University Hospitals Birmingham NHS
NHS Foundation Trust

CONTROLLED DOCUMENT

GUIDELINES FOR PATIENTS ON CHRONIC HAEMODIALYSIS PROGRAMME QEHB

CATEGORY:	**Procedural Document**
CLASSIFICATION:	**Clinical**
PURPOSE	**These guidelines provide clinical guidance for registered nurses and medical staff caring for haemodialysis patients**
Controlled Document Number:	**770**
Version Number:	**3**
Controlled Document Sponsor:	**Associate Director of Nursing, Division B**
Controlled Document Lead:	**Lead Haemodialysis Consultant**
Approved By:	**Executive Medical Director** **Executive Chief Nurse** **Associate Director of Nursing Division B** **Matron for Established Renal Failure** **Lead Haemodialysis Consultant**
On:	**October 2014**
Review Date:	**September 2017**
Distribution: • **Essential Reading for:** • **Information for:**	**Registered nurses and medical staff caring for haemodialysis patients** **All clinical staff working in the renal specialty.**

Contents

Abbreviations used within this document

AVF	Arterial-venous fistula
AVG	Arterial-venous graft
BBV	Blood borne virus
BP	Blood pressure
BPM	Beats per minute
CVAD	Central venous access device (a standard term used by UHBFT and in this case relating to a dialysis catheter)
C	Centigrade
Ca	Calcium
CKD	Chronic kidney disease
DIPC	Director of Infection Protection and Control
ESA	Erythropoietin stimulating agent
ESKD	End stage kidney disease
g/L	Grams per litre
Hb	Haemoglobin
HD	Haemodialysis
HDF	Haemodiafiltration
Hep B cAb	Hepatitis B core antibody (the response to hep B antigen virus)
K	Potassium
Kg	Kilograms
Kt/V	Dialyser clearance, time / volume (measurement of dialysis efficiency)
MDT	Multi-disciplinary team
mmHg	Millimetres of mercury (scale used to measure a blood pressure)
mmol/L	Millimols per litre
MRSA	Meticillin resistant staphylococcus aureus
MSSA	Meticillin sensitive staphylococcus aureus
MSU	Mid stream urine
P	Pulse
QA	Quality assurance
Qb	Dialysis machine blood flow
Qd	Dialysate flow
R	Respiration
RBC	Red blood cells
RCA	Root cause analysis
RDC	Renal dialysis catheter
RPM	Respirations per minute
SOP	Standard operating procedure
T	Temperature
TSAT	Transferrin saturation
U/E	Urea / electrolytes
URR	Urea reduction ratio (measurement of dialysis efficiency)
VA	Vascular access

Reason for Development of the Guideline

This haemodialysis regime guideline has been developed to support day-to-day clinical decisions, enabling delivery of high quality haemodialysis care based on the best available evidence.

The purpose of the guideline is to:

- Define clinical standards for patient dialysis prescriptions
- Define clinical standards to be achieved for haemodialysis patients bloods (as per Haemodialysis Renal Association guidelines)
- Define standards for monitoring and care of haemodialysis patients

Implementation

The guideline will be shared with all members of the renal healthcare team both employed by UHB and within partner organisations. If the partner organisations utilise their own policies and pathways for dialysis care, the information from this document must be incorporated within these. The following system will be employed:

- Heads of department will be responsible for signposting all members of their team to the guideline
- The guideline will be accessible via the intranet
- Knowledge/awareness of the guideline will be incorporated into local induction programmes
- Any updates to the guideline will be forwarded to all necessary parties

Monitoring

This guideline will be monitored by existing audit systems. These include monthly QA meetings led by the supervising consultant at each unit, monthly haemodialysis governance meetings attended by the haemodialysis sisters and chaired by

consultant lead for haemodialysis, vascular access governance meetings, monthly contractual meetings held with dialysis partner organisations, national renal dataset information and the UK Renal Registry Report. If issues of concern or interest are raised during these meetings further audits will be instigated as necessary.

Performance and any required corrective action plans will be monitored through the Trust clinical governance frameworks.

Application of the Guideline

The guideline identifies and promotes best practice but generally does not specify the proportion of patients to achieve the targets in clinical practice. Clearly, due to individual needs and circumstances, there are some exceptions to the guideline. These include quality of life judgements in those with limited life expectancy.
Moreover, some patients, despite full counselling, choose not to follow their recommended haemodialysis prescription regime. In these cases conversations should be fully documented and opportunities to re-establish treatment as per recommended regime always made available. Records of patients not receiving 3 x 4 hour sessions per week should be kept within the unit and updated regularly with reasons for variance from standard prescription.

