week we found that 5 out of 41 referred patients should have been alerted via our automatic system but they were not alerted. Two of these had outpatient CKD diagnosis, 1 had previous transplant and previous dialysis elsewhere and 2 on maintenance HD were wrongly coded.

Conclusion: We confirm that the automated alert system from coding diagnosis notifies the speciality team straight away. The SMS text message alert bypasses the need for access to e-mails. These patients otherwise are not always referred to the renal team. We also noticed that the system misses the patients with no previous episodes of admission and those who were coded inappropriately in the past. The system needs further refinement to include outpatient codes and exclude patients with recovered episodes of AKI who had required dialysis. The coding also needs improving.

References: http://www.dbh.nhs.uk/Electonic_alert_system.aspx

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Communication techniques, Patient safety

Service Delivery, Quality & Innovation

PO-268

Impact of Implementation of Low Clearance Clinic in Improving pre-dialysis care: Experience in a District General Hospital

M. T. Abdul Samad [1,*], J. Shears [2], R. Bavakunji [1]

[1]Renal medicince, Walsall Healthcare NHS Trust, Walsall, [2]Renal medicince, The Royal Wolverhampton NHS Trust, Wolverhampton, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: We recognized that there was an unacceptably higher rate of inadequately prepared patients commencing dialysis from our catchment area. In our catchment cohort, percentage of patients presenting late (unplanned start) for Renal Replacement Therapy (RRT) was 25% compared to the national average of 18%. It is well documented that unplanned start of RRT increases the mortality of patients who already have high co morbidity index.

Objectives: To address the above problem, we implemented a Low Clearance Clinic (LCC) to improve the care of pre-dialysis patients in our hospital and to ensure a smooth transition of patients with advanced renal failure to RRT. We identified critical points where problems occurred: timely pre-dialysis education to plan RRT modality , to aid timely Hepatitis B vaccination and vascular access referral, and also selection of potential transplant recipients so that a transplant work up can be done quickly and thereby timely referral to transplant waiting list. It was a modified LCC with a dedicated Consultant and a renal specialist nurse. As we do not have enough resources for vascular surgeon and dietitian, they were not included in the LCC; rather only those patients who needed dietetic input were referred to Dietitian. Those patients with estimated glomerular filtration rate (eGFR) < 15 ml/min were referred to LCC to optimise the Chronic Kidney Disease (CKD) pathway

Methods: The data was collected retrospectively from the bespoke renal database. The LCC was implemented in October 2015 and the data collected for the patients with CKD stage 5 in LCC during the period January 2016 to December 2016. It was compared with the benchmark data from Sep 2015 before the commencement of LCC.

Image:

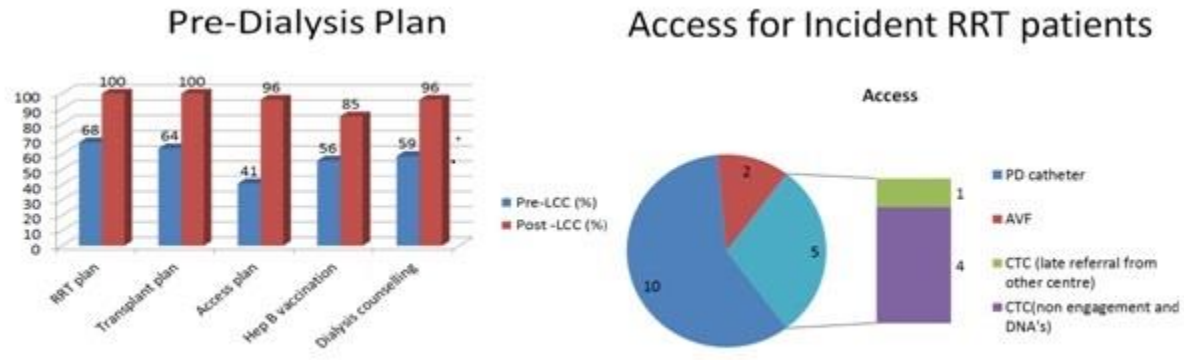


Table: Access Work Up Status

Work up Completed	6
Access created: Awaiting Maturation	3
Work Up Suspended	9

(Peritoneal dialysis planned)	
Work up Active- Clinic awaited and Surgery planned	8
No plan	1

Results: There were 22 patients known to renal team who had CKD Stage 5 in Sep 2015 compared to 27 patients in Dec 2016. All patients in December 2016 had clear RRT and Transplant plans in the LCC group but only 68% had RRT plan and 64% had transplant plan in the pre- LCC group. Dialysis counselling delivered and access plan initiated in 96% patients in comparison to 59% who had dialysis counselling and 41% who had access plan in the pre-LCC group. In relation to data completion on renal database, all 27 patients had comorbidity and EDTA-Diagnosis recorded but only 18% had co morbidity recorded and 82% had EDTA- Diagnosis recorded in the pre- LCC group.
There were 17 patients who started RRT in this 1 year period (Peritoneal Dialysis-10, Home Hemodialysis-1, Hemodialysis- 6). 12 of them started RRT with an adequate access while 5 patients started with a cuffed tunnelled catheter (CTC). All 5 CTCs were unavoidable due to either late referral to LCC or patient factors like non-engagement and indecisiveness. Out of 17 incident RRT patients, six were fit to be worked up for transplantation (1- Active on the list, 2- Referred to tertiary centre, 3- in work up)
Conclusion: In a District General Hospital, even a modified Low Clearance Clinic with a nurse and a doctor, can make significant impact on the pre-dialysis care of patients with established renal failure and thereby improve the long term outcome of these patients. Further analysis after 2 years required to prove whether it reduced the incidence of unplanned RRT start.

Disclosure of Interest: None Declared

Keywords: CKD, Dialysis initiation, Renal service planning

Service Delivery, Quality & Innovation

PO-269

Acute Kidney Injury Foundation Doctor Directed Meta-Quality Improvement Project

J. Littlewood [1,*], K. Abdulanbi [1]

[1]Renal Medicine, ARROWE PARK HOSPITAL, Wirral, United Kingdom

Preferred Presentation Method: Poster

Introduction: Acute Kidney Injury (AKI) has significant impact on mortality and length of hospital stay. Addressing this has become increasingly demanding in terms of increased staffing (nurse specialists and Nephrologists) but also in terms of engaging clinical staff positively about AKI care. We have created a meta-quality improvement (QI) project involving foundation year one (FY1) doctors to address this.

Objectives: To develop multiple individual quality improvement projects run individually which then cross pollinate successful improvements to other wards.

Methods: Twenty-six FY1 doctors were offered the opportunity to take part and eleven responded. One withdrew due to inability to meet the time commitment. Ten FY1 doctors were given access to an automated audit tool created in Excel and education regarding QI methodology. The audit tool measured AKI "Advancing Quality Alliance" care targets of urinalysis, discontinuation of ACE inhibitors, repeat creatinine measurement, renal ultrasound, specialist referral, AKI leaflet distribution, and AKI discharge summary creation. FY1 doctors were encouraged to review their wards performance weekly to identify weak areas and create individualised improvements to raise subsequent weeks measurements. These ideas were discussed amongst the group to allow sharing of improvements that were effective.

Results: A total of 10 weeks/cycles of improvement are completed so far. Five FY1 doctors remain in the project. Individual FY1 doctor improvements have included poster creation, computer-based reminder alerts, engaging in education of doctors and nursing staff, creating access to resources such as the AKI leaflet, and engaging with pharmacy staff.

Improvement has been positive at an individual ward level in the areas where FY1 doctors have most control: timely repeat blood tests (65% to 79% trend) and discharge summary advice for GPs (70% to 82% trend for patients discharged). Performance was also good in areas where staff are separately trained in AKI protocols i.e. pharmacy and medication reviews (ranging between 80-100%).

Performance is less successful in areas where engaging other teams to perform their role is required. Nursing staff/urine dip measurements showed an initial improvement from 20% to 40% then falling to around 20% again. Radiology/renal ultrasound performance is stuck between 0-20%. Performance was also poor in the 12-hour timed specialist referral measure (0-10%).

As a part of the trusts overall strategy for AKI care improvement, compliance has improved from 33.3% to 45.8% in this period.

Conclusion: The project is in early stages and on-going but suggests offering staff their own opportunities to engage with the challenges of AKI and tailor their improvements to their own clinical environments may be a helpful addition to trust wide improvements. Running a collection of smaller QI projects that then come together to share ideas and measures may also show increased benefit. The limitations appear to be that success is limited to areas where the operators have more control and difficulty is seen where influencing other teams is required. This supports the idea that dissemination of education as well as motivation amongst individual groups in the multidisciplinary team must be performed to maximise improvement.

Disclosure of Interest: None Declared

Keywords: AKI

Service Delivery, Quality & Innovation

PO-270

A cross sectional survey of contraceptive use and awareness in women with renal transplant.

L. Williams [1,*], N. Sarween [2], A. Williams [2], N. Jurawan [2], E. Knox [3], C. Day [2], G. Lipkin [2]

[1]College of Medical and Dental Sciences, University of Birmingham, [2]Department of Renal Medicine, University Hospitals Birmingham, [3]Maternal Medicine, Birmingham Women's Hospital, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Renal transplantation is associated with a rapid restoration of fertility and ovulatory cycles can restart within weeks following transplantation. Women with chronic kidney disease (CKD), including recipients of a kidney transplant have a substantially increased risk of fetal and maternal complications during pregnancy. European Best Practice Guidelines for timing of pregnancy post renal transplantation recommend deferring pregnancy for at least 12 months after transplant. The guidelines also recommend contraceptive advice should be given to all women following transplantation starting at hospital discharge. This is important given the teratogenic effect of standard post-transplant immunosuppression.

Objectives: We evaluated whether female renal transplant recipients attending transplant follow up in clinic at a tertiary renal centre had received contraceptive advice as part of their outpatient follow up and documented their current contraceptive choice.

Methods: Women attending renal transplant follow up at Queen Elizabeth Hospital, Birmingham (aged 16-50 years) were identified using hospital informatics data and approached at their clinic visit and invited to participate in a questionnaire survey, in strict confidence.

Results: A total of 48 women were approached and all agreed to participate. The average age of participants was 37.3 (range 17-48) years. Eight women had received their transplant under a year ago and for the remaining women transplant date was on average 7 years earlier. Fifty two percent of all participants reported a previous pregnancy, 16% of which were post-transplant. Of these women just under a quarter (24%) reported an early pregnancy loss, 36% recalled worsening kidney function during pregnancy and nearly two-thirds reported need for early delivery. Interestingly 40% of these women reported using contraception at the time of conception.

Of all women surveyed 45.8% were currently using contraception, all reported using one method only. These were male condoms (40.9%), intrauterine device (IUD) (22.7%), female sterilisation (13.6%), combined oral contraceptive (9.09%) and spermicide, progesterone only pill and implant (all 4.5%). Of the women who currently use contraception 72.7% were using contraception prior to being diagnosed with kidney disease. The most commonly used forms of contraception prior to CKD diagnosis were the combined oral contraceptive (43.7%) followed by male condom (18.8%) and IUD (18.8%). Under half of respondents (41.6%) recalled having received contraceptive advice since being diagnosed with CKD. Of these, 31% were given this advice by a nephrologist, 20.8% by a general practitioner and 8% by a specialist renal nurse.

Conclusion: This data suggests that contraceptive advice provided to women with renal transplants is lacking. Despite the risks associated with pregnancy for mother and fetus, many of these women are adopting less secure forms of contraception and this was associated with a significant number of unplanned pregnancies. Contraceptive counselling should be provided at point of discharge following renal transplantation and should also be embedded into routine clinic follow up. This can be achieved through education and increasing awareness amongst multi disciplinary health care professionals involved in the management of renal transplant patients as well as close links with primary care.

Disclosure of Interest: None Declared

Keywords: CKD, Pregnancy, Renal transplant

Transitional Care

PO-271

UK renal young adult transition services – results of a national survey

A. Hamilton [1,*], R. Gair [2], R. Elias [3], C. Chrysochou [4]

[1]School of Social and Community Medicine, University of Bristol, [2]UK Renal Registry, Bristol, [3]King's College Hospital NHS Foundation Trust, London, [4]Salford Royal Hospital NHS Foundation Trust, Salford, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: New National Institute for Health and Care Excellence guidance regarding transition of young people using health services was published this year. There is currently no national data regarding transition and young adult services in UK renal units.

Objectives: We aimed to collect a snapshot view of UK young adult and transition clinics in order to understand the provision and services available. We also aimed to disseminate the results to the renal community and use the information collected as basis for further research and guide service development.

Methods: We sent an email invitation to a cross-sectional survey to one renal consultant in each UK renal unit during September 2016. An automated reminder email was sent after 2 weeks. The survey was devised by CC and reviewed by the British Renal Society Shared Decision Marking (SDM) and Young Adult Special Interest Group, and was not piloted. Study data were collected and managed using REDCap. Median age limits were compared with Pearson's chi squared test with a continuity correction for small cell sizes. Categorical variables were compared with Fisher's exact test or the chi-squared test depending on cell sizes. We divided the survey responses by whether respondents reported having a dedicated transition clinic, and if units reported having such a clinic, we compared services by whether renal units were adult or paediatric.

Results: The response rate to the survey was 49/84 (58.3%), with no statistical difference between adult and paediatric units. Adult units represented 81.6% of survey responses. Renal units with a dedicated transition clinic were much more likely to have a named transition lead (90.3% v 22.2%, $p<0.0001$) and a dedicated nurse specialist (64.5% v 11.1%, $p<0.0001$), as well as to use a transition assessment tool (74.2% v 16.7%, $p<0.0001$). Over half overall reported using a tool, and of those that did, 25/26 (96%) used the Ready Steady Go framework. Overall access to a psychology service was high at 76%, and was higher in centres with a transition clinic (87.1% v 55.6%, $p=0.02$). Under half the centres with a transition clinic had a youth or key worker (45.2%) with no statistical difference by transition clinic status. Few centres (8/49, 16.3%) reported current use of a formal peer support mentor programme and this also did not differ by transition clinic status. Centres with a transition clinic were not more likely to have a formal social network group, although a higher proportion (13/31, 41.9%) of transition clinic centres had a social network group. There was a trend for renal units without a transition clinic to be more likely to have had training in SDM, but there was no difference for training in Motivational Interviewing. Two-thirds of renal units (31/49, 63.3%) reported having a dedicated transition clinic, with all paediatric responders reporting having a transition clinic compared to just over half of adult responders. Transition clinics were most often quarterly (48.4%), with a median patient age range of 16-21 years and involving predialysis, dialysis and transplant patients.

Conclusion: Our survey had a reasonable response rate with over half of UK paediatric and adult units renal units represented. We have provided a snapshot view of UK transition clinics, which has aided understanding of the provision and services available, showing areas for potential development. More work is now needed to understand potential barriers and facilitators to transition services in renal units.

Disclosure of Interest: None Declared

Keywords: Children, Renal service planning, Young adults

Transitional Care

PO-272

Socio-demographic, psychological health and lifestyle outcomes in young adults on renal replacement therapy: results of a systematic review

A. Hamilton [1,*], R. Clissold [2], C. Inward [3], F. Caskey [4], Y. Ben-Shlomo [1]

[1]School of Social and Community Medicine, University of Bristol, Bristol, [2]University of Exeter, Exeter, [3]Nephrology, Bristol Royal Hospital for Children, [4]UK Renal Registry, Bristol, United Kingdom

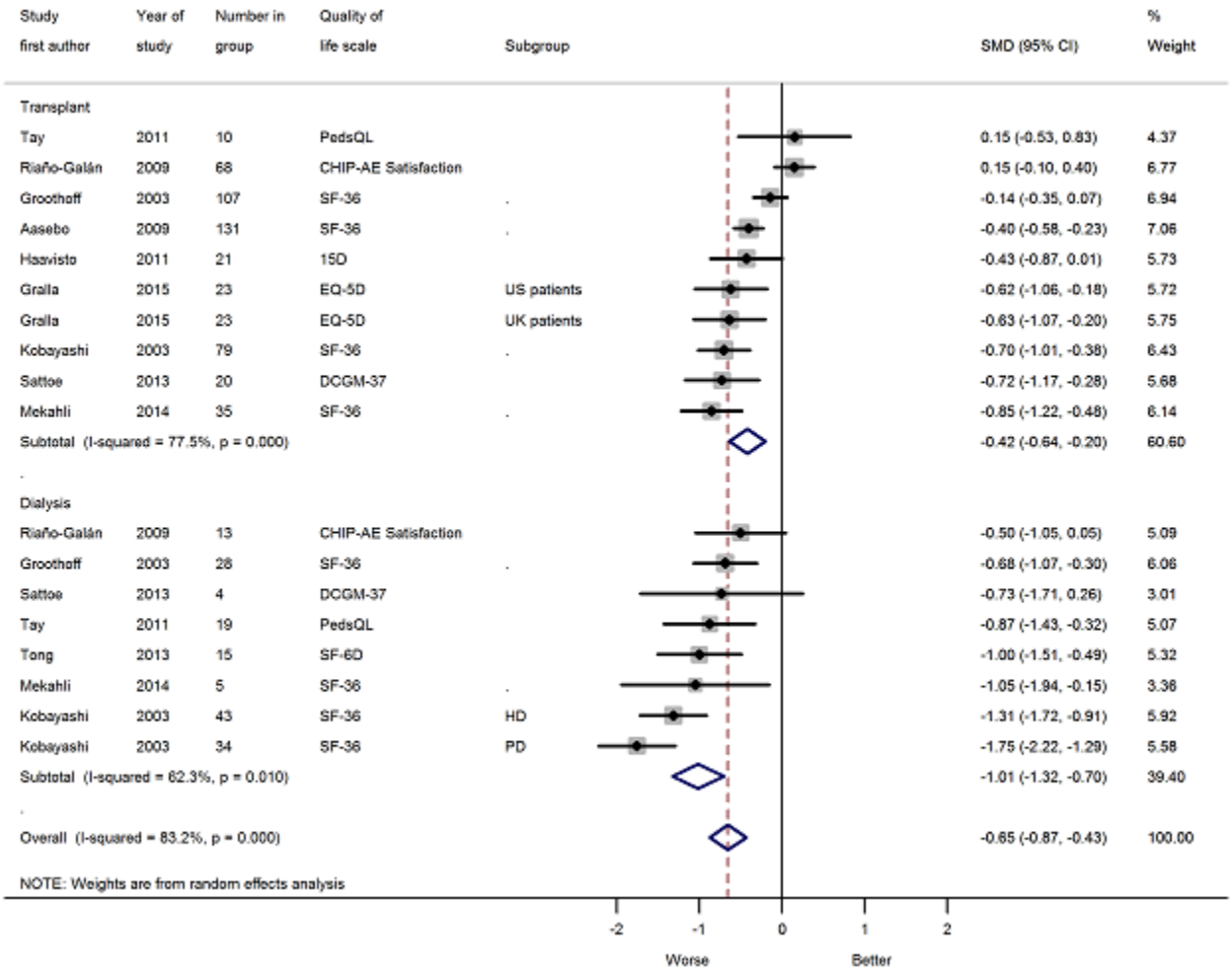
Preferred Presentation Method: Oral

Introduction: Young adults receiving renal replacement therapy (RRT) face additional challenges in life. The impact of renal failure on non-medical aspects of young adulthood is uncertain.

Objectives: We aimed to establish socio-demographic, psychological health and lifestyle outcomes for young adults on RRT by undertaking a systematic review of the literature and performing meta-analyses.

Methods: We studied 16-30 year olds receiving RRT, compared with the general population. We selected randomised controlled trials, cohort or cross-sectional studies without language restriction. We extracted proportions of socio-demographic and lifestyle outcomes and quality of life scores assessed using validated psychological health tests.

