University Hospitals Birmingham NHS
NHS Foundation Trust

Standard Operating Procedure (SOP) for On-Call Emergency Out of Hours Haemodialysis for Renal Patients

CONTROLLED DOCUMENT

CATEGORY:	**Procedural Document**
CLASSIFICATION:	**Clinical**
PURPOSE	**To provide information and guidance on the procedure for on-call emergency out of hours haemodialysis for renal patients.**
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Controlled Document Sponsor:	**Associate Director of Nursing, Division B** **Divisional Medical Director, Division B**
Controlled Document Lead:	**Professional Development Nurse-Renal**
Approved By:	**Divisional Medical Director, Division B** **Associate Director of Nursing, Division B** **Matron Established Renal Failure** **Clinical Service Lead Renal** **Haemodialysis Consultant**
On:	**May 2015**
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Distribution: • **Essential Reading for:** • **Information for:**	 **All nursing and medical staff involved in the on-call emergency out of hours haemodialysis for renal patients.** **All clinical staff involved in the care of renal patients receiving emergency out of hours haemodialysis.**

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1.0 Introduction

The number of renal patients has risen consistently over the last 10 years which has had a direct impact on the services of the Acute Haemodialysis Department within the Trust. The Renal Unit treats around 1000 patients on chronic haemodialysis as well as providing the care for and management of around 310 patients with Acute Kidney Injury.

Acute Kidney Injury (AKI) is a sudden decline in kidney function, occurring over hours or days. It can occur in people with normal kidney function or in those who have pre-existing Chronic Kidney Disease (CKD). Common causes of AKI are pre-renal disease from volume depletion, dehydration, cardiac failure or sepsis, acute tubular necrosis (ATN) secondary to ischaemia or nephrotoxins and acute inflammatory renal disease (Levy et al 2005). Many people make a complete recovery from AKI but some are left with CKD or even End Stage Kidney Disease (ESKD). Mortality rates are very high in AKI particularly among those who require dialysis (NSF 2004).

If AKI is severe, extra-corporeal therapies such as haemodialysis are required as life saving treatment, often as an emergency (NSF 2004). In order to provide emergency haemodialysis, out of hours cover is a necessity.

Out of hours dialysis will also be required for patients on chronic haemodialysis, who become unwell and are admitted to hospital with for example, pulmonary oedema, sepsis or hyperkalaemia.

Within the Trust out-of-hours cover will be provided everyday (including bank holidays) from 18:00 hrs to 08:00 hrs Monday to Friday, Saturday 18:00 hrs to Sunday 09:00 hrs and from Sunday 17.00 hrs to Monday 08.00 hrs.

2.0 Statement of Need

This SOP has been developed by senior medical and nursing staff in the Renal Unit in order to ensure that there is a standard document that is evidence based and available for registered staff working within the renal specialty.

The purpose of this SOP is to:

1. Clarify and define the procedure for performing on-call emergency out of hours haemodialysis to renal patients.

2. Provide registered practitioners with support, knowledge and evidence based practice necessary to enable them to provide on-call emergency out of hours haemodialysis to renal patients

3.0 On-Call Emergency Out of Hours Haemodialysis

3.1 Indications:

The following must occur in order for on-call emergency out of hours haemodialysis to be undertaken:

- On-call emergency out of hours haemodialysis must only be requested by the Renal Specialist Registrar or Consultant. If the Renal Specialist Registrar has any uncertainty, they must contact the Consultant on call.
- The patient must have been seen by the Renal Specialist Registrar or Consultant before the request for on-call emergency out of hours haemodialysis is made.
- The patient must have a dialysis prescription completed and signed by the Renal Specialist Registrar or Consultant. The prescription must indicate length of dialysis, ultrafiltration required, type of dialysate, dialyser size, heparinisation, bicarbonate setting, sodium setting and dialysate temperature.
- All on call dialysis must be entered on Euclid system.
- Medical cover must be provided by the acute renal team.
- The haemodialysis will be carried out on 303, 305 or in the designated on call room on ward 303 (which accommodates out-patients or patients from clinical areas with no dialysis facilities). Out of hours haemodialysis must not be carried out on 301.
- The patient in AKI must fit one of the following criteria:

