

Acute Kidney Injury

Subject:	Acute kidney injury
Policy Number	N/A
Ratified By:	Clinical Guideline Committee
Date Ratified:	January 2011 (original) reviewed with no change October 2014
Version:	2.0
Policy Executive Owner:	ICAM Divisional Director
Designation of Author:	Dr L Yap (Consultant, Acute Medicine), Review: Dr J Kumaradevan and Dr Mark Harber, October 2014
Name of Assurance Committee:	As above
Date re-issued:	November 2014
Review Date:	3 years hence
Target Audience:	All medical staff
Key Words:	Hyperkalaemia, Dialysis, Haemofiltration, Acute Renal Failure, Kidney

Version	Date	Author/ Reviewer	Status	Comment
1.0	2011	Dr L Yap, Dr J Kumaradevan Dr M Harber	OFFLINE	New guideline ratified at CGC
2.0	Oct/ Nov 2014	Dr J Kumaradevan Dr M Harber	LIVE	Reviewed – no change based on London AKI guidelines.

➤ **Criteria for use**

For use when a patient has a rising creatinine on blood tests, decreased urine output (oliguria) or suspected acute kidney injury.

➤ **Background/ introduction**

Acute Kidney Injury (AKI) is a medical emergency. The following pages are pathways which should be followed when a patient fits the criteria for AKI.

The management goals are:

- 1. To Grade AKI into stage 1-3**
- 2. To follow the AKI care bundle for fluid management, monitoring and investigation, management and referral of the patient appropriately to a renal unit**
- 3. AKI Referral in hospital – when to refer to renal or urology team**
- 4. AKI Transfer Policy – when to transfer to the Acute Kidney Unit or Critical Care**
- 5. AKI with Complications – managing complications in AKI**
- 6. Imaging in AKI**

➤ Clinical management

1 AKI Grade

STAGE 1: Increase in serum creatinine of 1.5 x to 2 x basal value *or* oliguria >6 hours (<0.5mls/kg/hr)

STAGE 2: Increase in serum creatinine of 2 x to 3 x basal value *or* oliguria >12 hours (<0.5mls/kg/hr)

STAGE 3: Increase in serum creatinine of > 3 x basal value *or* serum creatinine >300 with acute rise from baseline of 50 *or* oliguria >24 hours (<0.5mls/kg/hr)

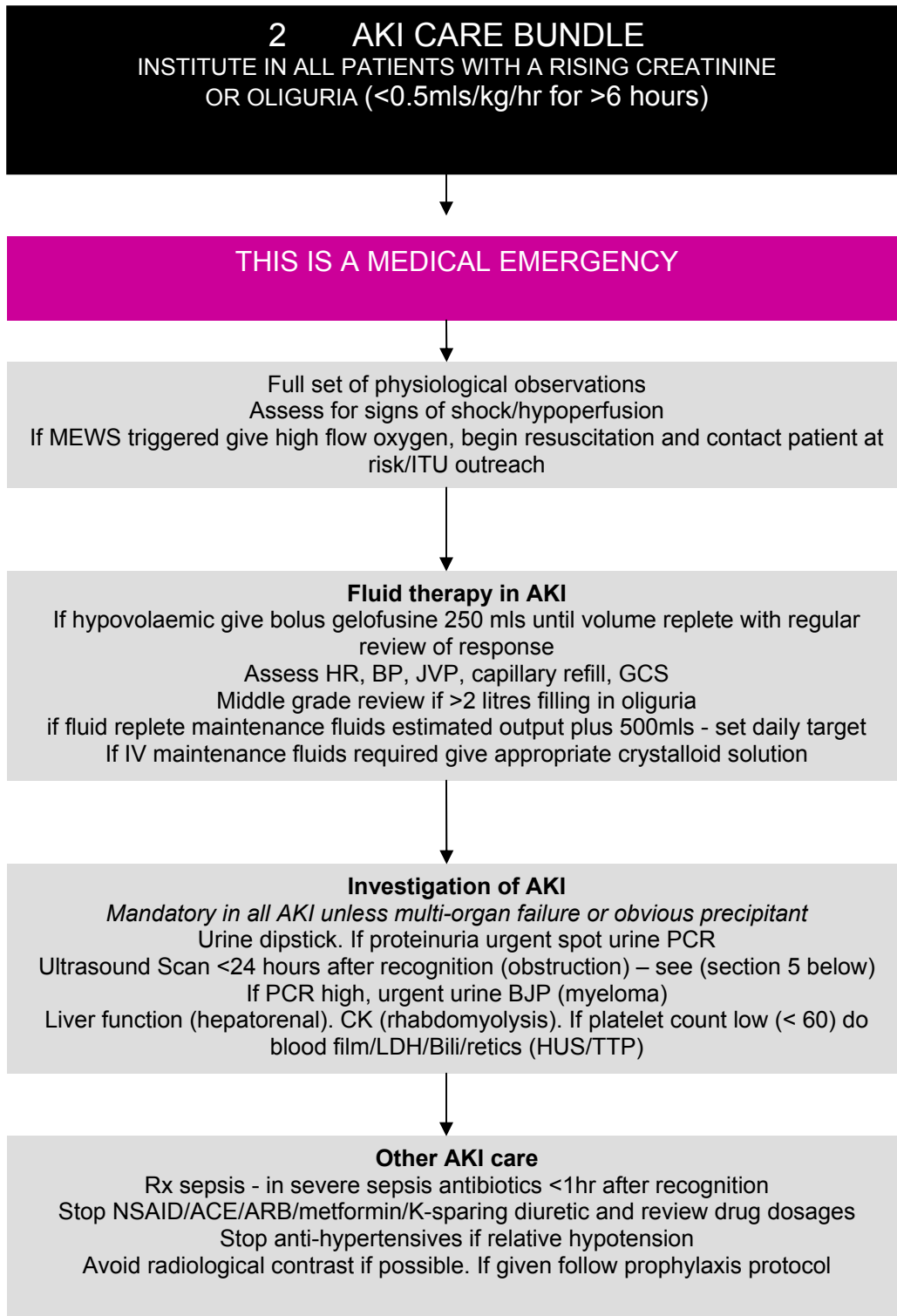
Urine volume examples:

60kg patient urine volume <30mls/hr for 6 hrs = AKI 1

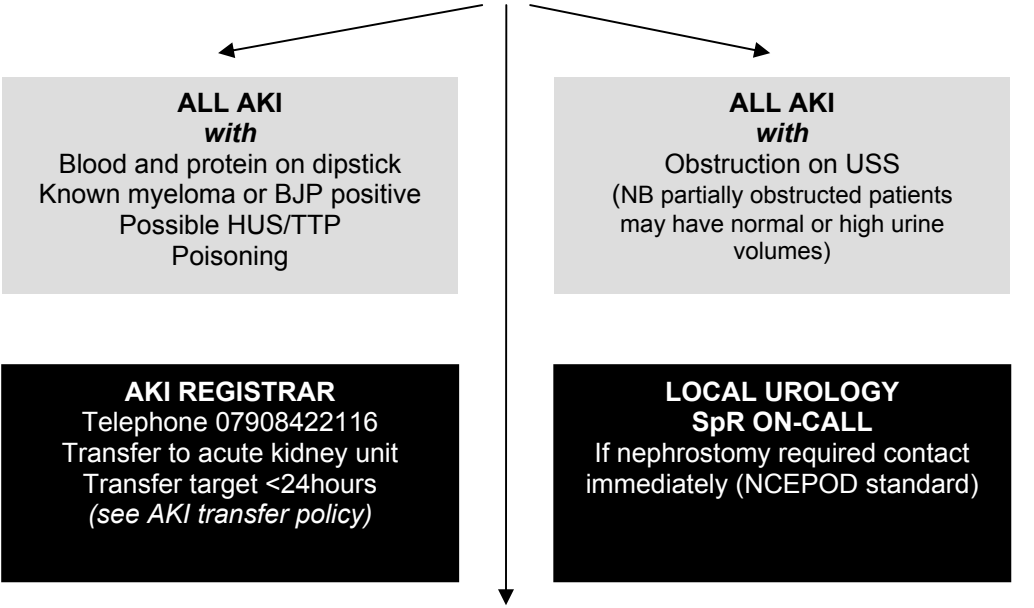
60kg patient urine volume <30mls/hr for 12 hrs = AKI 2

60kg patient urine volume <400mls/24 hrs = AKI 3

➤ **Clinical management**



3 AKI REFERRAL (HOSPITAL)



PROGRESSION TO AKI 3 or AKI 3 AT RECOGNITION or AKI COMPLICATIONS NO EVIDENCE OF IMMINENT RECOVERY

AKI REGISTRAR
Telephone 07908422116
Transfer to acute kidney unit
Transfer target <24hours
IF THE IS PATIENT IS TOO ILL TO TRANSFER
(see AKI transfer policy, ward-acute kidney unit)
TRANSFER TO LOCAL HDU/ITU
(also applies if patient needs to stay at base hospital for other specialist care)
Institute or continue bundle while transfer pending