Image:



Results: We included 64 studies of 15635 participants. Articles were largely single centre cross-sectional studies of those transplanted in childhood. As shown above, compared to healthy peers, young adults on RRT had reduced quality of life, worse for dialysis patients (7 studies, standardised mean difference (SMD) -1.01, 95% confidence interval (CI) -1.32 to -0.70) compared to transplant (9 studies, SMD -0.42, CI -0.64 to -0.20). They were twice as likely to be unemployed (9 studies, relative risk (RR) 2.62, CI 2.19-3.13), to live in the family home (2 studies, RR 1.98, CI 1.45-2.71) and to abstain from alcohol (3 studies, RR 2.07, CI 1.10-3.92). They were half as likely to be married or have a partner (5 studies, RR 0.45, CI 0.35-0.57). Higher education (3 studies, RR 1.05, CI 0.73-1.51) and smoking rates (2 studies, RR 0.69, CI 0.38-1.25) did not differ. The data synthesis is limited by high heterogeneity and study bias towards surviving patients; in addition, the proportions do not consider patients' current modality.
Conclusion: Established renal failure is associated with worse quality of life in young people and limited employment, independence and relationships compared to healthy peers. Routine prospective data collection is needed to raise clinical awareness of outcomes vital for patients.

Disclosure of Interest: None Declared

Keywords: Quality of life, RRT, Young adults

Transitional Care

PO-273

Neonatal unit survivors developing advanced chronic kidney disease in young adulthood

D. Adlington [1,*], I. Carol [2], C. Bingham [1]

[1]Renal medicine, NHS, Exeter, [2]Paediatrics, NHS, Bristol, United Kingdom

Preferred Presentation Method: Poster

Introduction: Newborn infants requiring neonatal intensive care are known to be at risk of kidney injury. The estimates of incidence of AKI vary from 2-8% of infants admitted to neonatal intensive care units (NICU) with extreme prematurity, need for ventilatory support and low Apgar scores at birth all increasing the risk. Overall survival of these infants has improved over the last 10 years but as AKI has previously been considered transient and reversible structured follow up of renal function has been lacking. For the same reason long-term follow up studies of the incidence of significant chronic kidney disease in survivors of neonatal intensive care are limited. Also, in some young patients with impaired GFR there may be delay in the emergence of symptoms or signs of impaired renal function until the period of rapid growth in adolescence or early adulthood.

Objectives: We aimed to review our young adult practice to identify patients with significant chronic kidney disease who had required neonatal intensive care early in life.

Methods: We reviewed all patients attending our young adult (age range 16-24) general nephrology and transplant clinics and the patients within this age range on dialysis, to identify those who had received initial treatment on the NICU. The records of the patients who had been on the NICU were reviewed in detail.

Results: A total of 46 young adult patient were identified, 27 general nephrology, 13 transplant and 6 on dialysis. Of these 3 had been on the NICU (6.5%).

Case 1:

A 20 year old male born prematurely at 26 weeks. He was born with renal dysplasia and has an atonic bladder requiring intermittent self catheterisation via a Mitrofanoff. He has sensorineural hearing loss - possibly relating to gentamicin toxicity during his NICU stay. He developed progressive chronic kidney disease and was commenced on peritoneal dialysis at the age of 17 before undergoing deceased donor kidney transplant at the age of 18.

Case 2:

An 18 year old female born prematurely at 28 weeks with a birth weight of only 358g - she was one of the lowest birth weight babies to survive at the time. She has a small right kidney, possibly due to neonatal renal vein thrombosis, and developed progressive chronic kidney disease. She has significant learning difficulties with visual and hearing loss due to extreme prematurity. She commenced haemodialysis aged 18 and is currently on the transplant list.

Case 3:

A 23 year old male born at term who was admitted to the NICU after cardiovascular collapse 1 hour post-partum secondary to congenital sepsis. He developed multi-organ failure requiring inotropic support and 5 days of peritoneal dialysis. He was discharged from follow up aged 2 but represented at the age of 17 following a minor head injury after falling from a quad bike. At that time he was found to be hypertensive with chronic kidney disease and small kidneys on ultrasound. He currently has stable chronic kidney disease with a GFR of 48 and good blood pressure control on 2 agents.

Conclusion: Adult nephrologists should be aware of the potential longer term impact on renal function for patients who have been born prematurely or received NICU treatment. It is important to explore neonatal medical histories in young adult patients presenting with chronic kidney disease. With continued improvements and developments in neonatal care these patients are likely to represent an ever increasing group with chronic kidney disease presenting to adult practice.

Disclosure of Interest: None Declared

Keywords: Children, CKD, Young adults

Transitional Care

PO-274

Adherence Patterns in Young Adults With Renal Disease

E. Stainton [1], S. S. Heslam [1], M.-L. Turner [2,*], J. Popoola [2] and British Kidney Patient Association

[1]Medical School, St George's University of London , [2]Department of Nephrology and Transplantation, St George's University Hospitals NHS Foundation Trust , London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Adolescents and young adults with chronic diseases are a growing population which deserves prioritising due to high morbidity and mortalitycompared to their contemporaries. They are under represented in audit, research and evidence based studies. The population is unique due to distinct patterns in emotional and cognitive development. Non adherence in young adults across conditions varies between 11 and 90% (1). Adherence to medications is key to outcomes in renal disease. Here we assessed adherence atterns in our young adult population with renal disease.

Objectives: To explore medication adherence patterns in young adults (18-30) with renal disease and to identify those at risk of consequences of non-adherence in order to optimise the quality and target their care as well as assessment of the impact of targeted interventions.

Methods: Patients under 30 years in the renal department at St George's hospital on our young adult database were interviewed. Letters were sent out to all patients on the database then a self report medication adherence assessment (socio-demographics & Morisky 8-Item Medication Adherence Scale (MMAS-8)) was completed either by face-to-face interview, email or telecommunication after obtaining verbal consent. Participants were asked a qualitative question with two potential follow up questions, used to gain a perspective of the patients view of their current situation and whether they felt they could benefit from input along with suggestions how. Patient treatment modality was also noted. Data has been collected over two consecutive years 2015 and 2016. Informed consent was gained from all participants or their guardians. Patient treatment modality was also noted. The survey was only accessible through secure NHS access to ensure confidentiality. Following the initial audit in 2015 our young adult worker adopted targeted interventions such as supervised text reminders/alarm setting on mobile devices, electronic calendars with personalised reminders, provision of dosette boxes, orchestrated peer support opportunities and simplification of treatment regimens with the help of the clinical team.

Results: The patient database varied between, 93 (2015) & 95 (2016). Response rate was between 63.4 to 67%. In 2015 none of the dialysis patients reported high adherence in 2016 this had improved to 25.5 with 37.5 demonstrating medium adherence. Approximately 30% of the general nephrology and transplant patients had high adherence similar to 2015. Adherence patterns were similar between males and females. Patients who were students and those who had two home bases demonstrated more ''low adherence'' than those in more stable environments. Those in relationships also seemed to demonstrate more ''low adherence''. Age did not have a clear influence on adherence patterns.

Conclusion: Adherence continues to be a significant problem in our adolescence/young adults with renal disease. We have shown that targeted intervention can improve adherence. Identification and targeting of the population with least adherence however is not adequate as even those identified as highly adherent at a point in time can demonstrate low adherence during times of transition or during life stressors and in association with changes in their social condition. There is need for global ongoing support for young adults with chronic renal disease.

References: 1. Aherence to treatment in adolescents. Taddeo D, Egedy M, Frappier JY. Paediatric Child Health. 2008 Janl 13(1):19-24

Disclosure of Interest: None Declared

Keywords: Young adults

Transitional Care

PO-275

Renal transplant outcomes in young adults before and after the introduction of a young adult service.

L. Baines [1,*], H. Lambert [2], A. Brown [1], H. Ritson [1]

[1]Renal Services, [2]Paediatric Nephrology, NHS, Newcastle upon Tyne , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The loss of a functioning kidney transplant is a serious adverse outcome for a young adult with chronic kidney disease and the return to dialysis often associated with complications, frequent hospital attendance and potentially reduced life expectancy. Some evidence suggests that holistic support directed to the complex needs of young adults with kidney transplants reduces graft loss and improves outcomes.

Objectives: To review renal transplant outcomes in young adults coming through adult services in Newcastle who were transplanted under the age of 25 years between 1997 and 2016 and to specifically explore rates of graft loss before and after the introduction of a young adult service in 2011 as well as factors contributing to graft loss.

Methods: Retrospective review of casenotes and hospital electronic records. Transplant outcomes were analysed in three groups defined by whether patients were transplanted before or after 2011 when a young adult service was introduced and also whether graft loss occurred before or after 2011; group 1 transplanted since 2011 with graft loss since 2011, group 2 transplanted before 2011 with graft loss since 2011 and group 3 transplanted before 2011 with graft loss before 2011.

Results: Between 1997 and 2016, 76 patients received 84 kidney transplants, median age 17 (range 3 to 24) years, follow-up range 1 to 19 years. 45 patients were transplanted in children's services and 39 in adult services. Overall there were 24 graft losses in 84 transplants (29%). Graft loss occurred in 23 out of 65 transplants before 2011 (35%) including 3 deaths with functioning grafts and 1 graft loss after 2011 (6%). In group 1, there was 1 graft loss in 16 transplants (6%) which occurred within 48 hours post-transplant patients with no documented rejection in these surviving transplants. In group 2, 9 graft losses occurred in 65 transplants (14%), 2 due to primary disease, 7 due to rejection, 5 before 2011 and 2 after 2011. Non-concordance was documented in 4 patients. In group 3, there were 14 graft losses in 65 transplants (22%), 3 due to renal vein thrombosis before 90 days, 1 due to primary disease, 7 due to rejection (50%) and 3 with patient death. There was documented non-concordance in 4 patients.

Conclusion: Young adults are at high risk of loss of their renal transplants. In Newcastle, the rate of graft loss has reduced considerably since 2011. This is coincident with the introduction of a young adult service. Rates of incident transplant rejection causing graft loss has also reduced since 2011. Whilst many factors influence transplant outcomes, young adults may benefit from intensive support from a young adult service with a dedicated kidney care coordinator to address their complex needs and prolong the lifespan of their renal transplants possibly by reducing the development of transplant rejection.

Disclosure of Interest: None Declared

Keywords: Rejection, Transplant outcome, Young adults

Transplantation - CVS Screening

PO-276

Cardiovascular Risk Management of Renal Transplant Patients

J. Newton [1,*], R. McLemon [1], T. Muniraju [1]

[1]Renal Medicine, NHS Dumfries and Galloway, Dumfries, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: There is a high burden of cardiovascular disease amongst renal transplant recipients, and it is the most common cause of death with a functioning graft (1). We have assessed the medical management of all transplant patients in our region by comparing regular monitoring of blood pressure, glycaemia and serum lipids, with appropriate prescription of medicines based on their cardiovascular risk.

Objectives: The aim of this is to enable better identification of areas for future cardiovascular risk reduction.

Methods: Using the electronic health record (SERPR) information was collected on cardiovascular comorbidities, all current medications, frequency of clinic visits, blood pressure and most recent biochemical results for glycaemia, proteinuria and lipid results for the local transplant cohort of 69 patients. Prescription of statins, antihypertensives and secondary prevention with aspirin were audited against standards in guidelines on postoperative management of renal transplant patients from the Renal Association (RA) and KDIGO. Cardiovascular risk was calculated using the Joint British Societies Guidelines (JBS2) as recommended in RA guidance. Data was initially collected in 2014 and the audit cycle was completed in 2016 with further data collection.

Table:

Category and screening target	Number of patients 2014	Percentage screened 2014	Number of patients 2016	Percentage screened 2016
Blood pressure (4/year)	60/69	87.0%	60/71	84.5%
Glycaemia (glucose or HbA1c - 1/year	68/69	98.6%	70/71	98.6%
Proteinuria (1/year)	68/69	98.6%	69/71	97.2%

Results: Cardiovascular comorbidities were common, and there was a rise in new-onset diabetes after transplantation between the 2014 and 2016 cohorts (5/62 patients), which may be attributable to increased frequency of HbA1c screening of hyperglycaemic patients (rise from 36.4% to 71.4%). Percentage of patients considered to have a 10 year cardiovascular risk of greater than 20% rose from 29.0% in 2014 to 32.4% in 2016, however, percentage of these patients taking statins as recommended fell from 60.0% to 52.17%. Although a smaller proportion of patients were hypertensive in 2016 (36.2%, fall from 40.6%), rates of patients with proteinuria receiving renin-angiotensin blockade was low, falling from 33.3% to 18.2%.

Conclusion: Whilst screening rates for cardiovascular risk factors are generally excellent, there is room for improvement in the management of hypertension and proteinuria. Rates of statin prescription suggest that we often underestimate cardiovascular risk clinically; however, further analysis will be required to determine whether valid reasons exist to support decisions to omit statins or renin-angiotensin blockade.

These results have been discussed with local clinicians, and will be added to the electronic record to highlight areas of variation from guidelines. Whilst this intervention and a process change of focusing on cardiovascular risk at a specific transplant clinic each year may have improved screening in some areas, such as detection of new diabetes, with rising numbers of patients with high cardiovascular risk more effective systems will be required. We intend to exploring the development of automated prompts built into the electronic record to provide reminders and facilitate guideline compliance and cardiovascular risk reduction, and will use further re-audit to assess the impact of this.

References: 1. Baker R, Jardine A, Andrews P. Post-operative Care of the Kidney Transplant Patient. Renal Association Guidelines (2011). Available at: www.renal.org

Disclosure of Interest: None Declared

Keywords: cardiovascular disease, Hypertension, Transplant outcome

Transplantation - Epidemiology

PO-277

Effect of ethnicity and socio-economic factors on renal transplantation

J. Baharani [1], M. Mahmood [2,*], T. Wilmink [3]

[1]RENAL MEDICINE, HEART OF ENGLAND NHS TRUST, [2]HEART OF ENGLAND NHS TRUST, FY2, [3]VASCULAR SURGERY, HEART OF ENGLAND NHS TRUST, BIRMINGHAM, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: For most patients on Haemodialysis (HD), the only way to end treatment is renal transplantation. We reported earlier that ethnicity and socio-economic group (SEG) had no effect on mode of starting HD.

Objectives: This study looks at the effect of ethnicity and SEG on renal transplantation.

Methods: Review of transplants from renal database from 2000 till December 2015. Ethnicity coded from hospital records. Deprivation index calculated from postcodes and 2011 census data.

Results: 407 ESRD patients were transplanted in the study period: 260 (64%) Caucasian, 118 (29%) Asian and 29 (7%) Afro-Caribbean. 190 transplant recipients (47%) were from the lowest SEG and less than 15% from the 4 higher SEGs. Of the transplants, 64% were deceased donor, 36% were living related and 58 (14%) were pre-emptive. There were no differences in proportion of living related transplants ($p = 0.28$) or pre-emptive transplants ($p = 0.30$) between ethnic groups. However patients from the lower SEGs had less living related transplants ($p=0.01$) and less pre-emptive transplants ($p=0.02$).

Conclusion: Patients from the lower SEGs are less likely to have a pre-emptive transplant or living related transplants. For these patients, PD should be stressed as initial dialysis modality as they may spend longer on dialysis prior to transplantation and could benefit from the early survival advantage afforded by PD.

Disclosure of Interest: None Declared

Keywords: Ethnicity, Pre-emptive transplantation, Socioeconomic

Transplantation - Epidemiology

PO-278

Does health literacy explain differences in patterns of care by socioeconomic status among dialysis patients?

D. Taylor [1,*], S. Fraser [1], A. Bradley [2], C. Bradley [3], J. Cairns [4], H. Draper [5], J. Forsythe [6], R. Johnson [7], G. Leydon [8], W. Metcalfe [6], G. Oniscu [6], M. Robb [7], C. Tomson [9], C. Watson [10], R. Ravanan [11], P. Roderick [1] and on behalf of the ATTOM programme

[1]Primary Care and Population Sciences, University of Southampton, Southampton, [2]Transplant unit, Cambridge university hospitals, Cambridge, [3]Royal Holloway, University of London, [4]London School of Hygeine and Tropical Medicine, London, [5]University of Birmingham, Birmingham, [6]Royal Infirmary of Edinburgh, Edinburgh, [7]NHSBT, Bristol, [8]University of Southampton, Southampton, [9]Freeman Hospital, Newcastle upon Tyne, [10]University of Cambridge, Cambridge, [11]Richard Bright Renal Service, North Bristol NHS Trust, Bristol, United Kingdom

Preferred Presentation Method: Oral

Introduction: Health literacy(HL) defines individuals' ability to access, understand and use information to improve health. Limited HL is hypothesised to impair navigation of healthcare services, and affects 20% of UK incident dialysis patients but only 12% of transplant recipients, associated with increased comorbidity and low socioeconomic status(SES).[1] In small US studies, dialysis patients with limited HL have reduced access to transplant referral[2] and increased mortality.[3]

Objectives: To examine the effect of limited HL on presentation, dialysis mode and access, transplant listing and survival.

Methods: The Access to Transplant and Transplant Outcome Measures(ATTOM) study recruited patients aged 18-75 from all 72 UK renal units from 2011-2013.[4] This analysis includes incident dialysis patients, never previously transplanted. HL was measured using the Single-Item Literacy Screener. Demographics, clinical details, and individual-level SES variables were recorded at enrolment. Transplant listing, transplantation and mortality were recorded at 2 years. Univariate and multivariate regression and survival analysis was performed, with sequential adjustment for demographics, language, comorbidity and SES,$p<0.05$.

Image:

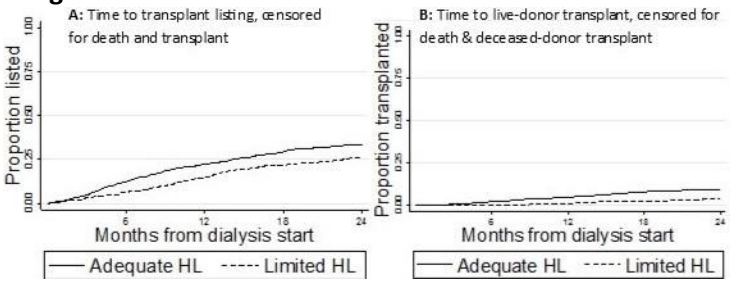


Table:

OR/HR [95%CI] p	**1**: Age/Gender	**2:** + Ethnicity/ Language	**3:** + Comorbidity/ PRD	**4:** + SES
Late presentation	0.52 [0.36,0.74] **<0.001**	0.54 [0.37,0.78] **0.001**	0.69 [0.47,1.02] 0.06	0.69 [0.46,1.04] 0.07
PD (vs HD)	0.68 [0.51,0.90] **0.007**	0.71 [0.52,0.95] **0.023**	0.73 [0.54,1.04] 0.053	0.98 [0.70,1.37] 0.9
DD transplant listing	0.71 [0.56,0.89] **0.003**	0.63 [0.49,0.81] **<0.001**	0.68 [0.53,0.88] **0.003**	0.86 [0.66,1.13] 0.271
Live-donor transplantation	0.37 [0.21,0.66] **0.001**	0.33 [0.18,0.61] **<0.001**	0.40 [0.21,0.74] **0.004**	0.64 [0.33,1.25] 0.2

Results: 2174 patients were included. 440(20%) had limited HL. Multivariate analysis is illustrated in **table**. Limited HL was associated with reduced odds of late presentation (OR:0.53 95% CI: 0.4-0.7) until adjustment for comorbidity, and with reduced odds of peritoneal dialysis as first dialysis modality (OR: 0.70; 95% CI:0.5-0.9) until adjustment for comorbidity or SES. No difference in dialysis catheter use was found (OR: 1.08; 95% CI: 0.9-1.4).There was no significant association between limited HL and risk of death. Limited HL was associated with reduced risk of deceased-donor transplant listing (OR: 0.72; 95% CI: 0.1-0.6) and live-donor transplantation (OR: 0.4; 95% CI:0.2-0.6), see **figure**. These associations remained significant after adjustment for comorbidity but not once SES included.
Conclusion: In this large UK-wide cohort, limited HL is not associated with dialysis patterns of care once comorbidity and SES differences are accounted for. However, limited HL may mediate the association between low SES and reduced access to transplantation/peritoneal dialysis. Interventions to improve access and understanding for those with limited HL may reduce inequity.
References: 1. Taylor D *et al.*Limited health literacy in advanced kidney disease.*Kidney Int* 2016;90:685-695;**2**.Grubbs V *et al.*Health literacy and access to kidney transplantation.*cJASN* 2009;4:195-200;**3**.Cavanaugh K *et al.*Low health literacy associates with increased mortality in ESRD *JASN* 2010;21:1979-1985;**4.**Oniscu GC *et al.*ATTOM: study protocol of a UK wide, in-depth, prospective cohort analysis.*BMJ open* 2016;6: e010377.