    - Hyperkalaemia – Potassium of >6 mmols/l
    - Acidosis
    - Fluid overload unresponsive to medical treatment
    - Uraemia
    - Poisoning i.e. Ethylene glycol
    - Other consultant request

- The patient with ESKD must fit the following criteria:

    - Hyperkalaemia – Potassium of >7mmols/l
    - Hyperkalaemia – Potassium of >6.5 mmols/l following the administration of dextrose and insulin
    - Hyperkalaemia – Potassium >6 mmol/l in the setting of intercurrent sepsis and/or cardiac instability (rhythm changes)
    - Acidosis
    - Fluid Overload
    - Pre-transplantation where surgery is envisaged during the night or first thing in the morning.
    - Other consultant request

In all cases where it is safe and logistically possible, the haemodialysis should be delayed until the following morning. However, haemodialysis must occur the following morning and must not be delayed until later in the day.

3.2 Contraindications:

The registered nurse must not provide on call emergency out of hours haemodialysis in the following circumstances:

- The patient with capacity refuses the treatment.
- The patient is under 16 years of age.
- The patient's central venous access device (CVAD) has not been x-rayed and the correct position of the CVAD device cannot be established.
- If the patient is not haemodynamically stable to tolerate haemodialysis.

3.3 Limitations:

- If the patient has not had a Hepatitis B and Hepatitis C status clearly documented in their notes within the last 3 months they will need to have their machine isolated for their use only until this is available. The isolation label must be used and fixed securely to the front of the machine. If in doubt, it is best practice to do this and results can be confirmed the following morning. The registered nurse **must not** accept verbal messages. Results from satellite units may be faxed through if it is before 12 midnight and the unit is open. The Prescribing Information and Communication System (PICS) and MARS must be checked to confirm whether the patient is a 'Holiday Returner.' If the patient has dialysed in a high risk area and uses a designated machine, the machine used out of hours should be isolated. If in any doubt, the machine should be isolated. If Hepatitis B sAb titre levels < 10 -100, the patient should dialyse in an isolation room or a physical barrier should be used on an own designated machine. Any new patients must have hepatitis screen sent and the machine isolated.
- If a Hepatitis B Virus (HBV) infected patient requires dialysis during the on-call service at UHBFT, where possible, a second nurse should support the delivery of this dialysis in the dedicated HBV (room 29 Ward 301 at Queen Elizabeth Hospital). Where this is not possible, an alternative plan must be discussed and agreed with the on-call consultant for a similar suitable environment. If the dedicated HBV room is not used, the area where the patient was dialysed must be thoroughly cleaned according to Trust policy, before being used by any other patient.
- If it is proposed that the on-call, emergency, out of hours haemodialysis is to be outside the designated on-call clinical area or not on one of the renal wards, this must be supported by the renal technicians for set up.

4.0 Staff competence

- The registered nurse must be a band 5 with 12 months post registration experience within renal haemodialysis.
- The registered nurse must have 3 months experience on the acute haemodialysis unit and have undergone the relevant education and

training and have achieved all recognised acute haemodialysis competencies (Appendix 1).

- The registered nurse must be familiar with the Trust Guidelines for the Care of Central Venous Access Devices (controlled document number 224 current version) and be assessed as competent to administer drugs via the CVAD (in accordance with controlled document number 232 Expanded Practice Protocol for the Administration of Intravenous Drugs and Infusions by Registered Practitioners (current version)).
- The registered nurse must have been assessed as competent to cannulate arterio-venous fistulae in accordance with the competencies for chronic haemodialysis (Renal Unit, current version).
- Evidence of satisfactory supervised practice must be provided by the registered nurse as witnessed by a practitioner who is already competent in the provision of on call emergency out of hours haemodialysis.
- The number of supervised practices required will reflect the individual registered nurse's learning needs.
- Evidence of competence must be provided and a copy kept in the registered nurse's personal file and in the department where the skill is practised. Competence will be re-assessed annually to ensure that staff are assessed against current practice.
- Members of staff who have been performing the skill elsewhere and are already competent in acute haemodialysis but are new to the Trust, must read and understand this SOP and be signed off against the competencies in Appendix 1.
- In accordance with codes of professional practice, the registered nurse has a responsibility to recognise, and to work within, the limits of their competence. In addition, the registered nurse has responsibility to practise within the boundaries of the current evidence based practice and in line with up-to-date Trust and national policies and procedural documents. Evidence of continuing professional development and maintenance of skill level will be required and confirmed at theregistered nurse's annual appraisal by the registered nurse's line manager.