Ensuring appropriate treatment of dialysis patients

In order to facilitate dialysis care described within this document, it is vital that patients are engaged with their care and are able to understand the reason for the restrictions that are imposed upon their lifestyle by end stage kidney disease itself, dialysis treatment and by the general care of dialysis patients. We are very mindful of the effect that such restrictions can have on patients' well-being and quality of life. It is therefore essential that communication by all staff is focussed around the ability to clearly explain treatment and the potential side effects of non-concordance. This should be in a manner appropriate for a given individual, using translation services if required. It should always be provided in a non-judgemental, fair manner within the

competence of the individual member of staff. Competence to communicate with patients, in a manner in which they understand, is specified within the nursing training documentation (and subject to annual reassessment) and renal patient education protocols. If an individual staff member feels unable to answer a patient or carer's queries, they should explain this to the patient and, in a prompt manner, facilitate referral to an appropriate member of the renal team in order that all queries can be answered.

Dialysis prescription

Haemodialysis should take place at least three times per week in nearly all patients with end-stage kidney disease. High flux dialysers will be used. In general, in-centre haemodialysis patients (with minimal residual renal function) should dialyse for three, four hour sessions a week. In some patients, it is accepted that sessions are required more than three times a week; in these cases, individualisation of prescription should occur but in general, treatment should not reduce below 720 mins per week. Treatment regimes for patients on home haemodialysis can be very varied and are beyond the scope of this guideline. Any deviation from this prescription must be recorded and discussed regularly within the units.

Patients must have a current, fully completed dialysis prescription which includes the prescribed blood flow rate (Qb), dialyser, dialysate composition, dialysate temperature, dialysate flow rate (Qd), duration and frequency of dialysis, haemodialysis (HD) or haemodiafiltration (HDF) (pre or post dilution), and type of anticoagulant used. This should be maintained within the patient's dialysis records (electronic or paper) at the dialysis unit. This must be reviewed at monthly QA and changed as appropriate.

Dialysis clearance:

Every patient with end-stage kidney disease receiving thrice weekly haemodialysis should have consistently:

- either urea reduction ratio (URR) > 65%
- or equilibrated Kt/V of >1.2 (or sp Kt/V of > 1.3) calculated from pre- and post-dialysis urea values, duration of dialysis and weight loss during dialysis. (Renal Association guidelines 2009)

This must be measured monthly as per pre and post dialysis sampling protocols (SOP 'Blood sampling on dialysis').

To achieve a URR above 65% or eKt/V above 1.2 consistently in the vast majority of the haemodialysis population clinicians should aim for a minimum target URR of 70% or minimum eKt/V of 1.4 in individual patients. Aiming for these target doses also addresses the concerns raised by data suggesting that women and patients of low body weight may have improved survival rates if the URR is maintained above 70% or eKt/V is at least 1.4 (Eknoyan et al). These targets are however only minimum requirements; dialysis time should not be reduced beneath prescription if achieved in a shorter duration of time.

Time on dialysis:

All patients should expect to dialyse for at least 4 hrs 3 times per week. This is the minimum in patients with minimal residual renal function. There is good evidence to suggest that any reduction in this time is associated with worse patient outcomes (Brunelli et al). Time should only be reduced if part of a regime of dialysis of more than three times per week, in patients with very significant residual renal function (eg creatinine clearance of >10mls/min as formally measured by 24 hr urine collection performed over a period not including a dialysis session) or in those patients who, when felt to be reaching the end of their lives, find such a dialysis regime very difficult. All such decisions should be discussed with the patient's consultant. Patients must be provided with information in a manner which they understand as to the disadvantages of reducing their dialysis to less than their prescription.

Blood flow rates (Qb) and dialysate flow rates (Qd):

Every effort should be made to maximise Qb for patients on dialysis. Qb over a given period of time is directly proportional to both dialysis clearance and HDF substitution volume, both of which may be associated with patient outcomes.

Qb should be at an effective Qb of >350ml/min in all patients who are able to tolerate. Qb of 400-450ml/min may be possible in patients with good access but the possibility of recirculation should be noted at high Qb . Lower levels should only be considered in patients with significant cardiac disease or hypotension with symptomatic worsening with Qb of >350ml/min. This is however not common and Qb

of >350ml/min should be considered optimal in all established AVF or AVG. Dialysis access should be adequate to achieve such Qb.

In new access Qb of 200-300ml/min with 17G needles is acceptable for 3-6 sessions, but the needle size and flows should then be increased as soon as possible. Table 1 suggests minimum needle sizes for prescribed blood flows but these may need adjusting on an individual base depending on access performance.

Table 1: suggested minimum needle gauge for prescribed blood flow

Prescribed blood flow mls / min	**Minimum Needle gauge**
>450	14
350 – 450	15
300 – 349	16
<300	17

Surveillance should be performed as per access protocols with both medical and nursing staff taking responsibility for appropriate action in the case of identified abnormalities (see UHB procedural document ‘Guidelines for the cannulation and monitoring of arteriovenous fistula (AVF) and arteriovenous graft (AVG) for the purpose of haemodialysis treatment’).