Disclosure of Interest: None Declared

Keywords: Epidemiology, ESRD

Transplantation - Epidemiology

PO-279

HLA-DR3 mismatch in Membranous Nephropathy graft survival. A Tricontinental Registry study

P. Hamilton [1,*], K. Poulton [1], L. Bradbury [2], S. Madden [2], D. Collett [2], N. P. Goodrich [3], L. H. Mariani [3], R. M. Merion [3], S. McDonald [4], P. Brenchley [5]

[1]CMFT, Manchester, [2]NHSBT, Bristol, United Kingdom, [3]Arbor Research Collaborative for Health, Ann Arbor, United States, [4]Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia, [5]Renal, CMFT, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Membranous nephropathy (MN) is one of the most common causes of nephrotic syndrome worldwide. For most, it is an autoimmune condition associated with the anti-PLA_2R autoantibody, the pathogenesis of which is unknown but with convincing evidence pointing to a genetic component in the development of the disease. Current renal transplant practice aims to provide the closest match possible of recipient and donor. There is a proven association of MN with HLA-DR3, but whether this antigen drives or initiates the pathology, and whether its presence in the recipient, donor or both impacts on graft survival is unknown.

Objectives: Using data from three of the largest renal transplant registries worldwide (USA, UK and ANZ) we investigated if HLA-DR3 mismatching affects graft survival in patients with MN.

Methods: We interrogated the registries for all renal transplant recipients with MN. We carried out univariate graft survival analysis and multivariate risk modelling using Cox proportional hazard regression (donor age, donor type, registry, recipient ethnicity & transplant year) comparing all 8 combinations of HLA-DR3 mismatch. To assess the importance of HLA-DQA and HLA-DQB polymorphisms on graft survival in MN, we repeated the analysis by grouping HLA-DR3 with other HLA-DR antigens to examine any combined effect that may implicate antigen presentation by HLA-DQ.

Results: A total of 54656 transplant recipients were identified in all three registries comprising 6848 PMN patients; 6195 from the US, 379 from the UK and 274 from Australasia. There were 2689 living donors compared to 4159 deceased donors. We found no reduction in graft survival for recipients homozygous for HLA-DR3 receiving a transplant from a donor homozygous for HLA-DR3.

Univariate analysis shows a single group with a significant graft survival reduction, recipients homozygous for HLA-DR3 receiving a donor from a patient with no HLA-DR3 (HR 2.07, 95% CI 1.12-3.82, p-value 0.020). Cox regression showed two significant combinations and both resulting in a reduced graft life. The first was again recipients homozygous for HLA-DR3 receiving a transplant from an HLA-DR3 negative donor (HR 1.93, 95% CI 1.05-3.58, p-value 0.035). The second group was HLA-DR3 negative recipients receiving a transplant from an individual homozygous for HLA-DR3 (HR 3.22, 95% CI 1.22-8.48, p-value 0.018).

Combining HLA-DR3 & HLA-DR7 we found that the same two groups as above became more statistically significant; HLA-DR3+/or DR7 homozygous recipients receiving a transplant from HLA-DR3+/or DR7 negative donors (HR 1.92, 95% CI 1.30-2.85, p-value 0.001).and patients negative for HLA-DR3+/or DR7 receiving a transplant from a donor homozygous for HLA-DR3+/or DR7 (HR 2.41, 95% CI 1.51-3.83, p-value 0.0002)

Conclusion: We have shown that close matching at HLA-DR3 does not result in a reduced graft survival. However recipients who are HLA-DR3 naive have reduced graft survival if the donor is HLA-DR3 homozygous. The reverse is also true with recipients homozygous for HLA-DR3 having reduced graft survival if receiving a kidney from a HLA-DR3 negative donor. These results become more significant if HLA-DR7 is combined with HLA-DR3 suggesting that this reduction in graft survival may in fact be due to an association with HLA-DQ2 polymorphisms. It also suggests that for MN patients requiring a transplant, these combinations of HLA-DR matching should be avoided in order to improve outcomes.

Disclosure of Interest: None Declared

Keywords: None

Transplantation - Epidemiology

PO-280

Using social media data to identify sentiment associated with renal replacement therapy

J. Smith [1,*], S. Methven [2], J. Traynor [1], P. Mark [3], P. Phelan [4]

[1]Renal Medicine, Glasgow Renal and Transplant Unit, Glasgow, [2]Renal Medicine, Aberdeen Royal Infirmary, Aberdeen, [3]Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, [4]Renal Medicine, Royal Infirmary of Edinburgh, Edinburgh, United Kingdom

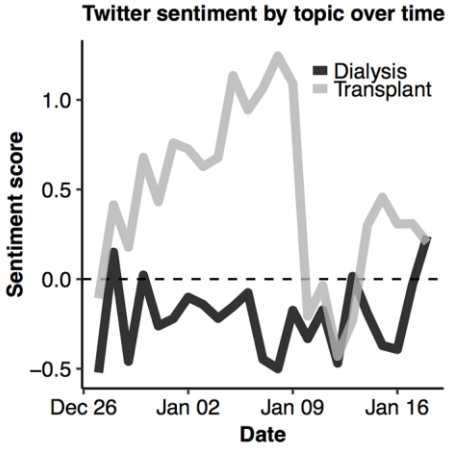
Preferred Presentation Method: Oral or Poster

Introduction: Renal replacement therapy requires intensive treatment for both patients and caregivers with high associated psychological burden, which can be difficult to measure. Conventional analysis methods (questionnaires, structured interviews, etc.) lack real time immediacy or the benefits of unfiltered comments. Twitter, a social media micro-blogging site, offers a rich resource for text analysis, with over 200 billion tweets annually, and is used by patients and healthcare professionals. Twitter data have been used previously to derive insights applicable to medicine, for example analysis of adverse drug reactions.

Objectives: To explore the use of Twitter data in a renal-specific context, we compared the content of worldwide tweets relating to dialysis with those of kidney transplant, hypothesising that the latter may be associated with a more positive overall sentiment.

Methods: Tweets posted between 27/12/16 and 18/1/17 containing the words “dialysis” or “kidney/renal + transplant” were downloaded. To analyse posts from individual users, we identified and deleted retweets, marketing posts, scheduled news, obvious computer generated tweets and viral campaigns. Each tweet was split into individual words, and symbols, punctuation and “stopwords” (common words e.g. "the", "I", "and") were removed. The AFINN lexicon, which contains words that have previously been allocated a sentiment score between -5 and +5, was used to derive sentiment scores from the resulting dataset, corrected for word frequency. Analysis was performed using R, and the packages “TwitteR” and “Tidytext”.

Image:



Results: Tweets containing the search term “dialysis” (n=25365), and “kidney/renal + transplant” (n=10401) were collected. After exclusions, 4478 (17.7%) and 2590 (24.9%) tweets respectively from 4571 unique users were analysed. Reassuringly, words expected to be associated with dialysis (e.g. nurse, peritoneal, machine) and transplant (donor, recipient, surgeon) were identified in relation to the respective topics.

The overall sentiment score for dialysis was -0.2, whereas transplant scored +0.4. Figure 1 shows a breakdown of sentiment scores over the 16 days of data collection; despite some fluctuations, transplant was consistently associated with more positive sentiment than dialysis.

Conclusion: This analysis supports the hypothesis that tweets mentioning renal transplant are associated with a more positive sentiment than those mentioning dialysis. This provides an example of the use of modern data science tools to interrogate unstructured, previously inaccessible data. Such analyses can be adapted and extended to derive insights about patient and clinician priorities both in snapshot and over time.

Disclosure of Interest: None Declared

Keywords: Communication techniques, Dialysis, Patient experience

Transplantation - Epidemiology

PO-281

An audit of HLA antibody profiling in potential kidney transplant recipients.

I. Logan [1,*], N. Sheerin [1], V. Carter [1], K. Jones [1]

[1]Renal services, NEWCASTLE HOSPITALS, Newcastle upon Tyne, United Kingdom

Preferred Presentation Method: Poster

Introduction: Circulating antibodies to human leucocyte antigens (HLA) predict kidney transplant rejection and graft failure. Potential transplant recipients are screened to determine their HLA antibody profile in order to 1) improve histocompatibility between recipient and donor, 2) reduce time taken to perform compatible transplants in a selected group of patients (those who are suitable for virtual crossmatching (VCM)), 3) plan desensitising treatment to overcome tissue incompatibility.

British Transplant Society guidelines state that patients awaiting transplantation require an HLA antibody profile 3-monthly. Developments in Luminex technology have facilitated such testing.

Objectives: Our objective was to determine the number of haemodialysis patients, listed for kidney transplant, who had HLA antibody profiling done as per the 3 month guideline. We present monthly audit data, spanning 12 months, from our haemodialysis population listed for kidney transplant.

Methods: In our department, colleagues developed a protocol to allow patients with a predictable antibody profile to receive a transplant following VCM, without the need for a wet crossmatch. We interogated this database of haemodialysis patients listed for transplant (n=84) to determine how many had an HLA antibody profile done within the last 3 months. Our subsequent intervention used pre-existing unit infrastructure to facilitate regular HLA antibody profiling, targeted specialist nurse input for home haemodialysis patients and improved staff and patient awareness using posters in the haemodialysis unit. We re-audited our performance monthly, over 12 months, after intervention.

Results: 1) We show that 32% of patients initially did not have a valid HLA antibody profile taken within 3 months, to facilitate transplantation.

2) After intervention, only 1.5% of haemodialysis patients do not have a valid HLA antibody profile. This improvement is sustained at 12 months after intervention.

Conclusion: 1) HLA antibody profiling was initially inadequate in our haemodialysis cohort.

2) Our intervention co-incided with a dramatic improvement in the number of haemodialysis patients with a valid HLA antiody profile, to facilitate transplantation.

Our next task is to the replicate our audit in other patient cohorts, and to confirm that the intervention improves long-term outcomes among transplant recipients.

Disclosure of Interest: None Declared

Keywords: HLA/MHC, Rejection, Transplant immunology

Transplantation - Immunosuppression

PO-282

Experience of Sirolimus conversion in the chronic renal transplant setting

M. Qasim [1,*], P. Carmichael [1], L. Atamaniuk [1]

[1]renal, ROYAL WOLVERHAMPTON NHS TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Mammalian target of rapamycin (mTOR) inhibition is potentially a less nephrotoxic form of immunosuppression than calcineurin inhibitors (CNIs). mTOR inhibitors also have the advantage of reducing progressive atherosclerotic injury and the incidence of malignancies. Conversion from CNIs to mTOR inhibitors after transplantation and before the development of renal injury may be an important strategic use for this therapy. The CONVERT Trial, Spare the Nephron and the RMR trials have all demonstrated benefit in eGFR on conversion from CNI to Sirolimus (SRL)

Objectives: 1- To know the effect of Sirolimus conversion from Calcineurin inhibitors on the eGFR

Methods: Patient selection for conversion from CNI's to Sirolimus was based on the presence of chronic progressive graft dysfunction, CNI intolerance, malignancy and severe cutaneous viral warts. 30 patients were identified, 9 female and 21 male, 4 were Live related and 26 cadaveric transplants of which 6 had previous transplant(s)

Results: Seven patients failed to tolerate the switch due to complaints of; generalised swelling, acne, pancytopenia, diarrhoea, generally unwell or a combination of above. The patients creatinine was documented 3 monthly over the 12th month prior to and after conversion. Renal functions stabilised in majority of patients, no patient developed nephrotic range proteinuria and 25% patients experienced increased levels of cholesterol requiring additional therapy. The analysis of those patients tolerating SRL for > 3months is as follows: age @ time of SRL conversion was 52.8 years with median 48.5 years; transplant duration was 9.6 years with median 6.3 years and the duration of SRL therapy was 2 years with median also of 2 years.

Conclusion: Over 24% of patients stopped SRL due to a range of side effects. In those patients who tolerated SRL, the majority stabilised their renal function. At a 2 year follow up point in this group of 22 patients there was statistically no difference between the pre-treatment and post-treatment serum creatinine values which implies benefit as most patients at time of switching had an increasing creatinine value. There is a need to expand the numbers and duration to better assess this potential benefit with regard to preservation of renal function.

References: Wyzgal J, Paczek L, Senatorski G, et al. Sirolimus rescue treatment in calcineurin-inhibitor nephrotoxicity after kidney transplantation

2002; 34: 3185.

Watson CJ, Firth J, Williams PF et al. A Randomized Controlled trial of late Conversion from CNI-based to Sirolimus-based Immunosuppression following renal transplantation.

Am J Transplant 2005; 5:2496.

Disclosure of Interest: None Declared

Keywords: Calcineurin inhibitors, Immunosuppression, Renal transplant

Transplantation - Immunosuppression

PO-283

A CHANGE TO GENERIC TACROLIMUS DOES NOT ADVERSELY AFFECT RENAL TRANSPLANT OUTCOME AT ONE YEAR IN A LARGE NON-TRANSPLANTING RENAL CENTRE

J. Andrews [1,*], A. Callaway [1], N. Snaith [1], I. Moore [1]

[1]Renal Unit, SOUTH TEES HOSPITALS NHS TRUST, Middlesbrough, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: In September 2014, NHS England issued a framework on repatriation of transplant immunosuppressant prescribing from primary care to secondary care[1]. Some UK renal units have switched from branded to generic immunosuppressant drugs as part of repatriation. In our region, we use a standard immunosuppressive regime of Tacrolimus and Mycophenolate Mofetil, with or without glucocorticoids. We decided to change from Tacrolimus (TAC) Prograf™ to generic TAC Adoport™. This change was undertaken at the start of January 2015 and has led to savings on immunosuppressant drug spend.

Our tertiary referral renal unit covers a wide geographical area and has 550 transplant recipients, 330 haemodialysis (HD) patients and 30 peritoneal dialysis (PD) patients. We normally have 45-50 patients transplanted per year at our local transplanting unit and discharged back to us day 7-10 post-operatively. We follow up these recipients in the early post-transplant clinic in-centre for at least 3 months. They are then transferred back to consultant clinic for ongoing follow-up.

Objectives: We wished to ensure the TAC change to generic did not affect patient or transplant graft outcome. We studied all patients transplanted in 2014 (who received Prograf™) and compared outcomes to those transplanted in 2015 (who received Adoport™).

Methods: We compared patient demographics, type of transplant, biopsy and rejection rates, mortality and Creatinine at 3months, 6months and 1year post-transplant in all our patients transplanted in 2014 and 2015.

Results: In 2014, there were 51 transplants, all of whom received Prograf™, average recipient age 51. Fifteen patients were pre-emptive (29.4%), 33 (64.7%) on haemodialysis (HD) and 3 (5.9%) on peritoneal dialysis (PD). Twenty-six patients (51.0%) had living donor (LD) transplants, 22 (43.1%) deceased after cardiac death (DCD), 2 (3.9%) simultaneous pancreas and kidney transplants (SPK) and 1 (2%) was a deceased after brain death (DBD) transplant. At 1year, 2 patients had died; 2 further patients had lost graft function. Mean function at 3months, 6months and 1year was 112, 116 and 128 umol/L. We biopsied 9/51 patients in the 1st year; 6 patients had rejection.

In 2015, there were 45 transplants, all of whom received Adoport™, average recipient age 48. Sixteen patients (35.5%) were pre-emptive, 28 on HD (62.2%) and 1 on PD (2.3%). Twenty patients had LD (44.4%), 15 DCD (33.3%) and 10 DBD (22.2%) transplants. At 1year, 1 patient had died, and 2 people had lost graft function – 1 immediately post-op and the other after 9months. Mean function at 3months, 6months and 1 year was 119, 123 and 123 umol/L. We biopsied 4 patients; 1 had rejection. There was no reported Adoport™ intolerance.

Conclusion: More patients were transplanted in 2014 and marginally more of them were LD grafts. Creatinine at 3months, 6months and 1year was not significantly different. There was similar mortality and the same number lost graft function in each group. In the Prograf™ group, more patients were biopsied and we found significantly more rejection: 11.7% versus 2.2%.

We conclude that the change from branded to generic Tacrolimus is well-tolerated and has not adversely affected outcome for our newly transplanted patients. In our study, patients taking branded Tacrolimus required biopsy more frequently and suffered more rejection episodes.

References: [1]https://www.england.nhs.uk/wp-content/uploads/2014/10/comms-intents-2015-16.pdf

Disclosure of Interest: None Declared

Keywords: Renal transplant, Transplant IS, Transplant outcome

Transplantation - Immunosuppression

PO-284

Variation in Tacrolimus levels are significantly associated with poor function and poor allograft survival.

S. Jham [1], L. Bull [1,*], A. Bentall [1]

[1]Renal, QUEEN ELIZABETH HOSPITAL BIRMINGHAM NHS TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Improving graft function and survival remain important goals of therapy and modern immunosuppression has significantly reduced the rate of rejection, but side-effects are present. Local audit data had suggested that most of our thrombotic microangiopathy on early biopsies was related to CNI toxicity. This study examines variation in tacrolimus levels during the first year post transplant, in 2 distinct periods – first 3 months and 3-12months, and the impact on both eGFR at subsequent time points and allograft survival.

Objectives: 1. Retrospectively collect tacrolimus readings during the first year post transplant between 2008 and 2010.
2. Divide the readings into early (first 3 months post transplant) and late (3-12 months post transplant).
3. Compare average levels to our unit protocol for each time period.
4. Compare the impact of mean tacrolimus levels with egfr and various time points within 5 years post transplant.
5. Compare the impact of mean tacrolimus levels and allograft survival at 3 and 5 years post transplant.

Methods: We retrospectively collected data on patients transplanted between 2008 and 2010, and included patients with >10 tacrolimus readings who had follow up at 1 year at our hospital. The tacrolimus levels was compared to the unit protocol and the co-efficient of variation calculated in each time period. eGFR was calculated as an average in 3 month periods and allograft survival was analysed by Kaplan-Meier plots.

Results: EARLY (<90days)

Mean FK levels less than 8 were associated with increased allograft. Mean FK levels >10 were not at increased risk. CV>30% were associated with increased risk of failure ($p<0.01$) and significantly worse renal function($p<0.01$).

LATE (90-365days)

Mean FK levels were within target (<8) and not associated with failure, however a mean FK<5 had increased risk of failure ($p<0.01$). A CV >30% was associated with worse function at all time points($p<0.05$) and increased allograft failure ($p<0.01$).

Conclusion: Management of Tacrolimus still proves to be clinically difficult, however these data support implementing monitoring not only for absolute level of FK, but also the CV% within the readings to classify risk within the follow up clinic.