5.0 Monitoring

Audit of this Standard Operating Procedure

The Renal Professional Development Nurse will lead the audit of the SOP. The audit will be undertaken in accordance with the review date and will include:

- Adherence to the SOP.
- Any untoward incidents or complaints.
- The number of registered practitioners competent to perform on call emergency out of hours haemodialysis

All audits will be logged with the Risk and Compliance Unit.

Clinical Incident Reporting and Management

Any untoward incidents and near misses must be reported via the Trust incident reporting system, and where required escalated to the appropriate management team. In addition, the Risk and Compliance Unit must be notified by telephone of any Serious Incidents Requiring Investigation (SIRI).

6.0 Implementation

This SOP will be rolled out and the following will be ensured:

- On successful completion of the chronic haemodialysis and acute dialysis competencies, acute dialysis registered nurses will receive education, training and assessment in on-call emergency out of hours haemodialysis in conjunction with this SOP.

- Only registered nurses deemed competent will be able to carry out on call emergency out of hours haemodialysis.

7.0 References / Bibliography

Department of Health (2004) **The National Service Framework for Renal Services Part 1: Dialysis and Transplantation**. HMSO, London.

Department of Health (2005) **The National Service Framework for Renal Services Part 2: Chronic Kidney Disease,** Acute Renal Failure and End of Life Care. HMSO, London.

Levy, J. Morgan, J. & Brown, E. (2005) **0xford Handbook of DIALYSIS** 2ND Edition, Oxford University Press, Oxford.

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University Hospitals Birmingham NHS Foundation Trust (2009) **Policy for consent to examination or treatment***,* University Hospitals Birmingham NHS foundation Trust.

University Hospitals Birmingham NHS Foundation Trust (2008) **Medicines Policy.** University Hospitals Birmingham NHS Trust, Birmingham.

SOP Submission Details

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Date: 13/5/15

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Date: 14/5/15

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Appendix 1
Registered Nurse Competencies - Acute Kidney Injury and its management

Acute Kidney Injury and its management

Aim: For the nurse to be able to identify a patient with acute kidney injury (AKI), assess kidney function and deliver the management of a patient requiring an acute haemodialysis session.

Competency assessment criteria	Competency taught		Competency achieved	
	Date	Signature	Date	Signature
Discuss the main causes of acute renal failure.				
Describe the signs and symptoms of pre-renal failure, intrinsic and post-renal failure.				
Document a patient's clinical history and plan of nursing care to manage the patient with AKI.				
Demonstrate clinical assessment skills of the patient with AKI.				
Explain and demonstrate urinalysis monitoring and urine output charting.				
Demonstrate the understanding and use of the AKIN criteria assessment.				
Identify common electrolyte abnormalities that occur with AKI (K+, Ca+, PO_4, CO_2) and fluid overload.				

Discuss your understanding of the Sepsis Six monitoring tool, explaining when it should be implemented. Prepare a plan for managing the patient requiring acute haemodialysis.				
Perform an acute 'Out of hours' HD session for a patient using all aspects of learning in Competency 1 and in accordance with SOP 'On Call Emergency Out of Hours Haemodialysis for Renal Patients' CDN:663 .				

Supporting Information. Acute Kidney Injury and its management.

Acute kidney injury (AKI) formerly known as acute renal failure, is a rapid loss of renal function, characterised by a rapid fall in glomerular filtration rate (GFR) due to damage to the kidneys resulting in the retention of nitrogenous wastes (urea and creatinine) and non-nitrogenous waste products. The sudden reduction in GFR is dependant on the severity and duration of the acute injury, which can occur over a number of hours or days. Initially, there may be no signs or symptoms, but an indication of AKI is if the urine volume drops to 400ml/ 24 hours (oliguria or anuria). However, as the duration and severity lingers, accumulation of metabolic irregularities, such as metabolic acidosis, hyperkalaemia and changes in body fluid balance can often affect many other organs and systems also. The situation at this point becomes a life-threatening medical emergency.

Acute kidney injury causes are categorised into one of three groups: *pre-renal, intrinsic or post-renal*, and the relative incidence of each of these is dependent on age, gender and clinical setting.