Qd should be at 1.5x Qb or as per automatic calibration on dialysis machines. This should be at least 500ml/min.

<u>Dialysate composition</u>:

Dialysate composition should be individualised for a specific patient depending upon their biochemical, physiological and fluid status. It should be reviewed regularly and changed only via consultant discussion.

Standard dialysate composition should be:

- K 2.0 mmol/l; this should be increased to 3.0 mmol/l in all patients with pre dialysis K of 4.0 mmol/l or less and strong consideration given to 3.0mmol/l in all patients with pre-dialysis K of 4.5mmol/l on high volume HDF. Evidence suggests this is associated with a reduced incidence of sudden death (Jadoul et al). This dialysate should be easily available at all dialysis units and changed promptly as per prescription. Results should be reviewed carefully monthly with alteration to prescription if required. A K of 1.0 mmol/l is not recommended; there is increasing evidence of the dangers of electrolyte shift in dialysis patients with an increased risk of sudden death with extreme shifts. Pre-dialysis hyperkalaemia needs to be addressed in a multifaceted way with intensive dietary support, assessment of dialysis clearance and thus access, acid base status, medication and consideration given to more intensive dialysis regimes.
- Ca 1.25 mmol/l; this should be used as standard in an attempt to keep patient calcium accumulation to a minimum. A concentrate of 1.5mmol/l or 1.75 mmol/l may be considered if:
    - Serum calcium is persistently beneath 2.0mmol/l and this is felt to be a clinical problem that cannot be addressed by other means
    - Severe hypotension
    - Long hours HDF eg nocturnal
    - A Ca of 1.0 mmol/l should not be used to in hypercalcaemia without careful thought and is not recommended. As with K, large swings in serum calcium associated with differences between serum and dialysate calcium have been shown to be associated with sudden death (Pun et al).
- Glucose 100mg/dl: glucose free dialysate is associated with symptomatic and asymptomatic hypoglycaemia. Glucose is now therefore routinely added to dialysate. It is likely that glucose at 200mg/dl will result in significant transfer of glucose from dialysate to patient and hyperinsuliaemia. This is unlikely to be metabolically advantageous and therefore standard dialysate will be 100mg/dl. (Raimann et al)

- Sodium: in general this should be maintained at 138mmol. Increased concentrations can be associated with sodium loading and thus subsequent thirst and fluid overload. Lower levels may be associated with haemodynamic instability. In patients who are gaining considerable amounts of fluid between dialysis sessions, or who are unstable on dialysis with considerable post dialysis recovery times, changing sodium prescription should be considered as part of a multi-faceted approach to patient management. 'Sodium profiling' should not be used as is likely to be associated with sodium loading.
- Bicarbonate: in general this should be kept at 34mEq/L. Bicarbonate is used in dialysate to replace buffer with bicarbonate diffusing from dialysate to patient. Patients with very low pre-dialysis serum bicarbonate (<19 mEq/L) and those with very raised pre-diaysis serum bicarbonate (>27 mEq/L) are at increased risk of mortality. However there is little evidence that these serum levels are related to dialysate levels and probably reflect either illness giving an underlying acidosis or malnutrition. Patients dialysed with a dialysate of >/= 38mEq/L may have an increased risk of adverse outcomes. It should also be recalled that all acid concentrates also contain acetate that is converted to bicarbonate by the liver and will therefore increase actual bicarbonate exposure (Bommer et al, Tentori et al)

<u>Dialyser</u>

- All patients should be dialysed using high flux, biocompatible membranes. The dialyser size is chosen to ensure it is both appropriate for the size of the patient and that it provides adequate dialysis clearance. Most patients can fit into one of the four sizes from 1.4m^2 to 2.5m^2. Adequate priming of the dialyser is vital to ensure full clearances are obtained. Table 2 suggests appropriate dialyser choices.

Table 2. Suggested dialyser choices

Dialyser surface area	**1.4 (m^2)**	**1.7 (m^2)**	**2.1 (m^2)**	**2.5 (m^2)**
Patient weight	<60kg or 1st dialysis session	60 – 80kg	80 - 100kg	>100kg
Blood flow (ml/min)	200 - 400	250 - 500	300 – 500	350 - 500
Dialysate flow (ml/min)	500	500 - 700	500 - 800	500 - 800
Example of manufacture's urea clearance (ml/min)	193 Qb200ml/min Qd 500ml/min	270 Qb300ml/min Qd500ml/min	281 Qb300ml/min Qd500ml/min	293 Qb300ml/min Qd500ml/min

Temperature:

Standard dialysate temperature should be 36.5°C. This can be lowered to 36°C (and even 35.5°C) if significant hypotension (Selby et al). Reducing temperature any lower than this is unlikely to be effective.