References:

1. A high intrapatient variability in tacrolimus exposure is associated with poor long-term outcome of kidneytransplantation.
Shuker N, Shuker L, van Rosmalen J, Roodnat JI, Borra LC, Weimar W, Hesselink DA, van Gelder T.
Transpl Int. 2016 Nov;29(11):1158-1167

2.High Intrapatient Tacrolimus Variability Is Associated With Worse Outcomes in Renal Transplantation Using a Low-Dose Tacrolimus Immunosuppressive Regime.
Whalen HR, Glen JA, Harkins V, Stevens KK, Jardine AG, Geddes CC, Clancy MJ.
Transplantation. 2016 Mar 4

3.Tacrolimus trough-level variability predicts long-term allograft survival following kidney transplantation.
O'Regan JA, Canney M, Connaughton DM, O'Kelly P, Williams Y, Collier G, deFreitas DG, O'Seaghdha CM, Conlon PJ.
J Nephrol. 2016 Apr;29(2):269-76

Disclosure of Interest: None Declared

Keywords: Calcineurin inhibitors, Transplant IS, Transplant outcome

Transplantation - Outcomes

PO-285

Urinary trace elements as early biomarkers of acute tubular injury after renal transplantation

J. Allen [1,*], D. Gardner [2], C. Byrne [1], K. Rigg [1], T. McCulloch [3], Z. Hodi [3], M. Devonald [1]

[1]Renal and Transplant Unit, NOTTINGHAM UNIVERISTY HOSPITALS NHS TRUST, [2]School of Veterinary Medicine and Science, University of Nottingham, [3]Department of Histopathology, NOTTINGHAM UNIVERISTY HOSPITALS NHS TRUST, Notitngham, United Kingdom

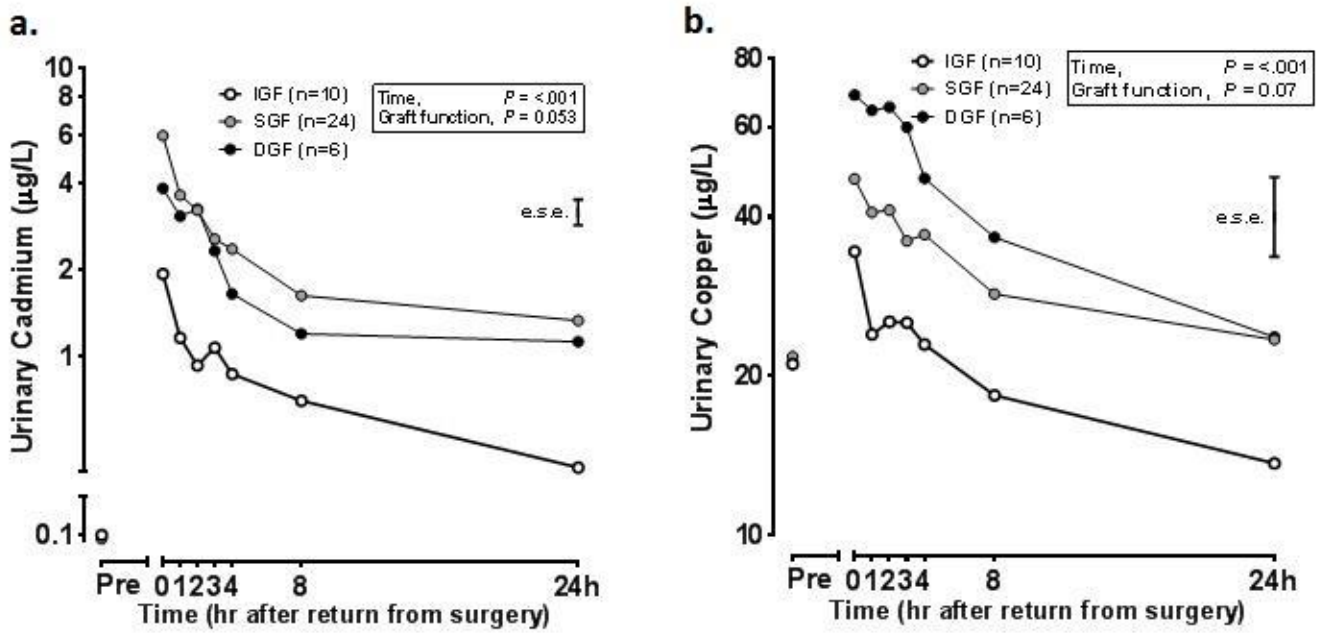
Preferred Presentation Method: Oral or Poster

Introduction: Ischaemia reperfusion injury (IRI) occurs during renal transplantation and can result in acute tubular injury (ATI) which may lead to slow or delayed graft function (SGF or DGF). Serum creatinine (SCr) is used as the gold standard measure of renal function after transplantation. SCr is a poor marker of ATI, being difficult to interpret in the context of existing renal disease and poor at differentiating between ATI and other causes of SGF/DGF. From a porcine model of IRI (Gardner et al AJP-Renal 2014) we have demonstrated that urinary copper (Cu) and cadmium (Cd) are potential early biomarkers of ATI and may predict SGF and DGF.

Objectives: As part of a programme of research investigating urinary Cd and Cu as early biomarkers of ATI we conducted a single centre prospective observational study of patients undergoing renal transplantation to determine whether urinary Cd and Cu may be used to predict SGF, DGF and ATI.

Methods: In adult patients undergoing renal transplantation urine was sampled at baseline and at 0, 1, 2, 3, 4, 8 and 24hr following surgery. Urinary elements were measured using ICP-MS and analysed with correction for urinary Cr by Restricted Maximum Likelihood estimating equations (Genstat v18, VSNi, Rothampsted, UK). SCr was measured as part of standard care. SGF was defined as SCr > 265µmol/L on day 5 or <30% reduction in SCr over first 3 days. DGF was defined as need for dialysis within 7 days (excluding a single session for hyperkalaemia). Immediate graft function (IGF) was defined as no SGF/DGF. Biopsies performed within 30 days were examined for ATI. Data are presented as means (SD or SEM as appropriate). Outcome measures were presence of SGF/DGF, and ATI on renal biopsy.

Image:



Results: We recruited 40 patients; 73% male; median age 49yr. Transplants were 88% deceased donor (heart beating 45%; non-heart beating 43%) and 12% living donor; 23% pre-emptive. 25% had IGF, 60% SGF and 15% DGF; 23% patients had ATI on biopsy. In all patients urinary Cd and Cu rose after transplantation (IRI) with levels higher in those with SGF and DGF relative to patients with IGF (Fig. 1a,b). In biopsied patients with ATI vs no-ATI, pre-transplant levels of Cd and Cu were similar (Cd, 0.19 vs 0.11 μg/L; Cu, 19.6 vs 36.6 μg/L) but increased post-transplant (at time zero Cd, 15.2 vs 4.6 μg/L, P=0.01; Cu, 64.2 vs 45.2 μg/L; P=0.85).
Conclusion: We suggest that after renal transplant, urinary Cd and Cu are promising biomarkers of renal injury. Urinary concentrations of each increased after surgery and were significantly higher in those patients with histologically proven ATI. Further work will identify if each can predict graft function (SGF/DGF).

Disclosure of Interest: None Declared

Keywords: Delayed graft function, Renal transplant

Transplantation - Outcomes

PO-286

Differential Effect of Antibody Removal on ABO Blood Group Type Chain Specific Antibodies Over Time

A. Bentall [1], M. Jeyakanthan [2], J. Pearcey [2], B. Motyka [2], T. Lowary [3], J. Buriak [4], L. West [2], S. Ball [1,*]

[1]Department of Nephrology , University Hospital Birmingham, Birmingham , United Kingdom, [2]Departments of Pediatrics, Surgery and Immunology, [3]Alberta Glycomics Centre, University of Alberta, [4]Department of Chemistry, National Institute of Nanotechnology, Edmonton, Canada

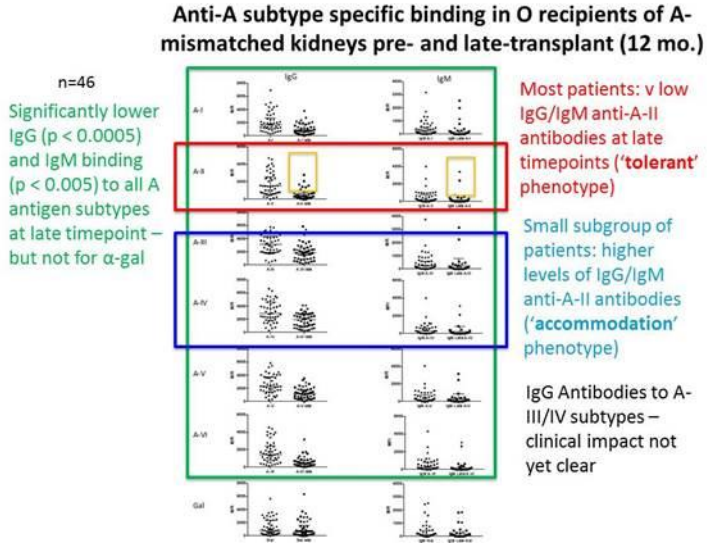
Preferred Presentation Method: Oral or Poster

Introduction: The trisaccharide epitope defines A&B blood group antigens where antibody binds to subtype chains (I-VI), but only subtype II is expressed on cardiac vascular endothelium. Following pediatric ABO-incompatible heart transplantation (ABOiHTx) there is evidence of humoral tolerance to this but not other allograft blood group antigen subtypes. This study reports subtype-specific antibody quantification in adult ABOi kidney transplant (ABOiKTx) recipients.

Objectives: The objective of this study was to investigate the binding of type-chain specific blood group antibody in a novel microarray in ABO incompatible adult kidney transplantation.

Methods: Plasma samples were obtained from 68 ABOiKTx recipients with blood group A donors. Antibody to ABH subtype antigens I-VI was quantified using a microarray platform in which the mean fluorescence intensity (MFI) of binding is proportionate to the concentration of antibody and a haemagglutination (HA) assay.

Image:



Results: Before and after a course of plasma exchange (PEx) or trisaccharide-based immuno-adsorption (IA), HA did not differ between treatment types. In the microarray assay, PEx reduced MFI of IgG and IgM binding to all blood group A subtypes and the Galili antigen. IA reduced the MFI of IgG binding to subtype II & VI equivalent to PEx, but the MFI of IgG binding to subtype III, IV & V remained significantly higher following IA ($p<0.01$) compared to PEx; the MFI of Galili antigen binding was unaltered. At 12 months post-ABOiKTx, the MFI of IgG binding to all subtypes had increased compared with pre-ABOiKTx (post-PEx /- IA), although IgG subtype binding remained below pre-treatment levels ($p<0.01$). Subtype II had the greatest relative reduction in IgG MFI at 12 months (Figure), as previously reported in paediatric ABOiHTx, but many adults nevertheless maintain moderate antibody levels even to this subtype.

Conclusion: These data demonstrate that IA preferentially removes IgG to subtype II compared to IgG to subtypes III/IV (subtypes for which there is evidence that these tetrasaccharides contribute to epitope generation). In the long-term, most adult recipients achieve very low levels of antibody to donor A antigen subtype II (a 'tolerant' phenotype) but a small proportion maintain significant antibody levels (an 'accommodated' phenotype).

Disclosure of Interest: None Declared

Keywords: ABO incompatible, Donor-specific antibodies, Transplant immunology

Transplantation - Outcomes

PO-287

Successful Treatment of Recurrent FSGS after Kidney Transplantation with Patient Tailored Plasma Exchange: A Single Centre Experience

H. Wilkinson [1,*], F. Willis [2], J. Stylianou [2], J. Ortizo [2], J. Popoola [1]

[1]Department of Renal Medicine and Transplantation, [2]Department of Haematology, St Georges University Hospitals NHS Foundation Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Objectives: Recurrence of primary idiopathic focal segmental glomerulosclerosis (FSGS) in the transplant kidney remains a serious concern. Recurrence is frequent (30%) (1) and is associated with poor graft survival. To date there are no consensus guidelines on the treatment of FSGS. We present our experience of patient tailored plasma exchange (PE) as treatment of recurrent FSGS in the transplant patients.

Methods: The patients were transplanted and followed up at St Georges Hospital and had clinically proven nephrotic syndrome post-transplant with biopsy findings consistent with early recurrent FSGS. Patients were treated with high dose steroids and plasma exchange. Initial treatment plan was 3x week then 2x week then weekly. Decision to reduce the frequency of PE was based on patient response, namely sustained reduction in proteinuria over 2 clinic visits, and not on duration of treatment or number of sessions. Recurrence was defined as proteinuria >3 g/day without evidence of acute rejection, glomerulitis or allograft glomerulopathy on the biopsy. Partial remission (PR) was defined as a 50% reduction of proteinuria, complete remission (CR) as a proteinuria <0.3 g/day.

Results: *Patient 1* diagnosed at 33 years had rapid progression and was started on peritoneal dialysis 3 years after diagnosis. He had an ABO blood group incompatible transplant at 41 years. At day 3 his urine protein/creatinine ratio (uPCR) reached 11609 mg/mmol. He received 3x week PE for 2 weeks then 2x week PE for 1 week. His uPCR subsequently increased requiring 2 further weeks of 3x week, higher frequency PE. He responded and reduced to 2x week PE for 12 weeks, the prolonged course at 2x week was due to a slow response. After 12 weeks he reduced to weekly PE for 3 weeks. He received a total of 41 sessions over 5 months. He remains relapse free 5 years post treatment. *Patient 2* diagnosed at 65 years, required haemodialysis within 2 months of diagnosis. He was transplanted at 73 years of age with a DCD transplant. At 7 weeks post transplant he had relapse of FSGS with a uPCR peaking at 1511mg/mmol. He was commenced on PE 3x week for 1 week then 2x week for 1 week (one session was held due to low WCC and cold sores), then weekly PE for 4 weeks. Receiving a total of 8 sessions over 6 weeks. He achieved PR at 1 month and CR 9 months. He remains relapse free at >2 years post treatment. *Patient 3* diagnosed at 55 years, she required haemodialysis 3 years after diagnosis. She received a live unrelated transplant at 59. She relapsed at 11 weeks with a uPCR of 666.7mg/mmol. She was commenced on 3x week PE for 2 weeks then 2x week for 2 weeks then weekly for 2 weeks. Receiving a total of 12 cycles over 5 weeks. She achieved remission by day 10. She is yet to complete 1 year follow up.

Conclusion: Prolonged plasma exchange tailored to patient response was efficacious in our cohort for recurrent FSGS in the transplanted kidney. There is a need for development of protocols for this potentially devastating condition through multicentre collaboration.

References: Pardon, Agathe, et al. "Risk factors and outcome of focal and segmental glomerulosclerosis recurrence in adult renal transplant recipients." *Nephrology Dialysis Transplantation* 21.4 (2006): 1053-1059.

Disclosure of Interest: None Declared

Keywords: FSGS, Plasma exchange, Transplant outcome

Transplantation - Outcomes

PO-288

Renal transplantation in patients with severe learning difficulties.

H. Campbell [1,*], J. Shanley [2]

[1]Renal, NORTH BRISTOL TRUST, [2]School of Medicine, University of Bristol, Bristol, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Renal transplantation is the optimal treatment for end stage renal failure. Patients with severe learning difficulties (LD) often face significant barriers to accessing medical treatment.

Objectives: We aimed to show that this patient population can undergo renal transplantation with similar transplant outcomes when compared to renal registry data. Consequently, we aimed to develop an individualised admission care plans prior to transplantation to guide staff during the peri-operative period.

Methods: A retrospective study was performed on all adult patients with severe LD who had received a renal transplant between 2013-2016 in our unit. We defined severe LD as a patient lacking capacity to decide if they wished to receive a renal transplant. Data collected included demographics, clinical diagnoses and transplant outcomes including creatinine, glomerular filtration rate (GFR), blood pressure (BP) and tacrolimus level. Lessons learned that influenced management of this patient population were then incorporated into future care plans.

Table: Recipient eGFR at 1 year

	Mean eGFR Live donor (mls/min/1.73m^2)	**Mean eGFR DBD (mls/min/1.73m^2)**	**Mean eGFR DCD (mls/min/1.73m^2)**
Renal registry data[1]	57	54	50
Patients with Severe LD	58	51	77

DBD=donation after brainstem death transplant, DCD=donation after circulatory death transplant.

Results: A total of 12 patients were successfully transplanted. The mean age of the patients was 36.4 years (range 22-66). 7 patients lived with family, 5 lived in social care. 2 patients were pre-emptively transplanted, 8 were on haemodialysis prior to transplantation and 2 were on peritoneal dialysis prior to transplantation. 7 patients received a transplant from deceased donors and 5 patients received transplants from live kidney donors. The mean length of stay was 15.8 days (range 5-40 days). Mean BP at 1 yr was 122/77mmHg (n=9) and mean tacrolimus level at 1 yr was 9 µg/L (n=9).

New admission care plans included pre-transplantation echocardiogram, consideration of eating and drinking habits, anaesthetic administration and whether post-operative sedation would be required, medicines review, how new medicines were to be taken and with what reliability, the ability to take blood tests and management of the monitoring required during the in-patient stay. Individualised care plans meant that at the time of transplantation most aspects of the patient's care had already been considered, freeing up time for patient care and decreasing cold ischaemic time in the deceased donor transplant recipients.

Conclusion: Patients with severe LD can receive a renal transplant and obtain similar transplant function to other renal transplant recipients. Our experiences highlighted the need for individualised care plans in the peri-operative period.

References: UK Renal Registry 18th Annual Report. Nephron 2016;132(suppl1):69-98

Disclosure of Interest: None Declared

Keywords: Patient experience, Transplant outcome

Transplantation - Outcomes

PO-289

Incidental Findings among Potential Living Related Kidney Donors at a Single non-transplanting Centre

F. Abdelaal [1,*], K. Hodgson [1], H. Rasheed [1]

[1]Renal Medicine, HEART OF ENGLAND NHS FOUNDATION TRUST, Birmingham, United Kingdom

Preferred Presentation Method: Poster

Introduction: Living Related Donor (LRD) Kidney transplantation is the optimum treatment for suitable patients with End Stage Renal Disease. The advantages are better graft and patient survival compared to deceased donor grafts. UK data has shown low live donor and pre-emptive kidney transplant rate in the West Midlands. A quality improvement project (Transplant First) was introduced in 2015 to improve access to kidney transplantation.

Objectives: In our centre, we conducted this study to evaluate the LRD program particularly looking at the number of incidental findings among presumed healthy live donors during their transplant work up and the impact on recipient's outcomes.

Methods: The records of all live donors who had transplant work up in our centre between 2012 and 2016 were reviewed. Those with incidental findings were identified and categorised into radiological, laboratory and other abnormalities (outlined below).

Table: Type of Incidental Finding (N=17)

Abnormal Radiology Results (N=10)	**Abnormal Laboratory Results (N=5)**	**Others (N=2)**
Abnormal CT Abdomen (N=6) -Renal stones -Renal tumour -Vascular abnormality -Gastric cancer -Liver lesions and small renal stone -Accessory renal artery	Biochemistry (N=3) -Low e GFR -Abnormal LFTs -Raised cholestrol	Psychological issues
Unequal split function on DMSA (N=2)	Microbiology (N=2) -Malaria Antigen -HCV PCR	Anaphylaxis at anaesthetic induction
Low Ejection Fraction on ECHO (N=1)		
Nodular shadows on CXR ? Sarcoidosis (N=1)		

Results: In the five years between 2012-2016 there were a total of 68 live donors who had their transplant work up, out of which 17 (25%) were found to have incidental findings. The majority were abnormal radiological scans (58.8%) followed by abnormal blood results (29.4%) and other issues (11.8%).

Most of these live donors required further investigations and referral to other specialist. Only 2 were suitable to donate after further work up with an average time delay of 9.5 months. 8 live donors (47%) were excluded from donation, the outcome of their potential recipients were alternative LRD (N=3), cadaveric transplant (N=2), on-going dialysis (N=2), and one waiting on the deceased list. The rest of live donors were put on hold or their recipients were no longer deemed suitable for transplant.

Conclusion: At our centre, a quarter of presumed healthy live donors had incidental findings identified during the transplant work up. Almost half of them were completely excluded from donation. This highlights an obstacle to the growth of the LRD program. Finding an alternative LRD should be discussed and considered at the start of the work up process.

Disclosure of Interest: None Declared

Keywords: Living donor, Renal transplant

Transplantation - Outcomes

PO-290

A Mouse Model to Validate Candidate Genes Implicated in Post-Transplant Lymphoproliferative Disease

P. Webster [1,*], J. Dawes [2], K. Takacs [2], H. Dewchand [2], B. Iadarola [2], A. Uren [2]

[1]IMPERIAL COLLEGE LONDON, [2]MRC LMS, Imperial College London, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Post-transplant lymphoproliferative disease (PTLD) is an important complication after renal transplantation. The anti-apoptotic BCL2 is frequently overexpressed in Non-Hodgkin's Lymphoma, and immunostaining of PTLD shows overexpression in these tumours. Epstein Barr Virus drives PTLD via oncoproteins that alter gene expression, including upregulating *MYC* and *BCL2*, and downregulating *p53*, creating an aberrantly expanding B cell population. BCL2 inhibitors have demonstrated some success in treating human lymphoma, and also in preventing transplant rejection and treating autoimmune disease in mice, however limited efficacy means there is a requirement for additional therapeutic targets.