Pre-renal AKI is functional and by definition not associated with any additional histopathological change. It is a consequence of decreased renal perfusion, which leads to a reduction in glomerular filtration rate (GFR). Pre-renal often responds well to a fluid resuscitation.

Intrinsic occurs when there is damage to the nephron, such as the glomeruli, tubules, vessels or interstitium and is often reversible.

Post-renal follows obstruction of the urinary collection system.

Pre-renal	Intrinsic	Post-renal
Hypovolaemia • Vomiting/diarrhoea • Haemorrhage • Burns Decrease in effective circulating volume • Cardiac failure • Septic shock • Cirrhosis Drugs • ACE inhibitors • NSAID's	Glomerular • Glomerulonephritis Glomerular endothelium • Vasculitis • HUS • Malignant hypertension Tubular • Acute Tubular Necrosis (ATN) • Rhabdomylosis • Myeloma Interstitial • Interstitial Nephritis	Obstruction • Renal calculi • Retroperitoneal fibrosis • Prostatic hypertrophy • Carcinoma • Cervical carcinoma • Urethral stricture • Bladder neoplasm • Pelvic neoplasm • Retroperitoneal neoplasm

Risk Factors

Risk factors associated with acute kidney injury are being of older age, hypertension, vascular disease, pre-existing renal impairment, congestive cardiac failure, diabetes, myeloma and chronic infection.

Presentation of Acute kidney Injury

Symptoms	Signs
• Urine output (oliguria or anuria, occasional polyuria) • Nausea, vomiting • Dehydration • Confusion	• Hypertension • Abdomen – large bladder. ? retention • Dehydration (often postural hypotension but no oedema) • Fluid overload – raised JVP, pulmonary oedema and peripheral oedema) • Pallor, rash, bruising (petechiae, purpura, epistaxis, DIC) • Pericardial rub

Alterations in serum creatinine and urea

Creatinine	Cause	Urea	Cause
Increase	Rhabdomylosis Hypothyroidism African ethnicity Trimethoprim Cimetidine Unconjugated bilirubin	Increase	Cardiac failure Dehydration Gastrointestinal Haemorrhage Severe burns Systemic sepsis Tumour lysis Haematoma Hyperlimentation Steroid therapy
Decrease	Liver disease Starvation Pregnancy	Decrease	Muscle wasting, amputation Vegetarian. Elderly. Chronic organ disease

			Liver disease, obesity.

Assessment of kidney injury

Assessment and diagnosis can be made using a standardised criteria AKIN (Acute Kidney Injury Network) staging system for AKI. This defines AKI due to an increase in serum creatinine, or a drop in urine output or both.

AKIN STAGE	Serum creatinine criteria	Urine output criteria	
1	SCr≥ that is 26.4µmol/L above patient's baseline OR SCr≥ that is 1.5 – 2 x above patient's baseline	<0.5ml/kg/hr for > 6 hrs.	Risk
2	SCr≥ that is 2-3 x above patient's baseline.	<0.5ml/kg/hr for > 12 hrs.	Injury
3	SCr≥ that is 3x or more above patient's baseline. OR SCr≥ that is 354µmol/L with an acute rise of ≥ 44µmol/L in 24 hrs. OR Initiated on RRT (irrespective of stage at time of initiation)	<0.3ml/kg/hr for 24 hrs. OR Anuria for 12 hours	Failure

	Urine Output	**70 Kg**	**80 Kg**	**90 Kg**
Risk	<0.5ml/Kg/hr x 6 hrs	< 210 mls	< 240 mls	< 270 mls
Injury	<0.5ml/Kg/hr x 12 hrs	< 420 mls	< 480 mls	< 540 mls
Failure	<0.3ml/Kg/hr x 24 hrs or anuria x 12 hrs.	< 504 mls	< 576 mls	< 548 mls

Assessment and Examination:

Assessment starts with a careful history and examination, including a thorough evaluation of the patient's case notes and drug treatment records. Any evidence of previous CKD should be identified from previous hospital attendances/admissions or GP. A focused history must identify pre-existing risk factors and potential causes for AKI including reduced fluid intake and/or increased fluid losses, urinary tract symptoms and recent drug ingestion. Other associated clinical features may be evident such as fever, rash and joint pains. Volume status assessment must be guided by core temperature, peripheral perfusion, heart rate, blood pressure and jugular venous pressure. Baseline laboratory investigations should be sent – urinalysis, biochemistry, haematology and microbiology (urine culture ± blood culture). More specific investigations are dependent upon clinical presentation but may include ECG, chest x-ray, abdominal x-ray, renal tract ultrasound and renal biopsy.