Haemodiafiltration (HDF)

The use of HDF as opposed to standard HD is encouraged for all patients. This provides theoretical advantages associated with increased convective clearance of uremic middle molecules. Clinical evidence, although at this time point not definitive, suggests that high volume post dilutional HDF (of at least 20 litres) may be associated with better patient outcomes (Maduell et al, Nistor et al). This requires maintenance of an effective Qb of 350mls/min or more and thus good dialysis access. It is accepted that HDF can only be performed in the presence of ultrapure water and if this is not available for any reason then standard high flux HD should be provided whilst there is urgent attention to the issue causing problems with water quality. It should always be considered in patients as below:

1. persistent hypotension, particularly in anephric patients, when other measures such as dialysate temperature reduction have failed.
2. in patients with calciphylaxis
3. primary hyperoxaluria

Pre dialysis blood samples

Blood sampling for biochemical and haematological measurements should be performed before a mid-week haemodialysis session as per protocol (SOP ‘Blood sampling on dialysis’). Monitoring of pre-dialysis biochemical and haematological parameters must be performed monthly for in-centre haemodialysis patients and at least 3 monthly in home haemodialysis patients. If a patient misses routine monthly

bloods because of eg holiday or hospital admission, they should be taken as soon as possible after return to the dialysis unit and forwarded to supervising consultant for review if after monthly QA. Standards are as per Renal Association guidelines (2009)[1].

- pre-dialysis serum bicarbonate concentrations measured with minimum delay after venepuncture should be between 18 and 24 mmol/l
- pre-dialysis serum potassium should be between 4.0 and 6.0 mmol/l
- pre-dialysis serum phosphate, if elevated, should be lowered towards the normal range, such as between 1.1 and 1.7mmol/l.
- pre-dialysis serum calcium, adjusted for serum albumin, should be within the normal range
- pre-dialysis PTH should be within 2-9 times the normal range (3 monthly).
- pre-dialysis haemoglobin concentration should be maintained within the range 100-120 g/l

  Patients will be supplied with an individualised copy of their blood results with an explanation that they understand. They should also be given the opportunity to discuss these each month with their primary nurse. In addition all haemodialysis patients will be supplied with the patient information leaflet entitled ‘Knowing your blood results’.

Anticoagulation

This is performed using low molecular heparin (tinzaparin) as a bolus within 15 minutes of the start of haemodialysis and illustrated in table 3. If deviations are needed from this protocol, these must be agreed by a consultant.

Table 3 Tinzaparin dosing in chronic haemodialysis

HD 4 hours or less	
Body weight **less** than 100kg	Body weight **more** than 100kg
2500 units	3500 units

HD more than 4 hours	
Body weight **less** than 100kg	Body weight **more** than 100kg
3500 units	4500 units

The only variations from this should be in:

- patients with HIT (heparin-induced thrombocytopaenia) where discussion with haematologists may be required to establish whether low molecular weight heparin is suitable or whether an alternative is required
- patients on long hours haemodialysis (eg nocturnal) where the $T^{1/2}$ of tinzaparin is not suitable and at present these patients should be maintained on unfractionated heparin.
- Patient on home haemodialysis already using unfractionated heparin with no clinical reason to change
- If tinzaparin is not available and when suitable alternatives need to be sourced and approved by the Trust.
- In patients at significant increased risk of bleeding (often in consultation with haematology) eg platelet count lower than $50x10^9$/l, when heparin free dialysis should be considered with frequent saline flushes

- In patients who need warfarin eg metallic heart valve, high risk atrial fibrillation when consultants may wish to consider heparin free dialysis or use of heparin at lower than protocol requirements because of increased bleeding risks. Use of warfarin in dialysis patients with atrial fibrillation should be carefully considered with current evidence suggesting that risks of bleeding are very marked in this population and remove much of the benefits seen in the non-dialysis population (Shah et al).

This is discussed in more detail in the document ‘Anticoagulation in haemodialysis’.

Vascular access for dialysis

Renal Association Vascular Access guidelines 2011 should be adhered to. Further information can be found in the document ‘Guidelines for the cannulation, monitoring and surveillance of arteriovenous fistula and arteriovenous graft for the purpose of haemodialysis’.

All patients should, if possible, dialyse via a native arterio-venous fistula (AVF). A suitable alternative if not possible is a graft (AVG). The use of tunnelled dialysis catheters should be kept to a minimum as there is good evidence that there is increased incidence of infection and decreased patient survival with their use (Ishani et al). All patients with tunnelled lines should either be classified as ‘permanent’ or have a defined plan for access formation discussed at monthly QA meetings when current and accurate access data should be available. It is the responsibility of the entire renal team, whether from UHB or partner organisations, to ensure correct information is relayed in an appropriate manner to patients about vascular access, and that all opportunities are facilitated to aid rapid creation of AVF or AVG if possible.