Objectives: We aimed to: (1) Identify genes deregulated alongside *BCL2* in lymphomagenesis, and (2) Develop a mouse model of PTLD to validate these candidate genes.

Methods: We performed a retroviral insertional mutagenesis screen using Moloney murine leukaemia virus in *Vav-BCL2* C57BL/6 mice as our lymphoma model, with next-generation sequencing to identify mutations co-occurring with BCL2. To validate candidate genes, we created a model of PTLD by overexpressing *Myc* in splenic B cells from *Vav-BCL2 p53*$^{+/-}$ C57BL/6 mice by retroviral transduction. Candidate genes are cotransduced and these cells are injected via tail vein into immunodeficient NOD scid gamma mice and irradiated C57BL/6 mice which are monitored for lymphoma.

Results: The screen identified 3,000 clonal and 700,000 subclonal mutations. Many genes were mutated more frequently in *Vav-BCL 2* mice than controls, including genes already implicated in PTLD e.g. *Bcl6a* and *Pax5* ($p=0.0028$ and 0.0224 respectively) and also lymphoma drivers novel to PTLD e.g. *Ebf1* and *Ikzf3* ($p<0.0001$ for both). In the validation model, mice developed lymphoma from 30 days and latency was modified by altering expression of candidate genes. We also find mutations of loci encoding B7 family costimulatory molecules, and using this model we are able to show that these can modify host immune responses to lymphoma.

Conclusion: We have identified new *BCL2* cooperating mutations for further study in PTLD. We have developed a new model of PTLD to validate candidate genes, with disease generated in an immunodeficient state comparable to renal transplantation. This furthers insight into disease mechanism, and identifies putative therapeutic targets.

Disclosure of Interest: None Declared

Keywords: Animal model, Genomics, PTLD

Transplantation - Outcomes

PO-291

BK viraemia – Factors associated with progression to BK nephropathy

K. Mahmood [1,*], A. Ponnusamy [1]

[1]Renal medicine, LANCASHIRE TEACHING HOSPITAL NHS TRUST, Preston, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: The emergence and characterisation of polyomavirus over the past decade has been of great importance in renal transplant medicine. The elucidation and analysis of BK virus has allowed clinicians throughout the world to better understand the complex interplay that exists in causing BK viraemia and BK nephropathy. Many facets of this complex relationship are poorly understood. These factors are important to understand to allow clinicians to aim for targeted therapy via controlled immunosuppression, to eradicate the emergence of viraemia and nephropathy in transplant patients.

Objectives: The objective of this project was to understand the various factors which interplay to cause BK viraemia and subsequent progression to BK nephropathy. This research project aimed to lay the foundation for future work to be undertaken in understanding how immunosuppression and the emergence of BK virus in the graft co-exist.

Methods: Several information/data points were collected retrospectively from data records held within the centre, which related to the donor, the recipient, or factors which were interlinked. The data was collected for all patients who underwent a transplant and were subsequently followed up by one of the renal transplant clinics allied to the centre, between September 2009 and June 2015.

Image:

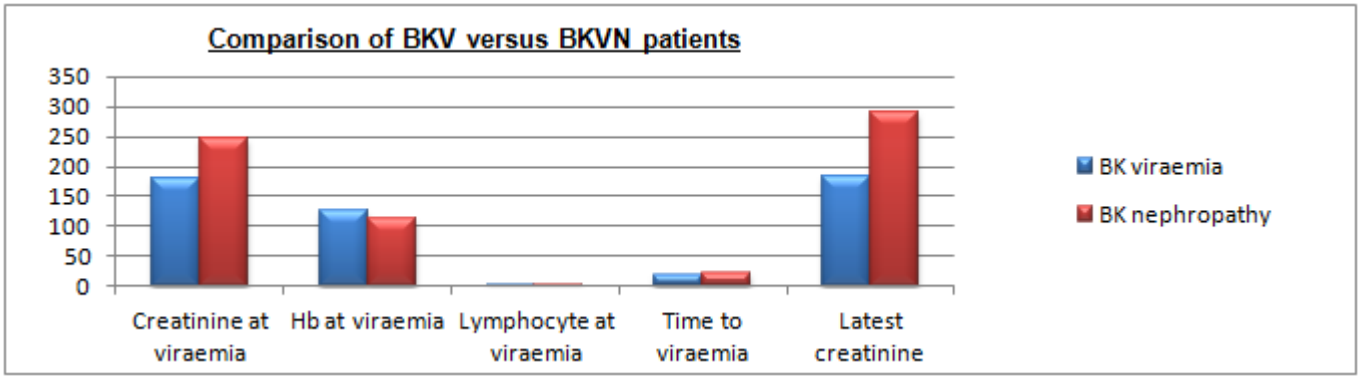


Table:

Recipient characteristic	BK viraemia (n=33)	BK viraemia with nephropathy (n=5)	
Creatinine at viraemia	178.42	245.6	p<0.05
Peak viral copies	1296709	428712.8	0.8747
Latest clinic creatinine	183.51	291.2	P<0.05
Cold ischaemia time (minutes)	614.65	836.8	0.1432

Results: The number of patients identified for analysis was 2209. Of these, 33 had BK viraemia and 5 progressed to BK nephropathy. The average age of BK viraemia patients was 52, comparable with those who developed BK nephropathy. The average time to viraemia post transplantation was 18.2 months.

Our data showed the importance of a creatinine rise in determining progression to BK nephropathy. A statistically significant rise was a poor prognostic factor and was invariably seen. The final clinic creatinine was worse in those with BK nephropathy, and this result was significant. The risk of a patient remaining BK viraemic was also seen in a greater number of patients with BK nephropathy.
Basiliximab induction was utilised in 72.7% of patients, making it the commonest induction agent. The presence of lymphopenia was not significant. The haemoglobin levels were comparable between both groups, as was the time to viraemia, the urine PCR at the point of viraemia and cold ischaemia time. It was interesting to note that peak viral load was comparable between both groups, suggesting that viral load was not linked to the emergence of BK nephropathy in a linear manner. In analysing the treatment regimes, it should be noted that those patients who remained on prednisolone/tacrolimus at maintenance and at the point of viraemia developed BK nephropathy. However, the widespread use of tacrolimus may be a confounding factor.
Conclusion: Deteriorating transplant function is an important risk factor for transition from BK viraemia to BK nephropathy. Interestingly, in our cohort viral load and cold ischaemia time were not associated with BK nephropathy.
References: Hirsch, Hans H. Polyomavirus BK nephropathy: a (re-) emerging complication in renal transplantation. *American journal of transplantation* 2.1 (2002): 25-30
Radtke, J., et al. Incidence of BK virus infection after kidney transplantation is independent of type of immunosuppressive therapy. *Transplant Infectious Disease* (2016)

Disclosure of Interest: None Declared

Keywords: Immunosuppression, Polyoma virus, Post-transplant infection

Transplantation - Outcomes

PO-292

Parathyroidectomy Outcomes in Renal Transplant recipients: Partial vs. Total

R. Rathore [1,*], D. Farrugia [1], M. Lambie [1], K. Tomlinson [1]

[1]Renal Medicine, UNIVERSITY HOSPITALS OF NORTH MIDLANDS, Stoke-on-Trent, United Kingdom

Preferred Presentation Method: Poster

Introduction: Persistent hyperparathyroidism in renal transplant recipients has been associated with increased mortality and decreased allograft survival in up to 50% of patients. Management involves Cinacalcet and/or Parathyroidectomy and practices vary across renal units. Merits of partial vs. total parathyroidectomy have been debated and currently there is no consensus on best practice.

Objectives: · To compare outcomes in terms of calcium, PTH and graft function in partial (adenoma identified on MIBI imaging) vs. total parathyroidectomy.

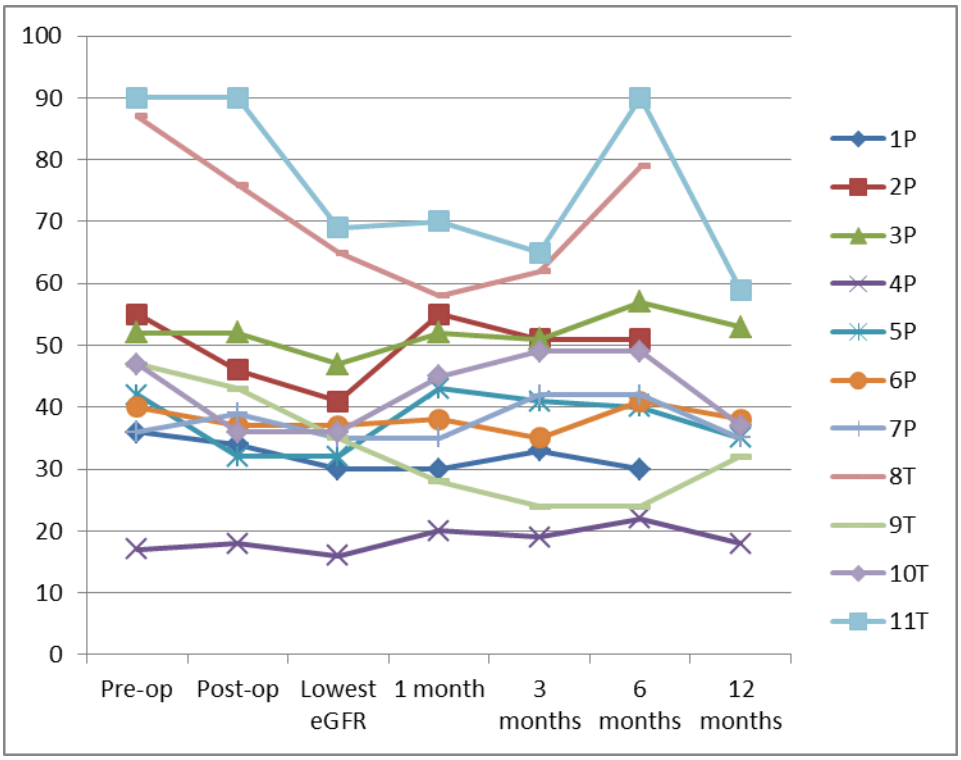
· To determine if there was sustained deterioration in graft function and possible causes

· To determine appropriate pre-operative loading regimes

Methods:

- In this single centre retrospective study, all renal transplant patients that had parathyroidectomy between 1/01/2007 and 1/01/2017 were identified from surgical records. Further biochemical and demographic information was extracted from patients' notes and clinical databases.
- Parathyroidectomies performed after failed transplants and those prior to retransplantation were excluded as disease process was expected to be different in those situations (These patients likely had tertiary hyperparathyroidism as opposed to persistent hyperparathyroidism post transplantation which resembles primary hyperparathyroidism).
- Patients were divided into 2 groups, first group included 7 patients (1P to 7P) with partial parathyroidectomy and second group included 4 patients with total parathyroidectomy (8T to 11T)

Image:



Results: 1. In group 1,18% showed adenoma histologically,72% showed nodular hyperplasia and 10% showed multinodular goitre while 100% showed nodular hyperplasia in group 2.

2. At 12 months, 57% achieved normocalcaemia in group 1 and in 43%, calcium levels were only marginally elevated while 100% patients achieved normocalcaemia in group 2.

3. Graft function declined in 1 patient in group 1 due to vascular rejection while it stabilised in the rest. In 75% of group 2, there was sustained decline but causes were unrelated to surgery(profound hypercalcaemia, cellular rejection and recurrent urinary tract infections).

4. Minor post-operative complications (cysts) were seen in 2 patients in group 1 and 1 patient in group 2. IV calcium post-operatively was required in 1 patient in group 2 (as a precaution- Nadir Calcium 1.96) and in none of the group 1 patients.

5. PTH levels were lower at 12 months in both groups except in 2 patients (recurrent adenoma) in group 2.

Conclusion: Preliminary findings based on a small cohort of patients suggest that partial parathyroidectomy can safely lower calcium and PTH levels in renal transplant recipients with persistent hypercalcaemia due to hyperparathyroidism. In our cohort, total parathyroidectomy was associated with a lower subsequent eGFR but the causes appeared to be unrelated to the procedure. In 1 patient, however, graft function was affected by hypercalcaemia post-operatively which is thought to cause direct vasoconstriction of the allograft and natriuresis-induced volume contraction. Pre-operative loading has to be individualised to avoid significant hypo/hypercalcaemia post-operatively.
However, the best course of action in the longer term is not clear from this study as outcomes were measured over a 12 month period. For longer term outcomes, longer study period is needed.

Disclosure of Interest: None Declared

Keywords: Calcium, Hyperparathyroidism, Renal transplant

Transplantation - Outcomes

PO-293

Predictors of transplant failure in patients undergoing indication renal transplant biopsy',

K. Stevens [1,*], B. Mackinnon [1], D. Kipgen [1], S. Coley [1], M. Clancy [1], C. Geddes [1]

[1]Renal and Transplant Unit, QEUH, NHS GG&C, Glasgow, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: This study considers indication renal transplant biopsies and factors which may be important predictors of transplant loss and patient death.

Objectives: To identify the time line of histological diagnosis, from transplant, in our population and to identify predictors of graft and patient survival in those undergoing indication renal transplant biopsy.

Methods: All indication renal transplant biopsies undertaken between 01/2011 and 12/2015 were identified. Demographic data including immunological and outcome data was recorded. Statistical analysis was undertaken in SPSS (v22).

Results: 354 patients underwent 549 biopsies. Mean patient and transplant age at time of biopsy was 43.2 ±15.3 and 4.2±5.8 years respectively. 44.9% (n=247) of biopsies showed evidence of Cell mediated rejection (CMR)/ABMR or both. 9.3% (n=51) demonstrated features of chronic transplant glomerulopathy (CTG). DSA was present at the time of biopsy in 23.1% (n=127). In transplants aged ≤ 6 months old histological diagnosis was CMR in 32.5% (n=69) with ABMR seen in 2.8% (n=6). In transplants aged ≥10 years, CTG was seen in 32.5% (n=26) with ABMR accounting for 6.3% (n=5). 22.9% (n= 81) of transplants failed at a median of 182 days from most recent biopsy. On cox regression analysis, peritubular capillary (PTC) C4d and CTG were independent predictors of transplant failure. Probability of transplant failure was 45% and 50% at one year if mixed rejection or CTG were present. 9.3% (n=33) patients died at a median of 227 days from most recent biopsy. Independent predictors of death included deceased donor transplant, patient age and presence of ABMR on biopsy ($p<0.05$).

Conclusion: Acute ABMR is a risk factor for patient loss whilst chronic ABMR is a risk factor for transplant loss. This association is independent of DSA but dependent upon PTC C4d staining, indicative of donor humoral activity – HLA or otherwise. Histological diagnosis in an indication biopsy is an important factor in predicting outcome. This study is limited by the inherent bias in patient selection with indication biopsy.

Disclosure of Interest: None Declared

Keywords: Transplant immunology, Transplant outcome

Transplantation - Outcomes

PO-294

TB or not TB, that should have been the question! A case of puzzling post-transplant pyrexia.

A. Cove-Smith [1,*], C. Puliatti [1], J. Abbott [1], P. Sellers [1], J. Lambourne [2]

[1]Renal Department, [2]Infectious Diseases & Microbiology , Barts Health NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Fever following renal transplant is a common occurrence and post-transplant infections are a leading cause of graft failure and mortality peri-operatively[1].Meticulous pre-transplant workup includes screening for EBV, CMV, HIV, Hepatitis B/C and Tuberculosis[2]. Regular monitoring post-operatively aims to strike the fine balance between immunosuppression to prevent rejection whilst minimising opportunistic infections.

Objectives: We report a case of post-transplant prolonged pyrexia of unknown origin.

Methods: -

Results: Case report: 60 year-old male, presented in June with fever, urinary frequency and nocturia following recent live donor renal transplant in India. He received low dose ATG induction, and subsequently MMF, prednisolone, & tacrolimus with valganciclovir & septrin prophylaxis. He was known to the renal service, having commenced haemodialysis 6 months previously, for diabetic nephropathy, and was active on the UK transplant list. During admission he was treated for ESBL E.coli urosepsis with IV antibiotics and subsequently discharged. Recurrent post-transplant ESBL UTIs required nephrostomies and ultimately bilateral native nephrectomies due to on-going sepsis in September. This was complicated by nephrectomy bed collections which were drained percutaneously. 6 months following the initial admission he had persistent fevers, night sweats and a cumulative 8 kg weight loss, which were attributed to recurrent bacterial infections. Consecutive early morning urine samples in November showed AFB positivity, initially thought to be a contaminant, and subsequently cultured mycobacterium. Imaging suggested an abscess in the graft, and detected multifocal ring-enhancing lesions in the brain compatible with scattered supra-/infratentorial tuberculomas. LP excluded other CNS infections. Treatment for proven urinary tract TB and cerebral TB was Rifater with pyridoxine and moxifloxacin for 12 months, and initiation abated clinical symptoms swiftly whilst maintaining graft function.

Conclusion: This case of prolonged pyrexia reiterates that despite detection of multiple organisms, TB must always be considered as there is risk not only of reactivation but also of transmission. Difficulty arises with patients transplanted outside a regulated programme, as screening may not be as robust, and donor details often incomplete. Despite efforts to eradicate commercial organ donation it is still commonplace in certain countries, such as China, Iran and Pakistan[3]. In an increasingly multicultural society the likelihood of encountering patients who may have received a transplant from such a source is neither negligible nor avoidable.

References:

1. Karuthu.S & Blumberg E. 2012. Common Infections in Kidney Transplant Recipients, *CJASN*, 7(12). p. 2058-2070.

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3. World Health Organisation. 2010. WHO guiding principles on human cell, tissue and organ transplantation [pdf]. Available at: http://www.who.int/transplantation/Guiding_PrinciplesTransplantation_WHA63.22en.pdf?ua=1 [Accessed 12th January 2017]

Disclosure of Interest: None Declared

Keywords: Post-transplant infection, Transplant outcome, Tuberculosis

Transplantation - Outcomes

PO-295

Insight into the pathogenesis of the detrimental sequelae of post-transplant blood transfusions from non-HLA matched blood donors

S. Hassan [1,*], F. Regan [2], C. Brown [3], A. Harmer [2], N. Anderson [2], P. Brooks [4], D. Taube [1], M. Willicombe [1]

[1]Renal and Transplantation, IMPERIAL NHS TRUST, [2]Haematology, [3]Histocompatibility and Immunogenetics, NHS Blood and Transplant, [4]Histocompatibility and Immunogenetics, IMPERIAL NHS TRUST, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Blood transfusions are a recognised cause of allosensitisation.[1] Recent evidence has shown that blood transfusions post renal transplant are associated with the development of de novo donor specific antibodies (DSA).[2] The mechanisms behind this phenomenon are not clearly understood.

Objectives: By analysing de novo HLA antibody development, we were able to determine the incidence of transfusion specific HLA antibodies (TSA), determine the frequency with which the HLA antigenic targets of the TSA and DSA are shared, and correlate the subsequent clinical outcomes.

Methods: We HLA typed 108 blood donors to 36 renal ± pancreas transplant recipients who developed a de novo DSA following a blood transfusion.

Table:

	TSA-	TSA+		p value
		TSA≠DSA	TSA=DSA	
	[N=7]	[N=12]	[N=17]	
Allograft survival	50.0%	83.3%	0.0%	0.01
Rejection free survival	57.1%	50.0%	25.5%	0.13
AMR free survival	100.0%	66.7%	31.9%	0.015

Results: Of the 36 patients: 10 were female, 21 received kidney alone transplants, 17 were sensitised, mean HLA mismatch was 3.7±1.5. 54/108 transfusions resulted in a TSA, which occurred in 29 patients. 33/108 transfusions resulted in a TSA which was the same specificity as the subsequent DSA (TSA=DSA). The median time to blood transfusion was 2.5(0.0-6.2) days and to DSA detection was 57.0(17.4-160.9) days. Patients where TSA=DSA, had the worse allograft outcomes as shown in the table below.