Urinalysis:

All patients presenting with AKI should have reagent dipstick urinalysis performed supplemented with urine microscopy where indicated. The table below suggests possible causes for AKI.

SG (Specific Gravity) (Normal 1.001- 1.035)		**Positive Protein** (read at 60 secs)	**Microscopic haematuria** (read at 60 secs)	**Nitrates** (read at 60 secs)	**Pyuria** (White cells) (read at 60-120 secs)
<1.007 =1.010 >1.020	Diabetes insipidus, fluid loading, diuretic use. CRF. Renal tubular Dysfunction. Relative dehydration, Glycosuria, SIADH.	• Glomerular disease – nephritic/nephrotic syndrome. • Tubular proteinuria • Cardiac failure • Fever.	• Glomeruular disease • Non-glomerular renal haematuria • Urological (tumours of urinary tract, calculi, infections – bacterial, UTI, prostatitis, TB. • 'False positive results – menstruation,	• Some bacteria convert nitrates in urine to nitrite. • Positive result confirms a Coliform UTI > 10_5/ml	• Bacterial UTI • Other UTI associated infections – urethritis, TB, viral. • Vaginal infections • Bladder tumour • Stones and other foreign bodies. *(False negative results*

			myoglobinuria, UTI.		*can occur with Cefalexin and Tetracycline)*

Investigations:

	Request
Urinalysis	blood, protein, cells, casts, osmolality
Biochemistry	U/E's, bicarbonate, bone, liver, creatine kinase, myoglobinuria, CRP,
Haematology	FBC, eosinophilia, clotting screen
Immunology	CRP, electrophoresis, Bence Jones, immune paresis, immunoglobulins, ANA, ANCA,
Virology	Hepatitis B and C, HIV
Radiology	Renal ultrasound, chest x-ray, IVU, Doppler ultrasound of arteries and veins, MRI, ECG, renal biopsy
Microbiology	Urine and blood as required

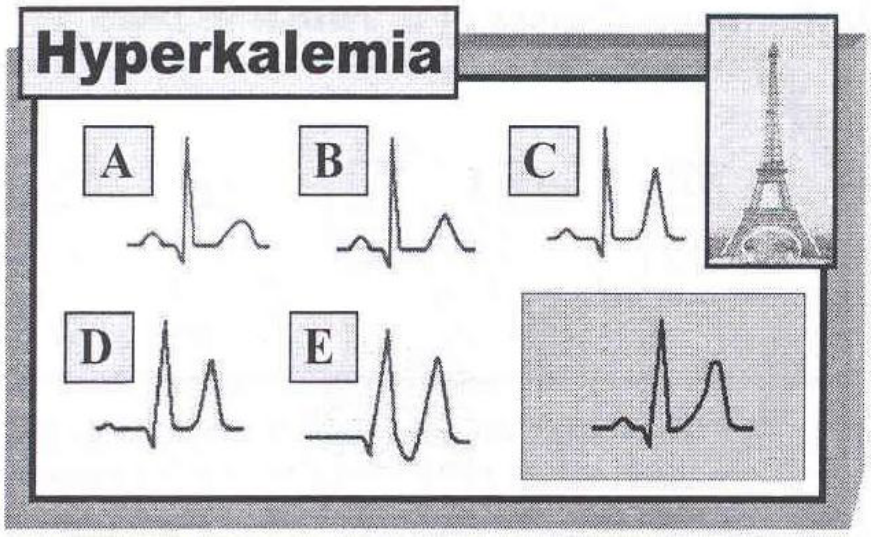
Hyperkalaemia (>5.5 mmol/l)

Hyperkalaemia requires urgent clinical intervention, and can be fatal, as the failing kidney is unable to excrete potassium effectively. This more commonly occurs when kidney function drops and the patient is oliguric (<400ml urine in 24 hours) or worse if anuric (no urine passed). It is often further complicated if the patient is septic, hypoxic and requires a blood transfusion, and if potassium containing drugs are administered. Haemodialysis is the most efficient treatment for hyperkalaemia. Alternative (first line) treatments are oral or rectal calcium resonium and intravenous administration of insulin and dextrose, which temporarily shifts potassium ions back into the intracellular compartment from the extracellular compartment. Close monitoring of the patients blood sugar is necessary, if insulin and dextrose therapy is used to prevent hypo-hyperglycaemia. Treatment must be immediate to avoid cardiac complications, which could be fatal.