‘Permanent’ lines are defined where there are either no further sensible vascular access options available (as defined by UHB VA doctor) or where the patient, having been given appropriate information, in a way in which they can understand, has declined formation of permanent vascular access. No patients on the chronic haemodialysis programme dialysing as an out-patient should have a non-tunnelled dialysis line.

Access options should be re-reviewed in all patients who develop an access related bacteraemia. Individuals who have previously elected to dialyse via a tunnelled catheter should be offered a further access clinic review to determine if there are alternative access options available to them, which they may now wish to choose.

All patients will be supplied with patient information leaflets appropriate for their form of current access (eg ‘Following insertion of your haemodialysis line’, ‘Vascular access for haemodialysis’).

In order to maintain functioning vascular access it is very important that robust monitoring and referral pathways are in place and followed correctly. Surveillance of AVF/AVG should be performed as per protocol (see UHB procedural document ‘Guidelines for the cannulation, monitoring and surveillance of arteriovenous fistula (AVF) and arteriovenous graft (AVG) for the purpose of haemodialysis treatment’) with prompt referral in for further review as dictated by protocol.

Tunnelled haemodialysis lines must be cared for as per Trust HD CVAD protocol (‘Guidelines for the care of central venous access devices’). Any CVAD score >0 should be treated as per protocol to reduce incidence of line related bacteraemias, which are a very significant health risk to patients. It is also accepted that dialysis patients may develop a bacteraemia with signs that differ from patients without renal failure. The guidelines for situations in which to obtain blood cultures in dialysis patients therefore differs from standard UHB Trust policy (see ‘Blood cultures in haemodialysis patients’.)

In addition, lines must be referred for removal when a new fistula has been needled successfully on three successive occasions. Referral for removal should be via lineout@uhb.nhs.uk. All referred lines should have been removed within 2 weeks of referral and regular audit will identify and deal with non-attenders. If there are repeated problems needling a new fistula, this should be reported to vascular access team via fistula@uhb.nhs.uk or direct to vascular access team and to the consultant nephrologist responsible for the unit and certainly within one month of commencing needling so plans for clinic review or imaging can be made.

A risk register will be kept by UHB satellite co-ordinator nursing staff containing the names of patients who are not able to follow UHB policy with regards to access care. This may be because of sensitivity or allergy to components of the access care package, or due to non-concordance with suggested treatment regimes. Each of these patients should have an individual ‘access care prescription’ making use of

alternative products and this individualisation of policy should also be clearly recorded in the patient's records at the dialysis units with UHB satellite liaison nurses informed immediately of any changes. Consideration should be given to teaching self-care of dialysis lines if felt to be appropriate with use of relevant UHB self-care documentation. This differing care should be discussed at QA meetings.

MRSA screening

This is performed to try and reduce carriage of MRSA amongst the renal dialysis population, recognising the severity of systemic infection with this organism for the dialysis population and the relatively low rate of carriage. Screening and treatment should be as per 'Screening and Treatment of *Staphylococcal aureus* colonisation in haemodialysis patients'. If possible, any patient colonised with MRSA should dialyse in a side room. However it is recognised that this is not always possible and therefore a patient should then be treated away from others if possible, for instance at the end of a row. The use of universal precautions for care of dialysis patients should always be implemented.

At the time of writing, there are no plans to introduce screening of dialysis patients for MSSA carriage.

There will be rolling audit of:

- Bacteraemias in renal patients with RCAs initiated if felt clinically necessary (certainly for all MRSA/MSSA). It is expected that all members of the renal team caring for UHB patients, whether UHB employed or partner organisations, will take part in gathering of information accurately and promptly for such investigations. Equally, if summoned for RCA meetings, they should attend.
- Following of MRSA colonisation treatment protocols following positive screening result
- Access for dialysis for incident dialysis patients with mini-RCA for all known to renal services for more than 90 days and starting without permanent access.

These will be reviewed at minuted haemodialysis or vascular access governance meetings with further review meetings organised as felt necessary. In addition, such data will be submitted to national audit if requested.

- Infection control and prevention audits will be performed as per ‘Audits in dialysis’ and reviewed in contract review meetings.

Anaemia management

Renal anaemia will be managed using NICE guidelines CG114 (2011) and Renal Association Anaemia in CKD guidelines (2010) with any subsequent national guidelines. Patients will be treated with intravenous iron (currently iron sucrose 'Venofer') as per QEHB protocol using Hb, ferritin and TSATs to determine frequency. Brand of ESA use will be determined by their place of dialysis as per current Trust practices. This will be guided by the renal anaemia specialist nurses and monthly QA meetings (unless as part of a clinical trial) with instigation of further investigations and treatments as suggested by the supervising consultant. It is noted that there are some patients who maintain Hb above the recommended ranges without the use of ESA. It is acknowledged that it is likely to be the use of ESA to maintain a Hb above the recommended range that is the probable cause of increased risk of adverse outcomes and thus the management of Hb above the recommended range in patients not on ESA will be at supervising consultant's discretion taking in to account quality of life and access protection (Renal Association Guidelines 2009. Anaemia in CKD).