Conclusion: This study has shown important novel findings. In transplant recipients, an alloimmune response against a blood transfusion is common and avoidance of transfusions from blood donors who share HLA antigens with the transplant donor may reduce DSA development and improve outcomes.

References: 1. Blood transfusions in organ transplant patients: mechanisms of sensitization and implications for prevention. Scornik JC, Meier-Kriesche HU. Am J Transplant. 2011 Sep;11(9):1785-91.

2. Impact of Early Blood Transfusion After Kidney Transplantation on the Incidence of Donor-Specific Anti-HLA Antibodies. Ferrandiz I, Congy-Jolivet N, Del Bello A, Debiol B et al. Am J Transplant. 2016 Sep;16(9):2661-9.

Disclosure of Interest: None Declared

Keywords: Donor-specific antibodies, Highly sensitised, Renal transplant

Transplantation - Outcomes

PO-296

Recurrent urinary tract infections in transplant recipients: Challenges and dilemmas

T. Scale [1,*], V. Aithal [1]

[1]Nephrology Department, Morriston Hospital, NHS, Swansea, United Kingdom

Preferred Presentation Method: Poster

Introduction: Bacteriuria is common in patients with a renal transplant(1). Guidance on the management of asymptomatic bacteriuria(AB) is unclear. Routine culture of urine is not a common practice in transplant clinics(2). All renal patients who attended clinic in Swansea had a urine dip and urine culture.

Objectives: To assess the frequency of urinary tract infection and AB in renal transplant patients and analyse the variables that predispose transplant recipients to recurrent urinary tract infections (UTIs).

Methods: The transplant clinic in Morriston Hospital, looks after around 320 transplant patients. All renal transplant patients who attended the renal clinic between October 2015 and April 2016 were included in the study. Data including urine dipstick abnormalities, urine culture results, graft function, spectrum and sensitivity of organisms, inflammatory response to UTI, immunosuppression medications, underlying structural urological abnormalities, presence of diabetes and patient demographics were collected prospectively. Transplants less than 6 months old are not seen in this clinic and are followed up in Cardiff. Patients were categorised into symptomatic and asymptomatic after review of clinic letters.

Table:

Therapy	All patients with bacteriuria	≥ 1 episodes	Single episode
Triple therapy	17	9	8
Patients on MMF	33	20	13
Patients on Azathioprine	10	9	1
Patients on Prednisolone	28	16	12

Results: 142 of the 1267 clinic visits had bacteriuria (53 patients, 31 were female), of which 96 episodes were asymptomatic. The median age was 61yrs and the median transplant age was 5yrs. 4 patients with bacteriuria ended up on renal replacement therapy and 2 patients died during the study (myocardial infarction in 1 patient and pneumonia in the other, 1 had returned to dialysis). 14 episodes with AB were treated (6 due to >20% increase in creatinine).

The conventional dipstick urinary markers (nitrites and leucocytes) predicting a UTI were not useful in our patients, with nitrites being positive only in 28.8% of positive cultures and the leucocytes being positive in 61.9%.

Of the 150 organisms grown, Escherichia coli (n=74;49.3%) was the commonest, followed by coliform (n=41;27.3%). All of the E.coli grown were sensitive to nitrofurantoin, but resistance to amoxicillin, co-amoxiclav and trimethoprim were 59.5%, 29.7% and 41.9% respectively.

34 patients had more than one bacteriuria in the 6 months. Of these, 15 had no structural abnormality and 11 (73%) of them were on MMF .These 34 patients had 123 episodes of urinary tract infections, of which 38 episodes (13 patients) involved infections resistant to 3 or more commonly used antibiotics.

Conclusion: 67% of bacteriuria was asymptomatic. Conventional urine dipstick parameters were unhelpful in predicting a positive urine culture. Multiple drug resistance was common. There was no overt clinical evidence of severe immunosuppression in patients with bacteriuria. However only 55% of the patients with recurrent bacteriuria had

structural abnormalities in their native kidneys suggesting that other factors including immunosuppression and reflux in the transplant kidney may predispose these patients to UTIs.

References: 1. Alangaden GJ, Thyagarajan R, Gruber SA et al. Infectious complications after kidney transplantation: current epidemiology and associated risk factors. Clin Transplant 2006; 20: 401–409

2. Fiorante S, Lopez-Medrano F, Lizasoain M, et al. Systematic screening and treatment of asymptomatic bacteriuria in renal transplant recipients. Kidney Int 2010; 78: 774–781.

Disclosure of Interest: None Declared

Keywords: Transplant outcome, Urinalysis, UTI

Transplantation - Outcomes

PO-297

Urosepsis post renal transplantation associated with deleterious clinical impact on patient and allograft outcomes

K. Gulati [1,*], J. Maini [1], D. Taube [1], M. Willicombe [1]

[1]Renal, HAMMERSMITH HOSPITAL, London, United Kingdom

Preferred Presentation Method: Oral

Introduction: Urinary tract infection (UTI) remains the most common infection post-renal transplantation. This is associated with significant morbidity and mortality including allograft loss.

Objectives: To identify methods of curtailing the burden of UTIs post-transplantation in our centre, a detailed analysis was performed of 537 patients transplanted between 2012 and 2016.

Methods: All identified patients received alemtuzumab induction with a steroid –sparing immunosuppression regimen. Local standard protocol recommends that all patients have a ureteric stent with removal at 6 weeks. Patients receive 1 week of prophylactic antibiotics and co-trimoxazole for 6 months post-transplant. Mean follow-up in the cohort was 2.48 (2.27 – 2.64) years.

Table:

	UTI+ [N=123]	**UTI- [N=415]**	**p value**
Overall patient survival	86.3	97.7	0.002
Death with functioning graft	97.9	90.9	0.038
Censored allograft survival	76.2	97.0	<0.0001
DSA free survival	69.9	84.0	0.0079

Results: A microbiological proven UTI was identified in 123 (22.9%) patients post renal-transplant. 85 / 123 (69.1%) of patients experienced a UTI prior to stent removal. 31/123 (25.2%) had early stent removal due to infection. Risk factors for increased risk of urosepsis included being female ($p<0.0001$), increasing age ($p = 0.0002$), deceased donor recipients ($p=0.04$), diabetic ($p=0.02$) and sensitised patients ($p=0.02$). UTIs were associated with poorer outcomes including increased rate of wound infection ($p=0.005$) and bacteraemia ($p<0.001$). Allograft outcomes in the UTI+ and UTI- patients are shown in the table above.

Conclusion: UTIs are a common complication post-transplant and have been shown to be associated with negative patient and allograft outcomes. Possible targets of intervention include optimising management of ureteric stents and prophylactic antibiotics, and this should be the focus of future randomised controlled trials.

Disclosure of Interest: None Declared

Keywords: Transplant outcome, UTI

Transplantation - Outcomes

PO-298

The impact of pre-existing hypertension on the dynamics of improvement in residual renal function following Living Kidney Donation

R. Pyart [1,*], V. Dibbur [1], M. Eylert [1], A. Marsden [1], R. Cooke [1], D. Cooke [1], H. Burt [1], S. Griffin [1]

[1]Nephrology, CARDIFF AND VALE LHB, Cardiff, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Living kidney transplant donors undergo a careful pre-donation assessment and post-donation follow up is recommended to confirm a favourable long term outcome. The purpose of this study was to examine the kinetics of change of renal function following nephrectomy, and whether this was influenced by age or the presence of pre-donation hypertension.

Objectives: The purpose of this study was to examine the kinetics of change of renal function following nephrectomy, and whether this was influenced by age or the presence of pre-donation hypertension.

Methods: Retrospective analysis was performed of 280 kidney donors (126 males, 154 females) who had donated over a ten year period. The electronic data base and clinic letters were used for collection of blood pressure, drug treatment and renal function at baseline and subsequent follow up appointments. % change in MDRD eGFR from baseline over time – 1, 3, 5 and 8 years post donation is shown in the table below:

Image:

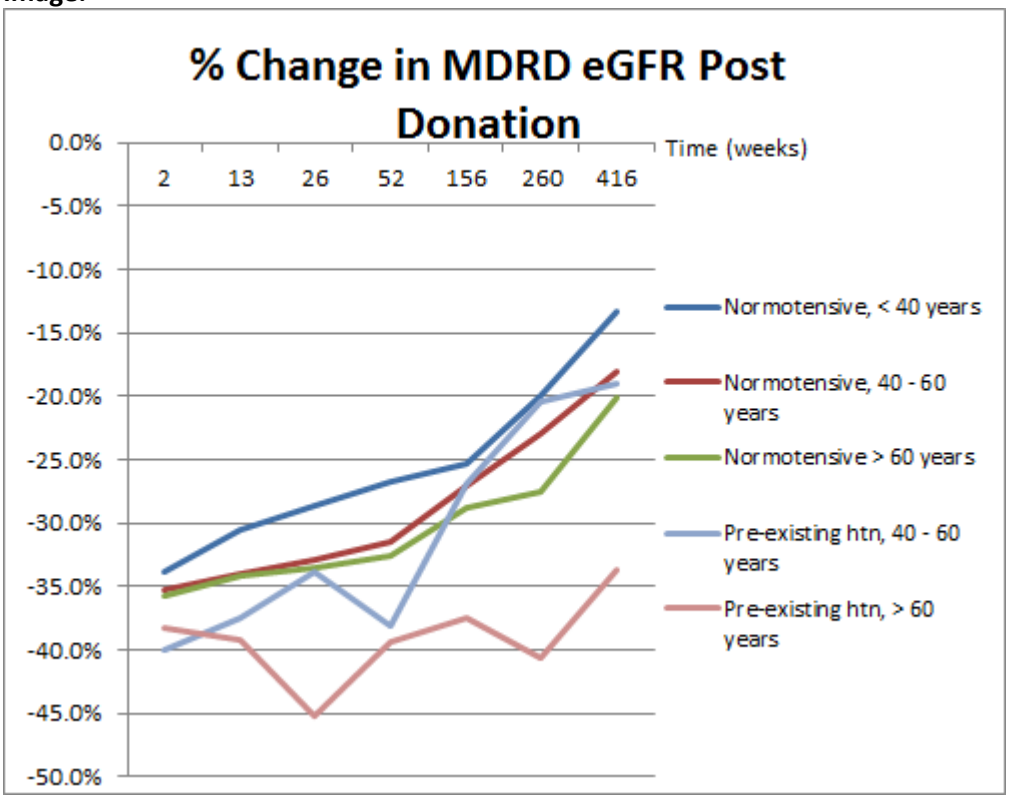


Table:

< 40 years (none had hypertension)	-26.8%	-25.3%	-19.9%	-13.3%
40 – 60 years,	-31.5%	-27.0%	-22.9%	-18.1%

normotensive				
>60 years, normotensive	-32.6%	-28.8%	-27.5%	-20.1%
40 – 60 years, hypertensive	-38.0%	-27.0%	-20.4%	-18.9%
>60 years, hypertensive	-39.4%	-37.5%	-40.7%	-33.6%

Results: The baseline characteristics at time of donation were: age 48.7 +/- 11.6 years; BMI: 27.2±3.4; eGFR (ml/min): male: 86.0±15.1, female: 79.7±12.2; blood pressure: mean 135/77 (+/-18.3/11.4). Seventeen patients (6.1%) were receiving anti-hypertensive therapy prior to donation. There were no deaths and no donor required dialysis over the period of follow up. The post-operative course was analysed for three age groups – under 40 years, 40 – 60 years, and over 60 years, each stratified by the presence or absence of pre-donation hypertension. The improvement in renal function over time was reflected in the proportion of donors assigned to CKD stage 3 or lower. Although improvement with time was seen in all groups, this was blunted for donors aged >60 years with pre-existing hypertension. These differences were significant at 3 and 5 years (p value 0.002 and 0.01 respectively).

Conclusion: This study confirms the long term safety of living kidney donors. After the initial fall, a consistent improvement is seen in renal function post donation in all age groups. Pre transplant hypertension in donors aged more than 60 years appears to influence renal recovery, which may have long term consequences for future renal function and cardiovascular risk.

Disclosure of Interest: None Declared

Keywords: Living donor, Older people, Transplant outcome

Transplantation - Outcomes

PO-299

Co-morbidities and Survival in CKD patients wait-listed for kidney transplantation

D. Kanigicherla [1,*], D. Green [2], T. Bhogal [3], S. Gray [3], S. Javed [1], C. Fortune [3], M. Picton [1], M. Morton [1], A. Hutchison [1], P. Kalra [2]

[1]Manchester Institute of Nephrology & Transplantation, CENTRAL MANCHESTER UNIVERSITY HOSPITALS NHS FOUNDATION TRUST, Manchester, [2]Department of Renal Medicine, Salford Royal Hospital NHS Foundation Trust, Salford, [3]Manchester Medical School, Manchester, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Patients with advanced CKD have multiple co-morbidities which affect longer term outcomes and are considered when determining suitability for kidney transplantation. Co-morbidity scoring using Charlson co-morbidity index (CCI) and van Walraven score (VW) can be used to estimate outcomes after transplantation. This potentially aids in decision making but use of these in clinical practice is not widely known.

Objectives: 1. To investigate whether these scores predict outcome before as well as after transplantation in wait-listed patients.

2. To compare outcome for patients matched for score in grafted patients versus those who did not receive a graft, to assess survival benefit from transplantation.

Methods: All patients who were wait-listed for a kidney transplant at 2 UK centres from 2009-2014 were included. Deep phenotype was recorded as part of clinical evaluation and used to compute CCI (diabetes, renal, vascular, lung, liver, connective tissue diseases and cancer). Non-immunological co-morbid parameters were used to compute modified VW (VW) index (ethnicity, DM, BMI, HTN, CCF, vascular, lung disease, smoking, albumin). CCI and VW scores were divided into low, medium, and high risk groups based on tertiles.

Cox-proportional hazard analysis was used to test the independent association of co-morbid indices with all-cause mortality, adjusted for other parameters that were not included in the score. The difference in estimate of mean survival during follow up was calculated and compared between grafted versus wait-listed patients, in each of the low, medium and high risk groups using each score.

IMAGE: KEY

pre = follow up from wait-listing, censored at transplantation

post = follow up from time of transplantation

Image:

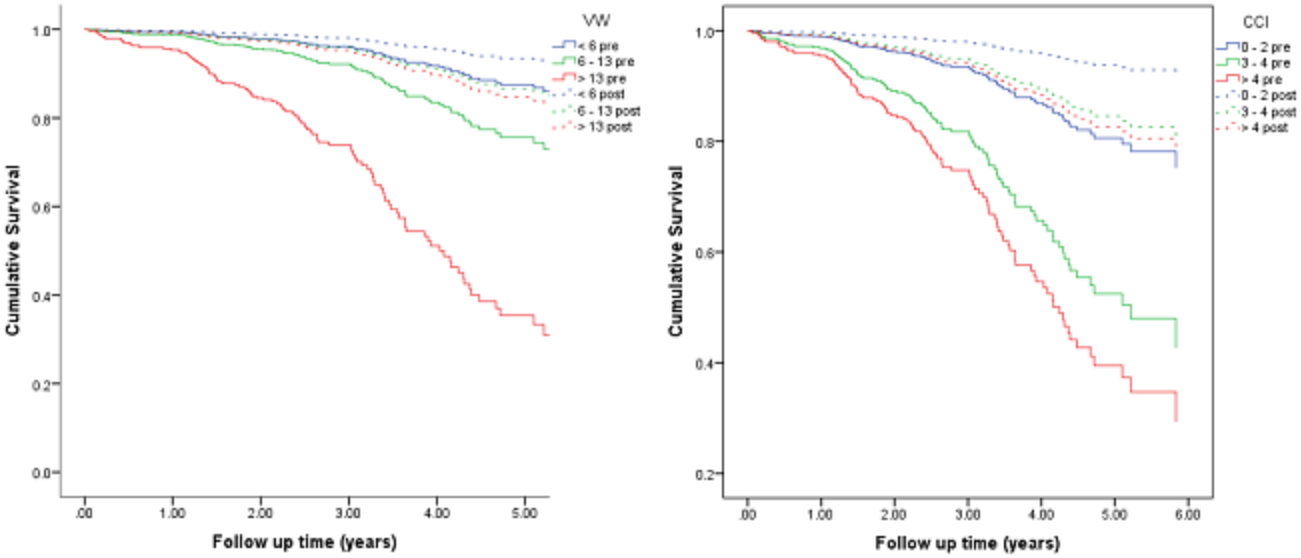


Table: Survival advantage (in years) following transplantation compared to without transplantation

Risk Group (CCI)	Survival Difference	Risk Group (VW)	Survival Difference
0-2	0.58	<6	0.22
3-4	1.15	6-13	0.70
>4	0.67	>13	1.27

Results: 939 patients were wait-listed (follow up 1.8±1.4 years, censored for transplantation), 548 of whom underwent transplantation subsequently (follow up after transplant 2.4±1.6 years). 117 patients (12.5%) died, of which 18 (3%) died after receiving transplant and 99 (25%) died before receiving a transplant.

The figures show adjusted survival curves for CCI and VW scores. In both cases, survival is worse with higher scores, both during waitlisting and after transplantation.

Patients with higher risk indices had the greater numerical survival advantage (table). The adjusted hazard ratio (HR) for death after transplantation compared to during waitlisting for patients with CCI 0-2 was 0.42 (0.18-1.00, p=0.05), for CCI 3-4 HR=0.34 (0.16-0.75, p<0.01), and for CCI >4, HR=0.24 (0.05-1.04, p=0.06); for VW score <6 HR=0.56 (0.17-1.82, p=0.34), for VW 6-13 HR=0.50 (0.20-1.22, p=0.13), and for VW>13 HR=0.16 (0.06-0.45, p<0.01).

Conclusion: Co-morbid risk indices may be useful for predicting outcome before and after transplantation. High risk patients gain the greatest survival benefit from transplantation quantitatively in terms of years added, and in terms of adjusted HR for death.

References: Charlson ME, Pompei P, Ales KL, MacKenzie CR: A New Method of Classifying Prognostic Comorbidity in Longitudinal Studies: Development and Validation. Journal of Chronic Diseases 40:373-383, 1987.

van Walraven, C., Austin, P.C. and Knoll, G., 2010. Predicting potential survival benefit of renal transplantation in patients with chronic kidney disease. Canadian Medical Association Journal, 182(7), pp.666-672.

Disclosure of Interest: None Declared

Keywords: CKD, Prognosis, Transplant outcome

Transplantation - Outcomes

PO-300

Biopsy transcriptome profiling does not predict long term outcome of renal transplants.