Actions in the event of hyperkalaemia:

Full history from the patient to determine any renal clinical history including review of prescribed and non prescription medication.	Stop all potassium containing drugs and supplements – ACE, ARB, diuretics (spironlactone), NSAID's, laxatives, beta blockers and digoxin.
Diet	Review diet to exclude high potassium containing food and drinks.
12 lead ECG and cardiac monitoring	Observe for decreased P- waves, PR prolongation, QRS widening, sinus wave QRST, AV dissociation or a-systole.
Act appropriately on current serum potassium result.	1. Stop further accumulation of potassium. 2. Protect cardiac membrane.

	3. Shift potassium back into the cells. 4. Remove potassium from intravascular space (Haemodialysis)



A – Normal ECG

B – Peaking of T wave (earliest sign of a K+ of 6-7mmol/L)

C – T wave becomes taller and more peaked with a narrower base –(like the Eiffel Tower. K+ 7-8 mmol/L)

D – P wave amplitude decreases, the PR interval lengthens and QRS widens (K+ > 8mmols/L)

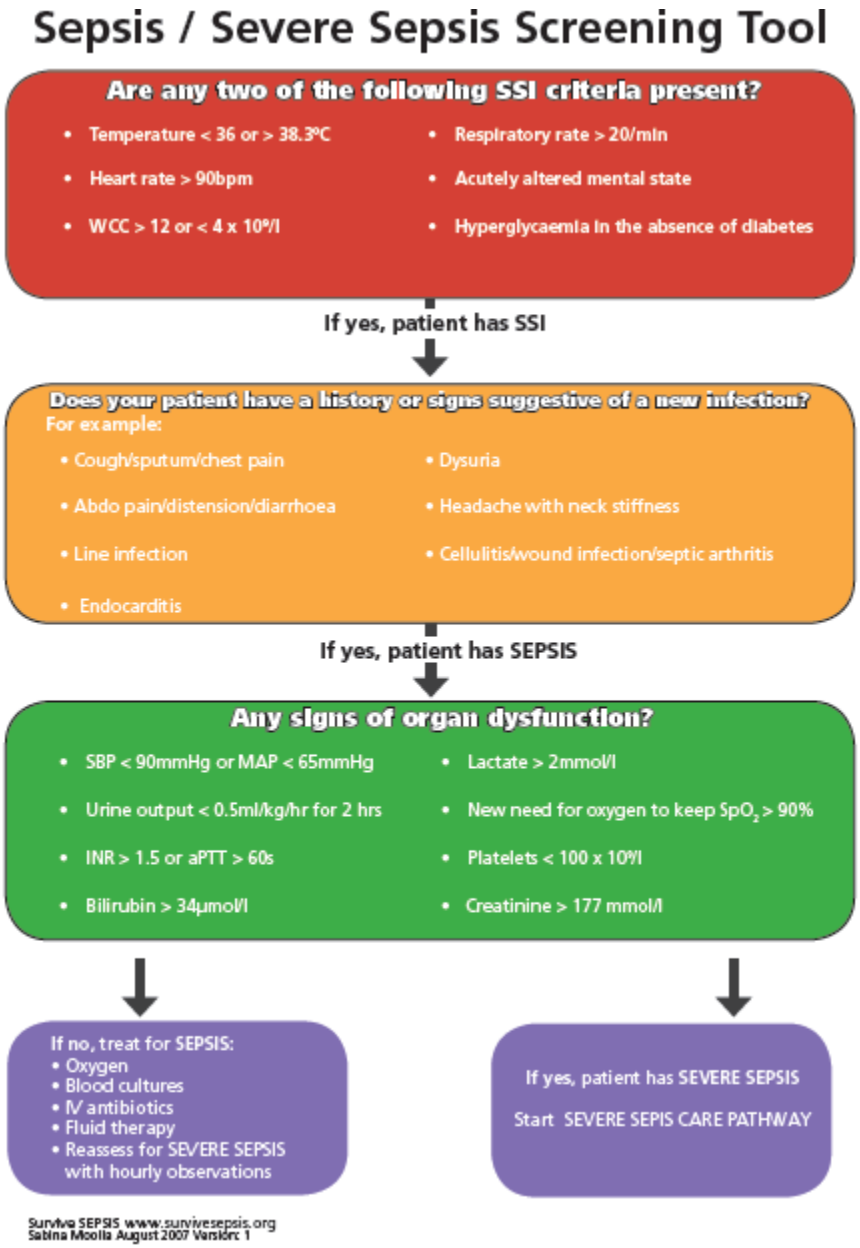
E – P waves disappear (*sinoventricular rhythm*) and QRS waves become sinusoid. K+ > 10mmol/l). Ventricular fibrillation usually follows