Dietician input

Dietetic input to the dialysis units is provided by UHB and shall be at the agreed dietician: patient ratio which is currently 1:135 as per national guidelines (BRS 2002) Each new patient at the unit will be reviewed promptly by the unit dietician (within a month) and be provided with tailored advice in a manner which is understandable to them and their family. Patients will then be reviewed regularly by the dietician according to monthly bloods and MDT suggestion. Each patient will be reviewed routinely at least every 3 months.

Psychological support

It is recognised that chronic ill heath such as ESKD is associated with significant depression and psychological symptoms (NICE CG91). The healthcare professionals treating dialysis patients will be aware of this and offer support to patients who they feel need further psychological input. This can be provided by:

- Referral to QEHB renal psychological services
- Referral to primary care for further treatment or monitoring

Welfare and benefits support

It is recognised that ESKD can be associated with significant social and welfare issues that can have a profound impact on a patient's quality of life. On commencement of dialysis a discussion should be had with the patient by the nursing staff with regards to this, with referral to the welfare team if necessary. Patient literature will also be provided guiding patient to available options.

Blood-borne virus management

This is to take place as per current UHB guidelines (Clinical Policy for Screening, Prevention and Management of Blood Borne Virus in Patients Under the Care of UHB Renal Service and Protocols For Blood Borne Virus Screening, Prevention and Management of renal patients under the care of UHBFT, Renal Services) with particular focus on:

- Prompt vaccination and provision of boosters as necessary for hepatitis B (as per 'Guidelines for the administration of Hepatitis B vaccine to renal patients').
- Routine BBV screening every three months (or monthly for patients with anti Hep B cAb because of the risk of reactivation)
- Screening as per protocol of patients returning from high risk countries ('holiday returners')
- Adherence to isolation and cohort policies for patients with known BBV and holiday returners
- Adherence to disinfection and storage procedures for machines

All such information must be readily available for clinical review and audit purposes. Any adverse incidents must be reported immediately to UHB and to BBV lead consultant. Routine three monthly BBV meetings are held at UHB attended by the wide MDT including representations from partner dialysis organisations and virology to ensure compliance to national and local guidelines.

Clinic review

Clinic review of haemodialysis patients will occur at the dialysis units by the supervising consultant. It is intended that this will be carried out at times that are convenient to patients, thus minimising time spent by patients on clinical appointments outside of dialysis sessions. All new patients should be reviewed within 4 weeks of commencing dialysis at the unit and all patients should be offered clinic review at least every 6 months and preferably every 4 months. More frequent review will be needed in sicker patients with particular attention provided for those with recent hospitalisation. Each consultation must generate a letter onto QEHB clinical portal with a copy to the dialysis unit and to the patient. This should undergo audit every 3 months to ensure all patients have been seen within the last 6 months.

If the dialysis unit are not being provided with enough clinic slots to provide clinical review as above this must be discussed directly with the QEHB lead for haemodialysis or clinical service lead for renal services.

A record must be kept within the unit of patients seen in clinic with regular review to ensure that all patients have been offered appointments. The satellite co-ordinators will ensure that all patients who have had in-patient episodes are flagged to the supervising consultant so that clinic review can be expedited if felt by the consultant to be necessary. If there are particular issues to handover to the supervising consultant it is helpful if the in-patient team can contact them directly. If patients are admitted to external hospitals, the satellite co-ordinators or dialysis unit staff should attempt to obtain a copy of the discharge summary for supervising consultant. It should be noted, that patients admitted to non-UHB hospitals, should not be attending for dialysis at satellite units but should, in general, undergo dialysis treatment in 301 at QEHB. This applies to patients admitted to emergency departments as well as to patients on wards. Satellite dialysis units do not have permanent presence of medical staff and are not designed to provide dialysis for unstable patients (see ‘Patient criteria for dialysis of chronic haemodialysis patients, currently inpatients or in accident and emergency units in other hospitals other than QEHB, at satellite units’).

Transplant listing

It is the responsibility of the unit consultant, working with UHB transplant team and dialysis unit staff to ensure that:

1. All patients with dialysis-dependent kidney failure for whom transplantation would be medically appropriate, understand the indications for renal transplantation, including advantages and disadvantages to themselves as an individual
2. Patients suitable for renal transplantation are appropriately counselled, undergo necessary cardiac testing and are reviewed and listed for transplantation in a timely manner
3. Patients with potential live donors know how to approach the UHB transplant service for donor assessment.
4. Annual review forms are filled in promptly to allow continued transplant listing
5. Any change in the patient's medical condition is communicated appropriately so that patients can be suspended from transplant list if necessary. Equally, once patient's condition has stabilised, prompt review and re-activation should occur.
6. Appropriate communication with the dialysis unit occurs to ensure that routine tissue typing bloods are taken at appropriate time intervals.