R. Hung [1,*], A. Dritsoula [2], J. Norman [2], A. Salama [3], B. Caplin [3]

[1]renal, ROYAL FREE HOSPITALS NHS FOUNDATION TRUST, [2]UCL Centre of Nephrology, [3]ROYAL FREE HOSPITALS NHS FOUNDATION TRUST, London, United Kingdom

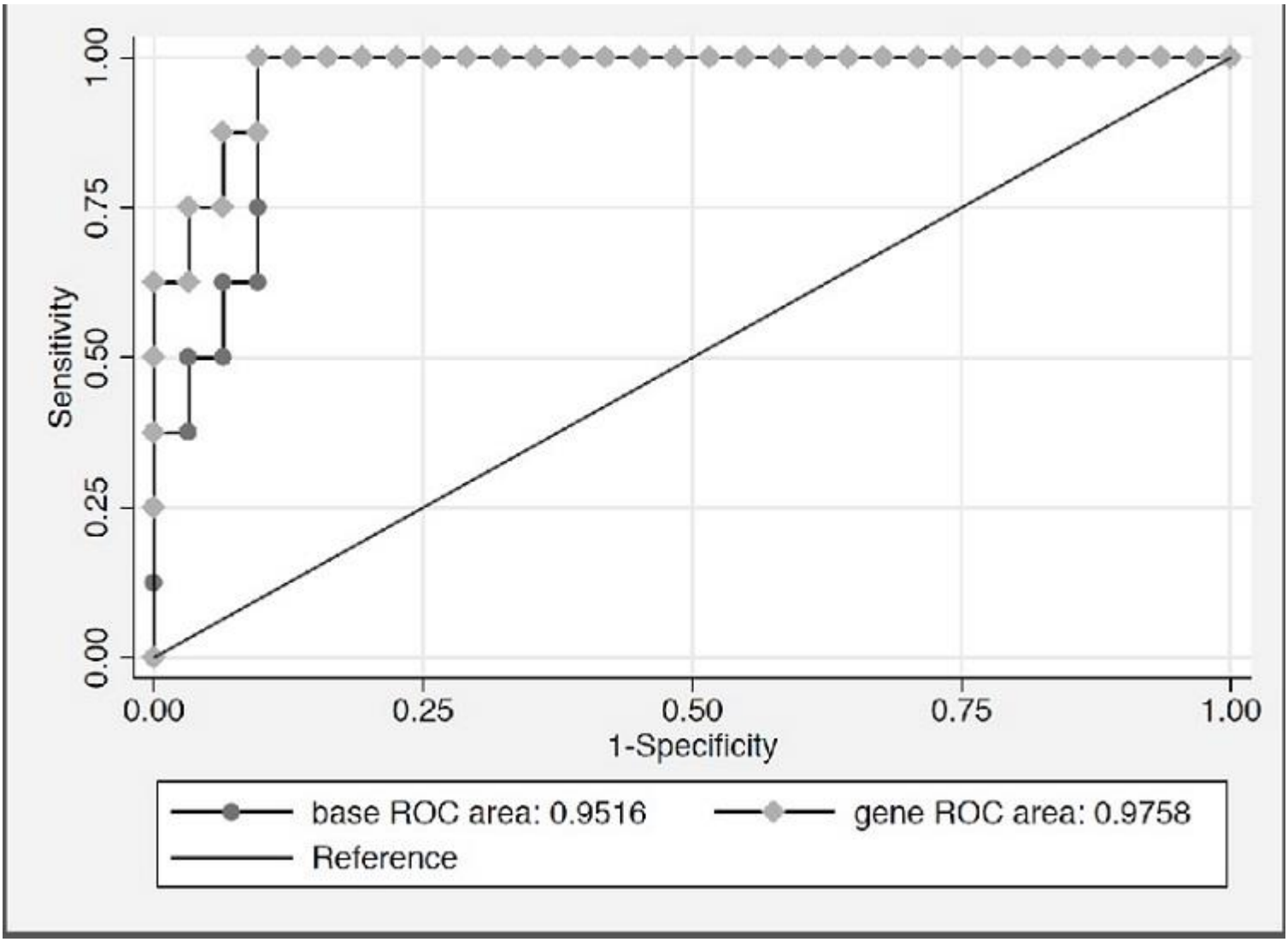
Preferred Presentation Method: Oral or Poster

Introduction: Recent studies have suggested that quantification of transcripts from 13 genes from tissue obtained at early protocol biopsy can be used to identify renal transplant recipients who will develop renal scarring or biochemical decline(1).

Objectives: We aimed to test the predictive capability of this set of genes in our population of renal transplant recipients over an extended follow-up period.

Methods: Biopsies were prospectively collected from renal allograft recipients (n=39) 2 months after transplantation from December 2007 to October 2008 at the Royal Free Hospital, London. Total RNA was extracted from the biopsies. Quantitative polymerase chain reaction (qPCR) was used to detect levels of gene expression. Clinical data including recipient demographics, donor age and type (donation after cardiac or brain death or live), eGFR at biopsy and over the 8 years follow-up period, alongside death and return to dialysis were collected.

Image:



Results: Gene transcripts were quantified using standard methods and normalised to 3 housekeeping genes. The median age of our recipient cohort was 47 years old (range 22-73) while the median age of the donor was 53 years (range 27-78). 11 (28%) patients received live donor kidneys and 28 (72%) recipients received cadaveric allografts. 25 (64%) patients were white, 7 patients (18%) were black and 7 (18%) of Asian origin. 8 (21%) patients demonstrated halving of their GFR in a median of 6 years (range 2-7). Out of these 8 patients, 2 (25%) patients returned to dialysis. 3 (8%) patients died in our patient cohort, all with a well-functioning graft. The median eGFR at biopsy (2 months) was 45.5mls/min (range 23-81).

Inclusion of the gene set in a multilevel of eGFR change over time reduced the unexplained variability in renal decline between individuals. Using the outcome of halving of eGFR or return to dialysis, the gene set was of borderline statistical significance when added to clinical variables (age of donor, donor type and GFR at biopsy) in a logistic regression model. Receiver operating curve analysis suggested that these data provide little additional predictive power when added to typical clinical predictors of outcome; Area under the ROC curve: 0.95 clinical variables alone versus 0.97 clinical variables and gene set (Figure 1).

Conclusion: Although there are associations between the expression of the gene set at 2 months and change in GFR over time, long-term outcomes can be accurately predicted by using baseline clinical characteristics alone in our cohort over an 8 year follow-up period. Although molecular biological techniques provide insight into the status of the graft at the

time of biopsy it is well-known factors such as donor type and donor age that predominantly determine long-term transplant outcomes.

References: 1. O'Connell PJ, Zhang W, Menon MC et al. Biopsy transcriptome expression profiling to identify kidney transplants at risk of chronic injury: a multicentre, prospective study. Lancet. 2016 Sep 3;388(10048):983-93

Disclosure of Interest: None Declared

Keywords: Genetic association, Transplant outcome

Transplantation - Outcomes

PO-301

Cell-subset diversity and biodistribution of adipose derived regenerative cells administered via the renal artery for therapy in a novel rat transplant model

R. Lathan [1,*], R. Ghita [1], D. Hillyard [1], R. Touyz [1], P. Mark [1], M. Clancy [1]

[1]Institute of Cardiovascular and Medical Sciences, UNIVERSITY OF GLASGOW, Glasgow , United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Studies in our novel hybrid model of transplantion/ischemic reperfusion (IRI) in rat has demonstrated significant improvement in kidney function post injection of adipose-derived regenerative cells (ADRCs) into the renal artery. This therapeutic technique has high translational value in human transplant surgery as ADRCs provide a robust supply of cells from a very accessible source of tissue, do not require culturing, and can be generated/delivered at point of care during the time of transplant. However, the exact mechanism on how these regenerative cells ameliorate IRI is not fully understood.

Objectives: Our research aims to understand the active cell subsets represented in the ADRC population, their biodistribution post injection, their mode of action, and their potential deleterious effects.

Methods: Studies were performed with flow cytometry to understand the cell diversity within the rat ADRC population. Analysis was performed on ADRCs extracted from inguinal (n=15) and perirenal tissue (n=7) of the rat. Cells were surveyed for markers that identify viability, immune cells (CD45+) and immune cell subsets (CD3+, CD3+CD4+, CD3+CD8+, CD11b+ cells), epithelial cells (CD45-CD31+), pericytes (CD45-CD146+), and mesenchymal stem cells (CD45-CD90+CD34-). To determine ADRC movement post injection, cells were stained with lipophilic dye, DiR, and images were taken of the brain, spleen, kidneys, liver, heart, and lungs using the In Vivo Imaging System. These organs were also surveyed for presence of labelled cells through histology and flow cytometry.

Results: We show a 15-20% fraction of injected ADRCs were non-viable cells. We also discovered cell subsets rich in varying levels of immune cells (25-75%) and containing variable levels of epithelial and pericyte cells. Stem cell like markers identify 3-5% of the total ADRC cell population. We show at early timepoints, a large collection of ADRCs accumulate in the glomeruli of the injected kidney and in portions of the spleen and liver.

Conclusion: Our study defines ADRCs as a pleomorphic cell suspension with multiple potential active subsets including T-cells, macrophages and mesenchymal stem cells of which a large subset likely initiates therapeutic effects within glomeruli of the kidney. Further studies will seek to determine which components provide the inhibitory effects on IRI and determine the persistence of these cells after intra-arterial injection. Additional analysis also aims to identify secreted factors and subset effects in renal tissue.

Disclosure of Interest: None Declared

Keywords: ESRD, Renal transplant, Stem cell

Transplantation - Outcomes

PO-302

Allergy is associated with reduced rejection rates in kidney transplantation.

J. Bockhart [1,*], N. Krishnan [2]

[1]Medical teaching centre, Warwick Medical School, [2]Renal Unit, University Hospitals Coventry and Warwickshire, Coventry, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: At present the best treatment for kidney failure is renal transplant, renal graft survival at 5 years is 86% and 91% from deceased and living donors respectively, in parallel with an 89% patient survival [1]. Despite the considerable improvements to transplant outcomes, episodes of rejection by the recipient's immune system still occur with optimal immunosuppression. Current theories suggest that an imbalance between specialised T- Helper (Th) cell subsets may regulate the immune system's response to allogenic renal tissue. An observed shift in polarity towards a Th1 or Th2 subsets is also thought to be involved in autoimmune and allergic disease respectively. The presence of these diseases clinically may provide insight into the risk of renal graft rejection.

Objectives: To deduce whether allergy or autoimmune disease affects the risk of renal graft rejection in a population of patients receiving a renal transplant.

Methods: Patients having undergone successful renal transplantation between 1990 and 2014 at our centre with appropriate ABO and HLA compatibility met the inclusion criteria. Evidence of atopy or disease were collected from paper records, databases. Patients were then grouped into allergic, autoimmune or no disease. Renal graft biopsy histology reports were analysed, evidence included a BANFF category, CD4+ cells or fibrosis of the renal intima from which the pathologists concluded acute or chronic rejection. Recent outpatient blood tests were indicative of graft function and used to group the populations further into acute, chronic or non rejectors. Chi squared analysis was used to calculate a statistical difference in the frequency of renal graft rejection in allergic and autoimmune populations compared to the control population who showed no evidence of disease.

Table:

Disease	Acute	Chronic	No rejection	Total
Allergy	7 (18%)	3 (7%)	30 (75%)	40 (100%)
Autoimmune	3 (18%)	2 (12%)	12 (70%)	17 (100%)
No disease	18 (35%)	2 (4%)	31 (61%)	51 (100%)
Total	28 (26%)	7 (6%)	73 (68%)	108 (100%)

Table 1: Number of patients with allergy, autoimmune or no disease and their rejection status

Results: Data from 108 of 113 patients met the inclusion criteria (Table 1). A 51% decrease in renal graft rejection risk was observed in the population of patients with an allergy (P=0.094) relative to those with no disease. Patients with an autoimmune disease did not show a statistically significant reduction in renal graft rejection risk when compared with patients with no disease (P=0.348).

Conclusion: A link between allergy and renal rejection has been observed in this study. Allergy status in patients may reduce renal rejection risk. Further research in this area is warranted to develop this as a prognostic tool for transplant clinicians.

References: [1] Bradbury L. Annual Report on Kidney Transplantation [Internet]. 2014. Available from: http://www.odt.nhs.uk/pdf/organ_specific_report_kidney_2014.pdf

Disclosure of Interest: None Declared

Keywords: Acute rejection, Renal transplant, T cell

Transplantation - Surgery

PO-303

Post renal transplant hyperlactaemia: risk factors and outcomes

M. Willicombe [1], A. Pain [1,*], V. Chiappa [1], D. Taube [1]

[1]Imperial College Renal and Transplant Centre, Imperial College NHS Trust, London, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Delayed graft function (DGF) post renal transplantation is associated with inferior allograft outcomes. Ischaemic reperfusion injury (IRI) is thought to be the pathological mechanism behind DGF. Any ongoing metabolic disturbance in the recipient following engraftment of the kidney may have the potential to attenuate the IRI. Serum lactate may be used as a biomarker of systemic hypoperfusion and oxygenation.

Objectives: We hypothesised that transplant patients who are hyperlactaemic in the post-operative period may be at higher risk of DGF and the associated detrimental sequelae.

Methods: We retrospectively collected the data on 450 patients who had lactate levels measured immediately post-transplant between 2013 and 2016. The results were then correlated with patient outcome data. Hyperlactaemia (HL) was defined as a level ≥1.1mmol/l. Median follow up was 1.97 (1.8-2.1) years.

Table:

Results: HL was associated with DGF. 69/103(67.0%) patients with DGF had HL compared with 188/347 (54.8%) patients with no DGF, p=0.02. The median lactate levels in the DGF group was 1.3 (1.1-1.40) compared with 1.1 (1.0-1.2) mmol/l in the no DGF group, p=0.0083.

Compared with living donors, DCD donors were significantly more likely to have HL at 69/138 (50.0%) and 64/95 (67.4%) respectively, p=0.009. There was no difference between DBD and DCD donors at 124/217 (57.1%) and 64/95 (67.4%), p=0.09. There was no difference in the cold ischaemic times between those with HL or not, p=0.15. Other variables on univariate analysis found to be associated with HL included: diabetes [85/257 (33.1%), p=0.0016], non-caucasoid ethnicities [182/257 (54.0%), p=0.0003] and not receiving a pre-emptive transplant [30/257 (11.75), p=0.0001]. Neither age or gender was associated with HL.

On univariate analysis, HL was associated with inferior patient survival [HR 2.87 (1.26-6.53), p=0.029] but not death censored allograft failure [HR 1.66 (0.94-2.96), p=0.10]. On multivariate analysis (MV), variables associated with graft loss did not include HL but did include DGF [HR 3.52(1.40-8.87), p=0.008], diabetes [HR 2.55 (1.02-6.40), p=0.046)] and DSA [HR 4.72 (2.02-11.05), p=0.0003]. However, on MV analysis of factors associated with death, higher age at transplant [HR 1.06 (1.01-1.12), p=0.015] and DGF [HR 3.00 (1.22-7.37), p=0.017] were both associated with death. Whilst having a normal lactate level was associated with a favourable patient prognosis [HR 0.25 (0.07-0.85), p=0.026].

Conclusion: Post-transplant HL is associated with inferior patient survival. The reason for this requires further study as to clarify whether post-transplant HL is a de novo contributing factor or reflects pre-transplant related patient factors associated with death.

Disclosure of Interest: None Declared

Keywords: Deceased donor, Delayed graft function, Transplant outcome

Tubular Cell Pathology

PO-304

Developing a Human Proximal Tubular cell model for Cystinuria Kidney Disease

L. Farmer [1], H. Rhodes [1], M. Huttman [1,*], T. Knight [1], M. Woodward [2], G. Welsh [1], R. Coward [1]

[1]Bristol Renal, UNIVERSITY OF BRISTOL, [2]Dept. of Paediatric Surgery, Bristol children's Hospital, Bristol, United Kingdom

Preferred Presentation Method: Poster

Introduction: Cystinuria is a rare genetically inherited disease that results in the life-long formation of recurrent kidney stones that can be incredibly debilitating, painful, and may result in end-stage-renal failure. Currently available treatments are sub-optimal and have multiple serious side-effects. More effective, less toxic, therapies are therefore required. Cystinuria occurs due to cystine accumulation in the urine due to an inability of the proximal tubular (PT) cystine transporter (CT) to either traffic to the plasma membrane or adequately function when located here. Normal functional CTs consist of the protein subunits rBAT and $b^{0,+}$AT (BAT), coded for by the genes SLC3A1 and SLC7A9 respectively.

Objectives: Understanding how these transporters normally traffic in the proximal tubule and the biochemical and functional effects of genetic mutations in these genes in cystinuric patients is desirable. This project set out to develop a human PT model to achieve this.

Methods: Understanding how these transporters normally traffic in the proximal tubule and the biochemical and functional effects of genetic mutations in these genes in cystinuric patients is desirable. This project set out to develop a human PT model to achieve this.

Results: Wild type rBAT and Bat CT co-localised in the cells and trafficked normally to the cell surface using confocal microscopy, together with biotinylation studies. Functionally transfecting both wild type BAT and rBAT significantly increased the cystine uptake into these cells. We then generated genetic constructs that mimicked common CT mutations found in the UK population from our previous work (Rhodes et al cJASN 2015). This revealed that some mutations caused trafficking abnormalities in the PT, whilst others trafficked normally but were unable to increase cystine uptake into the cells.

Conclusion: We have developed a robust molecular model to study cystinuria in the kidney. We envisage this will be useful in understanding the biology of cystinuria and ultimately help develop novel therapies for this debilitating condition.

Disclosure of Interest: None Declared

Keywords: Stones, Tubular epithelial cell, Tubular physiology

Tubular Disorders

PO-305

Sporadic, non-syndromic Fanconi syndrome due to a mutation of EHHADH

R. Gilbert [1,*], E. Seaby [2], D. Bunyan [3], S. Ennis [4]

[1]Paediatric Nephrology, Southampton Children's Hospital, [2]Human Genetics and Genomic Medicine, University of Southampton, Southampton, [3]Wessex Regional Genetics Laboratory, Salisbury District Hospital, Salisbury, [4]Genetics and Genomic Medicine, University of Southampton, Southampton, United Kingdom

Preferred Presentation Method: Poster

Introduction: Renal Fanconi syndrome refers to a generalised disorder of proximal tubule function with resulting urinary losses of water, electrolytes, low molecular weight proteins, aminoacids, phosphate, bicarbonate and glucose. Until recently the causes of isolated Fanconi syndrome were largely unknown. In 2014 Klootwijk et al[1] described a family with autosomal dominant Fanconi Syndrome due to a mutation in EHHADH, an enzyme involved in peroxisomal fatty acid oxidation.

Objectives: A two year old Caucasian boy born to healthy, unrelated parents was found to have proximal muscle weakness, gross motor delay and short stature. At three years of age he was referred to the orthopaedic surgeons for genu valgum. Knee radiographs showed evidence of rickets. There was no hepatosplenomegaly and no cataract formation. Biochemical investigation showed low plasma sodium, bicarbonate and inorganic phosphate concentrations. Plasma calcium, potassium, lactate and PTH concentrations were normal. There was low molecular weight proteinuria and generalised aminoaciduria. WBC cystine was normal on two occasions. Plasma caeruloplasmin was normal. Sequencing of *OCRL1* and *CLCN5* revealed no pathogenic variants. The mitochondrial m.3243A>G variant was not detected nor were major mitochondrial DNA rearrangements.

Methods: Whole exome sequencing was undertaken to find a possible genetic cause of Fanconi syndrome.

Results: A *de novo*, heterozygous, c.G7A; p.E3K mutation of *EHHADH* was detected. This is the same mutation described by Klootwijk et al. It causes mistargeting of the peroxisomal enzyme to the mitochondria where it causes mitochondrial dysfunction and Fanconi Syndrome.

Conclusion: To the best of our knowledge this is the first description of Fanconi Syndrome caused by a mutation of *EHHADH* apart from the original kindred described by Klootwijk et al. Our patient differs from their kindred in being Caucasian and having a *de novo* mutation. Isolated Fanconi syndrome is rare but in affected patients the diagnosis of this mutation allows for accurate genetic counselling. Furthermore the condition is associated with preserved renal function, an important factor in counselling patients and families.

References: 1. Klootwijk ED, Reichold M, Helip-Wooley A et al. Mistargeting of peroxisomal EHHADH and inherited renal Fanconi syndrome. New Engl J Med 2014; 370: 129-38. doi 10.1056NEJMoa130758

Disclosure of Interest: None Declared

Keywords: Fanconi syndrome, Genomics

Tubular Disorders

PO-306

Urinary exosomes as potential biomarkers in renal tubular disorders

T. Williams [1,*], C. Robinson [2], F. Karet Frankl [3]

[1]Department of Veterinary Medicine and Cambridge Institute for Medical Research, University of Cambridge, [2]Department of Medical Genetics, Cambridge University Hospitals NHS Foundation Trust, [3]Division of Renal Medicine and Cambridge Institute for Medical Research, University of Cambridge, Cambridge, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: Exosomes are nanovesicles released by all cells including those in the kidney. Kidney-derived exosomes are found in urine, where they are both bactericidal (1) and contain microRNAs capable of paracrine modulation of tubular membrane transporters *in vitro* (2). They are also a potential source of biomarkers, since their membranes contain apical proteins from all nephron segments.