Metabolic acidosis

Acidosis in renal failure occurs when the renal tubules fail to regenerate bicarbonate and secrete hydrogen ions into the urine. In turn, this causes an acid-base imbalance. In most cases the simplest method of correcting an acid-base imbalance is to infuse sodium bicarbonate. However, in patients with acute kidney injury this should be considered with caution where large volumes of IV bicarbonate may lead to hypernatraemia. The most efficient way of correcting acute acidosis is by bicarbonate haemodialysis.

Sepsis

Sepsis is a serious condition causing acute kidney injury in up to 20% of the ITU population in the UK. Severe sepsis is present when an infection causes one or more major organs to fail. These patients are extremely ill and mortality is high. Septic shock is a life threatening condition and such patients develop a number of classic possible symptoms. Because of its severity and effect on the rapid deterioration of patients with sepsis, early recognition and treatment of sepsis is critical in the survival of these patients. The Sepsis Six Tool represents six simple tasks which can be performed easily within the first hour of a severe sepsis developing. These are the crucial first steps to survival.



Signs of sepsis

- Temperature <36°c or > 38°c

Plus a combination of any of the below symptoms:
Heart rate > 90 bpm
Systolic BP < 90mmHg.
Respirations > 20rpm
Chills/rigors
Low or raised WBC < 4x10/L or > 12x10/L
New or worsening confusion

First hour actions:

1. Give high flow oxygen
2. Take blood cultures
3. Give IV antibiotics
4. Start IV fluid resuscitation
5. Check haemoglobin and lactate
6. Measure accurate hourly urine output

Assessment of volume status

Assessment of hypovolaemia

Signs of hypovolaemia	Examination for hypovolaemia
Dizziness/fainting on standing. Loss of consciousness	Dry axilla Dry tongue (also in dehydration, certain medication) Loss of skin turgor Raised heart rate Low BP (SBP < 100mmHg) Postural SBP drop of > 20mmHg Postural HR > 30 bpm. JVP not raised. Lung bases clear. No oedema.

Causes of oedema

- Cardiac failure
- Liver failure
- Renal failure
- Hypo-proteinaemia / hypo-albuminaemia
- Lymphatic
- Venous disease – eg DVT
- Inflammation / infection – eg cellulitis

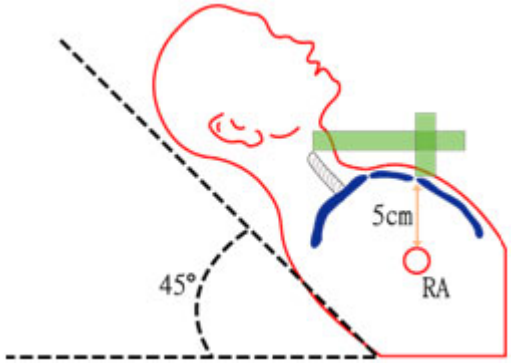
Assessment of fluid overload

Signs of fluid overload	Examination of fluid overload/oedema
Shortness of breath(SOB) - dyspnoea	Raised HR and/or BP (sometimes not apparent)
Shortness of breath on exertion (SOBOE)	Raised JVP
Unable to lie flat in bed – orthopnoea (uses pillows to sit upright)	Crackles at lung bases
Shortness of breath at night – paroxysmal nocturnal dyspnoea	Oedema (feet, legs, lumbar, face) – often pitting. Weight gain.