Monitoring of quality within the haemodialysis programme

Within UHB renal services, there are various mechanisms set up to monitor quality of care, both at an individual clinical level and at a population and organisational level. These mechanisms aim to ensure that care is provided as per this document.

The individual care of each patient remains with the UHB renal consultant ascribed to the patients unit (or shift). This is who should be contacted with regards to problems for the patient in the first instance. If this consultant is on leave then a second consultant should be nominated to cover and the unit should be made aware of this. Consideration needs to be made to the urgency with which contact is needed with the consultant and email used if possible. If the consultant is not contactable for urgent problems then:

1. Within working hours initial contact should be with satellite liaison co-ordinators or dialysis matron. The on-call team should not be used unless neither of these alternatives are available.
2. If advice is needed urgently outside of working hours then the on-call team should be contacted.
3. If contact is made with anyone other than the unit consultant, then the unit consultant should be emailed with details with regards to the issues raised and action taken as a result

Monthly quality assurance meetings

A quality assurance meeting will be held in each unit, each month. This is primarily designed as an opportunity to discuss each patient, their monthly blood results and any issues pertaining to their ongoing care in a multi-disciplinary environment. (Issues relating to monitoring of contractual issues and overall review of management will be performed centrally by the UHB lead haemodialysis team). This should be scheduled as soon after monthly bloods as possible and preferably at a defined time each month to allow MDT planning and attendance. Attendees should be; the supervising consultant, unit clinical manager, nursing team leaders, satellite

co-ordinator sister, anaemia clinical nurse specialist and dietician. The unit nursing staff, as above, should be given adequate time to prepare for this meeting and the unit must be staffed appropriately on that day to allow staff attendance whilst maintaining contractual staffing ratios within the treatment area.

The unit's QA meeting should cover:

1. Summary of monthly results for the unit with percentages of patients within range for RA parameters and actions for those patients that fall outside of the standards
2. Water quality and details of corrective action if performed for information. This will generally be managed on a day to day basis by the UHB haemodialysis team of lead consultant, matron for ESKD and lead renal technician.
3. Details of patients screening positive for MRSA and treatment processes, details of any holiday returners with demonstration of appropriate blood results and details of any patients vaccinated for Hep B (with reasons if not performed as prescribed).
4. Any complaints and action arising
5. Any treatment variances as presented via contractual performance matrix or via PICS monitoring
6. Any admissions to hospitals / patient deaths
7. A list of all patients for whom there is a prescription of less than 4 hours 3 times per week and reasons for that (exception reporting).
8. A list of those patients who score high on Waterlow assessment and documentation of appropriate actions

In addition for each patient the following should be discussed and any changes documented.

1. Monthly bloods as detailed above
2. Dialysis access with particular focus on

- Patients with haemodialysis lines classified as non-permanent to ensure plan is in place for permanent access (if felt possible)
- Problems with permanent access needing review (although this should not be left to the QA meeting but acted upon immediately as per protocol)

Any queries will be communicated with vascular access team via fistula@uhb.nhs.uk copied to the unit and supervising consultant.

3. Arising medical / social issues
4. 'At risk register' for patients who are felt to either be requiring extra attention or who are reaching a stage where the benefits of dialysis are less clear. Discussion with patients and family should be scheduled if necessary along with consideration of referral to community palliative care teams

Any changes will be documented in the patients' records at the unit, in a letter on to QEHB clinical portal (to be copied to GP, dialysis unit and patient) and by a handwritten note to be faxed to the GP by the unit if necessary. Any necessary changes in prescriptions will also be completed at this time to ensure prompt introduction of suggested alterations.

HD governance meetings

These occur monthly at QEHB chaired by the haemodialysis lead consultant and attended by senior dialysis nurses (Renal Matron, QEHB 301 sisters, satellite co-ordinators, home haemodialysis sisters, vascular access team, anaemia team, professional development team, renal technician). Its purpose is to review all units as per agenda (appendix 1).

Contractual review of performance of independent satellite dialysis providers

These are attended by clinical service lead for renal medicine, haemodialysis lead consultant, renal matron for ESKD, renal business managers and divisional

managers and representation from independent provider units. They are used to discuss:

- Adherence to clinical specification of provider contract
- Arising issues pertaining to independent provider units

Contact obviously occurs between these meetings with regional management if necessary.

These meetings will be preceded by a meeting between QEHB ESKD Matron, divisional nursing representation and satellite co-ordinators with independent provider regional management.

Vascular access governance meetings

These meetings are held every 3 months and primarily review all patients starting dialysis via a dialysis catheter not permanent access. A mini RCA is performed for all patients known to UHB renal services for more than 90 days. MDT attendance allows dissemination of finding to improve process. Attended by lead for haemodialysis, matron for ERF, satellite liaison sisters, CKD nursing team, vascular access co-ordinators.