Many inherited renal tubulopathies have known genetic bases, although some patients lack a genetic explanation for their phenotype, which may preclude a definitive diagnosis in such cases. Identification of urinary biomarkers of renal tubulopathies would be of value in these patients.

Urinary exosomal isolation has traditionally required ultracentrifugation of large volumes of urine (>50 mL), however kits utilising volume-excluding polymers (VEP kits) are now available which allow exosomal extraction from small volumes (1-10mL) using standard centrifuges.

Objectives: This study assessed the utility of VEP kits for small urine volumes and for proof-of-principle quantified specific proteins involved in Gitelman Syndrome (GS) and Cystinuria (Cy).

Methods: VEP kits were used to process frozen, small volume (1-2mL) urine samples from healthy volunteers (HV) and GS or Cy patients. Canonical and specific exosomal proteins were sought by Western blot and quantified by densitometry. The sodium-chloride co-transporter (NCC) and the dibasic amino acid transporter (SLC3A1, rBAT) were used as marker proteins for GS and Cy respectively. Data are presented as mean ± SD. Receiver operator characteristic (ROC) curve analysis was used to assess the accuracy of exosomal NCC content as a diagnostic test for GS.

Results: Preliminary VEP kit evaluation indicated that detectable amounts of protein (3.9-53.5 µg protein/mL urine) could be isolated from 2mL samples stored for up to six years. Blotting for TSG101 confirmed the presence of exosomes. Exosomal NCC content was significantly lower in known GS patients (n = 5; 25 ± 14 % of the mean from 8 HV; $p = 0.024$) than in HV. The area under the ROC curve was 0.95 (95% confidence interval 0.833-1.000; $p = 0.008$), indicating excellent diagnostic performance. Exosomal rBAT content was also significantly reduced in Cy patients (653 ± 542 densitometry units normalised to µg protein, n = 5) compared to HV.

Conclusion: The use of VEP kits allows extraction of sufficient numbers of exosomes from frozen, small volume urine samples to distinguish patients with renal tubulopathies from healthy volunteers. Improvement of our technique for detection of nephron proteins in urinary exosomes will aid diagnosis and improve characterisation of the molecular bases of renal tubular disorders, particularly in patients without known mutations or where genetic testing is not easily available.

References: 1. TF Hiemstra et al 2014; J Am Soc Nephrol 25:2017-27

2. T Gracia et al 2017; Sci Rep 7:40601

Disclosure of Interest: None Declared

Keywords: Potassium, Stones, Urinalysis

Vascular Access

PO-307

Vascular Access in Haemodialysis: An Audit of Current Practice

S. Ng [1,*]

[1]Nephrology, ROYAL LIVERPOOL UNIVERSITY HOSPITAL, Liverpool, United Kingdom

Preferred Presentation Method: Poster

Introduction: Renal association guidelines recommend that all patients with end-stage kidney disease (ESKD) who commence haeomodialysis (HD) should dialyse with an arteriovenous fistula (AVF) as first choice, an arteriovenous graft (AVG) as second choice, a tunnelled central venous catheter (CVC) as third choice, and a non-tunnelled temporary CVC as an option of necessity. AVFs have better patency rates, access survival, lower number of interventions needed during the entire life span of access type, lower rates of access-related sepsis and the overall morbidity and mortality is much lower compared to AVGs and CVCs. Hospitalisation frequency and costs are the lowest with AVF access. Provision of access for patients should be patient focussed and requires a coordinated and multi-discipilinary approach in assessing and educating patients in advance of need for renal replacement therapy (RRT) in order to provide optimal dialysis access.

Objectives: The Renal Association has published guidelines for vascular access for HD. 60% of all incident patients with established ESKD commencing planned HD should receive dialysis via a functioning AVF or AVG.

Methods: All patients who commenced HD on the HD unit at the Royal Liverpool University Hospital from 1 April 2015 to 31 March 2016 were identified through CyberRen. Information were obtained from discharge letters and clinic letters. Patients with acute kidney injury (AKI) were excluded from analysis.

Results: 124 new HD starters were identified through CyberRen. 34 patients with AKI were excluded. 8 patients alerted as new starters but were established on other forms of RRT such as transplantation or peritoneal dialysis (PD). There were 78 patients who had newly commenced HD from 1 April 2015 to 31 March 2016. 25 (33%) commenced HD via an AVF. 52 (66%) commenced HD via a CVC, of which 7 (8.9%) were non-tunnelled CVCs and 45 (57.7%) were tunnelled CVC. 17 of the 52 (32.7%) who commenced HD via a CC had a functioning AVF/AVG formed within 3 months of commencing HD, and 2 were converted to PD.

Conclusion: This audit highlights that our unit is performing at below national targets for commencing HD via the preferred access. A low clearance clinic was established in our unit in the last 2 years and this proved to be very effective in identifying patients who require RRT and fast-track vascular access. Establishing guidelines in chronic kidney disease (CKD) clinic and educating junior staff on the need to identify patients who are pre-dialysis is paramount in ensuring patients have got the optimal vascular access to commence HD in a timely manner. There needs to be a cultural change in getting patients referred to the vascular access service within 6 months of needing to start dialysis as this would lead to improved patient outcomes. We have also recently appointed a vascular access specialist nurse and we hope that this would lead to improvements in our service. A re-audit will be conducted in 6 months following implementation of these changes.

References: 1. Mick Kumwenda SM, Claire Reid. Vascular Access for Haemodialysis. The Renal Association 2015. Available from: http://www.renal.org/guidelines/modules/vascular-access-for-haemodialysis

Disclosure of Interest: None Declared

Keywords: Audit, Renal service planning, Vascular access

Vascular Access

PO-308

Achieving the Renal Association Vascular Access targets and beyond – a multi-disciplinary team approach

A. Swain [1,*], E. Vaux [1]

[1]Renal, ROYAL BERKSHIRE NHS FOUNDATION TRUST, Reading, United Kingdom

Preferred Presentation Method: Oral or Poster

Introduction: In 2015 the Renal Association introduced updated guidelines for Vascular Access which state that "60% of all incident patients with established end stage kidney disease commencing planned haemodialysis should receive dialysis via a functioning arteriovenous fistula (AVF) or arteriovenous graft (AVG)" In 2014, at RBH, we were only achieving this in 52% of patients so a quality improvement approach was taken to address this.

Objectives: The objective was to improve our patient outcomes by increasing the number of incident patients starting planned haemodialysis with an arteriovenous fistula or graft. This was in the group known to us for >90 days.

Methods: Using the Model For Improvement, a multi-disciplinary (MDT) approach was developed to address definitive vascular access in the incident patient. Improvement activity workshops identified key activities to put in place across the vascular access team, the Kidney Care education and administrative team and the wider Renal MDT. Our access surgery is provided for us by the Oxford University Hospitals NHS Trust and critical to our success has been collaborative team working and communication between all relevant team members.

Key to improving the rates has been the whole team collaborative QI approach involving every member from administrative to consultant. Key activities included robust patient education programmes, forearm vein preservation, early vessel assessment and imaging, and clarity of patient pathways of referral. Frequent and dedicated low clearance clinics, as well as fixed appointment slots in vascular access clinics, have been proven to be an important factor as well as receiving an extremely responsive service from our vascular access surgical colleagues in Oxford

Results: By the end of 2015 the AVF rate in incident patients had increased to 77%. By the end of 2016 it had increased to 80%.

Surgical referrals are made in a more timely fashion, informed by the reciprocal creatinine plot. Fistula / graft surgery is provided within 4-6 weeks of the first surgical review and can be even earlier for the very urgent patient, often utilising an early cannulation graft.

Conclusion: We believe that the RA targets are achievable through implementation of a clear and focused team approach. Collaborative team working and regular communication between all parties is critical to success.

References: http://www.renal.org/guidelines/modules/vascular-access-for-haemodialysis

Published 31st May 2015

Disclosure of Interest: None Declared

Keywords: Clinical quality improvement, Patient outcome measures, Vascular access

Vascular Access

PO-309

CLINICAL REVIEW AND OUTCOMES OF CRACKED TUNNELLED DIALYSIS CATHETERS

K. Greene [1,*], M. Imran [1]

[1]Renal Department, HULL AND EAST YORKSHIRE HOSPITALS NHS TRUST, Hull, United Kingdom

Preferred Presentation Method: Poster

Introduction: A crucial part of haemodialysis therapy is access. While it is established that the preferred access in most cases would be an AV fistula, it is recognised that a proportion of patients would either temporarily have tunnelled catheters or be expected to utilize them long term. A complication of catheter use is a cracked or leaking catheter.

Objectives: To study the clinical impact of cracked or leaking dialysis catheters.

Methods: Data was sourced from dialysis units covered by the Hull and East Yorkshire Hospitals NHS Trust's renal team, on patients who suffered cracked catheters over the period January 2015 to December 2016.

Results: 4 cases of cracked catheters were identified. These were detected when air was aspirated, or blood/fluid was found to be leaking from the catheter.

1 case was identified where a patient went into hypovolemic shock and subsequently died having bled from a broken catheter.

3 patients required line replacement. Of these, 1 patient required admission. Initially reluctant to undergo the procedure, he consented after reassurance, and had a new catheter railroaded under fluoroscopic guidance and local analgesia. The other 2 patients had line replacements coordinated as outpatients.

Conclusion: The access for a haemodialysis patient is often considered their lifeline. In the cases reviewed, the procedure of replacing the catheters were, fortunately, without acute severe complication. All patients however, would have been subjected to the stress and discomfort of undergoing this invasive procedure, and risks associated. In 2 cases, after assessment by their manufacturers, the cause of the cracked lines was found to be incorrectly and overly tightened caps. Care must be taken to train staff on the proper handling of catheters to reduce possible malfunctions. When cracks do occur, consider not just line replacement or securing another access, but also the reason for the occurrence, how this disruption may affect the patient, and how it may be prevented. Returning the cracked line to its producer for analysis may aid in defining a cause. There is mortality associated with leaking lines. Dialysis units may consider developing protocols or teaching patients on what to do in emergency situations should caps or clips become loose, or lines leak at home.

Disclosure of Interest: None Declared

Keywords: Vascular access

Vascular Access

PO-310

Endovascular management of immature fistulas by interventional nephrologists

M. A. Rahil [1,*]

[1]Interventional nephrology, Bachir ben nacer Hospital, Biskra, Algeria

Preferred Presentation Method: Oral

Introduction: Percutaneous transluminal angioplasty (PTA) has proven to be valuable for management of dysfunctional fistula; KDOQI guidelines acknowledged the time and the role of interventional angioplasty for treatment of vascular access dysfunction.

Objectives: The role of interventional angioplasty for treatment of vascular access dysfunction.

Methods: Between September 2014 and March 2016, 28 dysfunctional and 2 thrombosed immature fistulas were treated by PTA and or collateral veins ligation.Angiography was performed by ultrasound guided puncture of the brachial artery and stenosis was performed after cannulation of the vein. The balloon size was between 5 to 10 mm. Collateral veins ligation was performed surgically after ultrasound marker. Thrombosed immature fistula was treated by manual catheter-directed aspiration. Dilatation induced rupture was treated by balloon tamponade and no stent was used.

Results: An underlying stenosis was diagnosed in all cases except one.11 (36%) of them were located in the vein area (VA), 8 (26%) in the juxta anastomotic outflow area (JAOA), 4 (14%) in JAOA and in the fistula anastomosis (FA), 3 (10%) in JAOA and VA, 2 (7%) in JAOA, FA and artery stenosis (AS) ,1 in JAOA with collateral vein and one only with a collateral veins without stenosis.The initial success rate of the endovascular procedure was 90%. Dilation-induced rupture occurred in five cases (16%) but stents were not necessary. The rate of significant clinical complications was 6% (pseudoaneurysm).Primary and secondary patency rates at 1 year were 50% and 70%, respectively.

Conclusion: Early Doppler ultrasound enables identification of underlying areas of stenosis or collateral veins in nonmaturing fistulas, which can be safely and effectively treated with angioplasty, vein ligation or both. With continued surveillance and repeat interventions, functional patency can be sustained in the majority of fistulas.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Vascular access

Vascular Access

PO-311

Successful treatment of a brachiobasilic fistula pseudoaneurysm by manual ultrasound guided compression: two cases reports

M. A. Rahil [1,*]

[1]Interventional Nephrology, Bachir ben nacer hospital, Biskra, Algeria

Preferred Presentation Method: Oral

Introduction: A pseudoaneurysm or a false aneurysm is the consequence of a persistent blood leak caused generally by iatrogenic rupture of a vessel wall. The blood leak creates a new cavity delimited by surrounding tissues and allows blood flow to remain in continuity between this cavity and the vessel. In hemodialysis fistula, pseudoaneurysm results from repeated puncturing of the vein at the same site, leading to a bulging anatomical defect in the vein area. Surgery and endovascular treatment stay widely used as the treatment of pseudoaneurysm compared to the ultrasound guided compression (UGC).

Objectives: The role of the ultrasonography in the treatment of fistula pseudoaneurysm's.

Methods: Case 1: A 68 years old woman in end stage renal disease undergoing hemodialysis with a right transposed brachiobasilic arteriovenous fistula (AVF) presented a new pulsatile and painful mass, localized in cannulation sites just after her hemodialysis session. Hemodialysis needle used was a 16 gauge and the cannulation technique was site rotation. Hemostasis after needles removal has been obtained after 6 minutes of manual compression. A Doppler ultrasound has been performed showing a large pseudoaneurysm over the vein measuring 4 cm x 2.8 cm. Color mode confirmed blood flow continuity between the pseudoaneurysm cavity and the outflow vein through a tear in the vein wall. An ultrasound guided compression (UGC) was attempted to stop blood flow into the pseudoaneurysm cavity. The compression has been done manually over the mass and ultrasonography was used to ensure reduction of blood circulation in the cavity. After 30 minutes of manual compression, we have had a total thrombosed pseudoaneurysm cavity. The flow rate was 1150 mil/min and no recurrence was noted in the following days.

Case 2: A 65 years old woman treated by hemodialysis during 5 years with a left transposed brachiobasilic AVF presented a new bulging anatomical defect in the vein area. Hemodialysis needle used was a 16 gauge and the cannulation technique was site rotation. Hemostasis after needles removal could not be obtained by manual compression and suture at the needle site was necessary to stop blood loss during its session two days before. Doppler ultrasound showed a pseudoaneurysm (2.5cm x 0.99 cm) connected to the outflow vein through a large tear in the vein wall. Color mode confirmed blood flow continuity while diastole and systole. An ultrasound guided compression (UGC) was attempted to occlude the pseudoaneurysm cavity. After 20 minutes of manual compression, we have had a total thrombosed pseudoaneurysm cavity. No recurrence was noted in the following days.

Results: For our two patients, UGC allowed us to stop blood flow in the pseudoaneurysm cavity with a range time between 20 and 30 minutes. A total thrombosed cavity has been obtained and fistulas could be cannulated in next session. After several days the thrombosed cavity has resolved, bulging anatomical defect collapsed and no recurrence was noted.

Conclusion: In femoral artery pseudoaneurysm, UGC is a well-accepted treatment but stays rarely reported in hemodialysis arteriovenous fistula. It is a non invasive and effective procedure which could be attempted before invasive procedures. This procedure could preserve fistulas and avoid to hemodialysis patients' surgery or endovascular procedures.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Vascular access

Vascular Access

PO-312

Central venous access and peritoneal dialysis catheter for 10 kilos baby made by interventional nephrologists : a case report:

M. A. Rahil [1,*], I. Mouaky [2]

[1]Interventional nephrology , Bachir ben nacer Hospital, [2]Pediatric anesthesia, Bachir ben nacer, Biskra, Algeria

Preferred Presentation Method: Oral or Poster

Introduction: In pediatric population central venous catheter (CVC) and peritoneal dialysis (PD) catheter remain a big challenge for nephrologists. We reported an eight month baby which all procedures to treat her acute kidney failure have been undertaken by interventional nephrologists (IN).

Objectives: Can interventional nephrologist takes in charge the complications of vascular access in children?

Methods: We reported a case of an eight months baby weighing 10 kilos affected by diarrhea positive hemolytic and uremic syndrome (D+ HUS). The babe presented a severe dyspnea, hypertension, and acute kidney failure. After general anesthesia, a straight double cuff PD catheter was inserted into the peritoneal cavity. After two days the catheter presented a tip migration and dysfunction, in add to the baby presented peripheral veins exhaustion due to repeated peripheral vascular needling. We decided to remove the straight PD catheter and to exchange it by a coil PD catheter and to perform an ultrasound guided CVC. After two weeks the baby presented a related central catheter infection and we decided to exchange it over a wire. After four weeks the baby recovered a normal kidney function and both PD catheter and CVC have been removed and the baby came back home.

Results: Generally, the placement of a peritoneal dialysis (PD) catheter in babies has been accomplished by surgeons. In this case surgically placed PD catheter has been made by IN despite the small weight of the baby with performing ultrasound guided CVC in order to have the best caring support. All complications have been undertaken by IN.

Conclusion: Procedures like CVC and peritoneal catheter insertion in the pediatric population remain widely dominated by pediatric surgeons. IN can safely make those procedures in order to have the right care at the right time.

Disclosure of Interest: None Declared

Keywords: Haemodialysis, Vascular access

Regenerative Medicine

PO-313

Modelling smart biological therapies to prevent peritoneal fibrosis

S. Namvar [1,*], A. Woolf [1], L. Zeef [1], T. Wilm [2], B. Wilm [2], S. Herrick [1]

[1]Faculty of Biology, Medicine and Health, University of Manchester, Manchester, [2]Institute of Translational Medicine, University of Liverpool, Liverpool, United Kingdom

Preferred Presentation Method: Oral

Introduction: Peritoneal fibrosis is a major complication of long-term peritoneal dialysis (PD), leading to ultrafiltration failure and sometimes also to life threatening encapsulating peritoneal sclerosis. The fibrosis is driven by activated myofibroblasts that are believed to be derived, at least in part, from mesothelial-to-mesenchymal transition (MMT).

Objectives: We aimed to discover novel mediators of MMT and then experimentally exploit them to prevent peritoneal fibrosis.

Methods: We pioneered the purification of viable rat mesothelial cells using magnetic bead sorting after applying an antibody to HBME1, a microvillus protein, to dissociated peritoneal cells. After exposing the mesothelial cells to transforming growth factor β1 (TGFβ1), an instigator of peritoneal fibrosis *in vivo*, we undertook RNAseq whole transcriptome analyses. Next, we determined whether manipulating key altered signalling pathways prevented fibrosis in culture. Last, we immunostained fibrotic tissue from PD patients and controls, to begin to determine the translatability of our *in vitro* findings.

Results: Isolated HBME1-sorted mesothelia strongly expressed the transcription factor Wilms tumour 1 and the membrane protein uroplakin 3B, as they do *in vivo*. After exposure to TGFβ1 several hundred transcripts significantly changed during the MMT that took place in cell culture. As mesothelial cells lost their cobblestone shape, they downregulated epithelial signature transcripts including ZO1 and cingulin (tight junction molecules), podocalyxin-like protein 1 (a sialomucin protein) and COL4A3 and COL4A4 (basement membrane molecules). During MMT, we discovered upregulated insulin-like growth factor (IGF) signalling, with increased IGF1 and IGF2, and downregulation of their endogenous inhibitors, the IGF binding proteins (IGFBPs) 4-6. Moreover, bone morphogenetic protein 4 (BMP4) was markedly downregulated. Strikingly, exogenous application of either recombinant BMP4 or IGFBP4 ameliorated TGFβ1 induced MMT, as evidenced by: preservation of cobblestone morphology and ZO1 immunolocalisation; prevention of enhanced cell migration on scratch assays; and ameliorated upregulation of alpha smooth muscle actin, a myofibroblast marker. Fibrotic tissue from PD patients displayed increased IGF1 and IGF2, and reduced BMP4 and IGFBP4, immunostaining *versus* controls.

Conclusion: We not only discovered novel MMT signatures but also identified BMP4 and IGFBPs as therapies to prevent peritoneal fibrosis.

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