Fluid overload / pulmonary oedema requires prompt action to ensure that the patient's fluid balance is accurately assessed and managed to reduce cardio pulmonary complications and discomfort to the patient. Accurate fluid balance is vital by ensuring that fluid intake and output is recorded accurately in accordance with and fluid restriction. The patient's weight should be recorded daily to enable assessment of the patient's dry weight.

Renal patients with decreased urine output may be restricted to the amount of fluid they can drink each day. The prescribed fluid restriction may be as little as 500 mls/day to include all fluid contained within food as well!
Foods high in salt should be avoided as these will induce a thirst and risk non adherence to any fluid restriction.

Assessing a raised Jugular venous pressure (JVP)
The patient should lie on the examination table with the head of the bed raised to 45 degrees. Get the patient to turn his head away from you and look for a pulsation in the jugular vein. Observe the upper level of the blood column in the jugular vein in this position. A level of > 3 cm above the angle of Louis is an elevated pressure.



‘Out of Hours’ Acute Dialysis Nursing responsibilities

The following must occur in order for on-call emergency out of hours’ haemodialysis to be undertaken:

- On-call emergency, ‘out of hours’, haemodialysis must only be requested by the Renal Specialist Registrar or Consultant. If the Renal Specialist Registrar has any uncertainty about the request for acute dialysis, the consultant on call must be contacted.
- The patient must have been seen by the Renal Specialist Registrar or Consultant before the request for on-call emergency, ‘out of hours’ haemodialysis is made.
- The patient must have a dialysis prescription completed and signed by the Renal Specialist Registrar or Consultant. The prescription must indicate length of dialysis, ultrafiltration required, type of dialysate, dialyser size, heparinisation, bicarbonate setting, sodium setting and dialysate temperature.
- All on call dialysis must be entered on the Euclid system.
- Medical cover during the call out is provided by the acute renal team.
- The haemodialysis will be carried out in the designated ‘on call’ dialysis room on the nephrology ward. On call, ‘out of hours’ haemodialysis must not be carried out on the haemodialysis unit.
- The patient in AKI must fit one of the following criteria:

    - Hyperkalaemia – Potassium of >6 mmols/l
    - Acidosis
    - Fluid overload unresponsive to medical treatment
    - Uraemia
    - Poisoning i.e. Ethylene glycol
    - Other consultant request

The patient with ESKD must fit the following criteria:

1. Hyperkalaemia – Potassium of >7mmols/l
2. Hyperkalaemia – Potassium of >6.5 mmols/l following the administration of dextrose and insulin
3. Hyperkalaemia – Potassium >6 mmol/l in the setting of intercurrent sepsis and/or cardiac instability (rhythm changes)

4. Acidosis
5. Fluid Overload
6. Pre-transplantation where is surgery is envisaged during the night or first thing in the morning.
7. Other consultant request

In all cases where it is safe and logistically possible, the haemodialysis should be delayed until the following morning. However, haemodialysis must occur the following morning and must not be delayed until later in the day.

Contraindications:

a. The patient with capacity refuses the treatment.
b. The patient is under 16 years of age.
c. The patient's central venous access device (CVAD) has not been x-rayed and the correct position of the CVAD device cannot be established.
d. If the patient is not haemodynamically stable to tolerate haemodialysis.

Limitations:

1. If a Hepatitis B and Hepatitis C status within the previous 3 months is not available, the haemodialysis machine must be isolated for that patient's use only until a negative result for both hepatitis B and C is available. The isolation label must be used and fixed securely to the front of the machine. If the blood borne virus (BBV) status of the patient is in doubt, it is advisable to isolate the machine until the BBV results can be confirmed the following morning. The registered nurse 'on call' **must not** accept verbal messages of the BBV status. BBV results from satellite units may be faxed before 12 midnight. The holiday database in 'Renal Common' (electronic folder) should be checked. If the patient has dialysed in a high risk area and uses a designated machine, the machine used out of hours should be isolated. If in any doubt, the machine should be isolated. Any new patients must have hepatitis screen sent and the machine isolated.
   Please refer to the 'Management of patient's HBsAg positive status out of hours flow sheet' below for the management of patient's requiring isolation on haemodialysis

2. In rare cases when the 'out of hours' acute dialysis treatment is requested in a clinical area other than the designated 'on call' dialysis room, the renal technical team must be contacted for support.

Management of Patients' HBsAg POSITIVE Status 'Out of Hours'