Review of root cause analyses for bacteraemias in haemodialysis patients

These meetings occur every three months or more frequently if required. They are used as a forum to review all RCAs for MRSA and MSSA bacteraemias in haemodialysis patients. RCAs should be completed initially by lead nurse within area where patient was being treated when blood cultures were taken. Further information is then requested from other areas as needed. Attendance includes lead for haemodialysis, matron for ERF, satellite liaison sisters, band 7 nursing staff from QEHB dialysis units and divisional infection protection and control nursing staff. Further advice will be taken from Trust DIPC if required.

References

Mactier, R., Hoenich, N. and Breen, C. Haemodialysis. Renal Association Guidelines. 2009

Eknoyan et al. Effect of dialysis dose and membrane flux in chronic haemodialysis. N Engl J Med 2002; 347: 2010-2019.

Brunelli et al. Shorter dialysis times are associated with higher mortality among incident hemodialysis patients. Kidney Int 2010; 77: 630-636

Jadoul et al. Modifiable practices associated with sudden death among hemodialysis patients in the Dialysis Outcomes and Practice Patterns Study. Clin J Am Soc Nephrol 2012; 7: 765-774

Pun et al. Dialysate calcium concentration and risk of sudden cardiac arrest in hemodialysis patients. Clin J Am Soc Nephrol 2013; 8: 797-803

Raimann et al. Metabolic effects of dialyzate glucose in chronic hemodialysis; results from a prospective, randomized, crossover trial. Nephrol Dial Transplant 2012; 27: 1559-1568

Bommer et al. Association of pre-dialysis serum bicarbonate levels with risk of mortality and hospitalization in the Dialysis Outcomes and Practice Patterns Study. Am K Kidney Dis 2004; 44:661-671

Tentori et al. Association of pre-dialysis serum bicarbonate levels with risk of mortality and hospitalization in the Dialysis Outcomes and Practice Patterns Study. Am K Kidney Dis 2013; 62:738-746

Selby et al. Dialysis induced regional left ventricular dysfunction is ameliorated by cooling the dialysate. Clin J Am Soc Nephrol 2006; 1: 1216-1225

Maduell et al. High efficiency post-dilution online hemodiafiltration reduces all cause mortality in haemodialysis patients. J Am Soc Nephrol 2013; 24: 487-497

Nistor et al. Convective versus diffusive dialysis therapies for chronic kidney failure; an updated systematic review of randomized controlled trials. Am J Kidney Dis 2014; 63: 954-67

Shah et al. Warfarin use and the risk of stroke and bleeding in patients with atrial fibrillation during dialysis. Circulation 2014; 18: 1196-203

Fluck, R. and Kumwenda, M. Vascular Access for Haemodialysis. Renal Association Guidelines. 2011.

Anaemia management in people with chronic kidney disease.
National Institute for Health and Clinical Excellence.CG114 2011

Mikhail et al. Anaemia in CKD. Renal Association Guidelines 2010

Ishani et al. Septicaemia, access and cardiovascular disease in dialysis patients; the USRDS Wave 2 study. Kidney Int 2005; 68: 311-318

British Renal Society. The Renal Team; a multi-professional renal workforce plan for adults and children with renal disease. 2002

National Institute for Health and Clinical Excellence CG91. Depression in adults with a chronic physical health problem 2009.

Guidelines reviewed by:

Dr. Clara Day	Consultant Nephrologist
Liz Simpson	Matron Established Renal Failure

Guidelines submitted to and approved by:

Executive Medical Director .....

Date: 14/10/14

Executive Chief Nurse .....

Date: 03/10/2014

Associate Director of Nursing, Division B .....

Date: 3.10.14.

Lead Haemodialysis Consultant .....

Date: 24/9/14.

Matron, Established Renal Failure .....

Date: 23/9/14.

Appendix 1

MONTHLY HAEMODIALYSIS GOVERNANCE MEETING QEHB

Agenda

1. Technical
   - Including Water Report for the New Hospital
   - Outstanding issues

2. Acute Dialysis
   - Capacity
   - Review of activity
   - Review of variance matrix for chronic dialysis patients
   - Matters arising

3. 301 chronic
   - Capacity
   - Review of variance matrix
   - Matters arising

4. Satellite Units
   - Capacity
   - New Starters
   - Deaths/Leavers
   - Risk and clinical incidents including septicaemias
   - Holiday returners
   - Matters arising

5. Home Haemodialysis
   - Capacity
   - Review of variance matrix
   - Matters arising

6. Access
   - Access report per unit % lines vs fistulas

7. Anaemia
   - Update
   - % in targets for each unit (on and off ESA)

8. Nursing education update

9. AOB