DATASET NEEDED FOR ACUTE KIDNEY UNIT REFERRALS
U and E, ABG/lactate
HR, BP, Saturations, RR
AKI grade and pre-morbid Cr level
Urine dipstick
USS if obtained
Comorbid history
MRSA status
Whether diarrhoea last 48 hours

4 AKI TRANSFER POLICY - WARD TO ACUTE KIDNEY UNIT (interhospital transfer)

Transfer may proceed if the following criteria are met
All AKI 3 patients or patients with complications should also be assessed as safe for transfer by middle grade doctor

Hyperkalaemia
No ECG changes
K < 6.0
If K lowered to <6.0 after presentation this must be potentially sustained (e.g bicarbonate therapy or dialysis/CVVH) *not* transient therapy (insulin and dextrose)

Renal Acidosis
pH >7.2
Bic >12
Lactate < 4
Respiratory rate < 24
(N.B Renal acidosis does not have the same prognostic implications as acidosis due to hypoperfusion)

Respiratory
Respiratory rate < 24
Saturations >94% on not more than 35% oxygen
If patient required acute CPAP must have been independent of it for 24 hrs

Circulatory
HR < 120
BP > 100mmHg systolic
MAP > 65MMHg
Lactate < 4
(lower BP values may be accepted if it has been firmly established these are pre-morbid)

IF CRITERIA NOT MET EMERGENCY REFERRAL TO LOCAL CRITICAL CARE
Once stabilised follow *ITU to acute kidney unit transfer policy*.
Transfer target post stabilisation < 24hrs

5 AKI REFERRAL WITH COMPLICATIONS

Hyperkalaemia, acidosis, fluid overload, symptomatic uraemia

Begin medical therapy (below), review *AKI transfer policy* and refer appropriately

AKI REGISTRAR

Telephone 07908422116
(after 5pm and weekends RFH
switchboard)

LOCAL ITU REGISTRAR

(for local stabilisation prior
to transfer)

Hyperkalaemia in AKI

Medical therapy of hyperkalaemia is a transient measure pending imminent recovery in renal function *or* medical correction *or* transfer to AKU/ITU for RRT.

If ECG changes give calcium gluconate 10mls 10%
If bicarbonate <22 *and* no fluid overload, give 500mls 1.26% sodium bicarbonate / 2 hrs. Consider repeat.

$K > 6.5$ or ECG changes give insulin/dextrose (15 units in 50mls 50% over 30mins) *and* salbutamol 2.5mg Neb 6hrly.

Insulin/dextrose and salbutamol reduce ECF potassium for <4 hours only.

Refer to [Whittington Hyperkalaemia Guideline](#)

Acidosis in AKI

Ward therapy for renal acidosis should be reserved for therapy for hyperkalaemia pending imminent recovery of renal function or transfer to AKU/ITU for RRT (see above and transfer guideline)

Fluid overload in AKI

Oxygen therapy and consider CPAP for pulmonary oedema.

Frusemide 80mg IV stat, given over 20 min

If no response start frusemide infusion 10mg/hr

Symptomatic uraemia in AKI

Drowsiness should be managed as per all reduced conscious level (GCS monitoring, airway assessment) pending RRT

6 IMAGING IN AKI

Ultrasound imaging in AKI should be performed within 24 hours of admission

In patients with worsening and progressive AKI with an unclear precipitant such as sepsis or hypoperfusion, renal tract ultrasound should be performed within 24 hours to aid with diagnostic workup i.e. to determine whether a kidney biopsy will be required.

If there is clinical evidence of an infected, obstructed kidney and the patient only has a single functioning kidney, ultrasound should be performed within 6 hours.

Percutaneous Nephrostomy

Treatment of an infected, obstructed kidney (Abscess) is a medical emergency and should be performed as soon as possible, at least within 6 hours of ultrasound diagnosis. However, safe performance requires an experienced team who may need to be called in.

Other indications for nephrostomy, including renal failure, do not need a nephrostomy out of hours. The procedure should be done within 24 hours and preferably within core hours by a trained interventional radiology team consisting of a radiologist, radiographer and nurse.

➤ **Contacts (inside and outside the Trust including out-of-hours contacts)**

Working hours

Whittington Renal Registrar (Bleep 3106)

ITU Registrar (Bleep 2613)

CCOT Bleep (Bleep 2837)

Dr Mark Harber Consultant Nephrologist via Switchboard

Dr Lok Yap Consultant Acute Medicine via Switchboard

Dr Nick Harper Consultant in Intensive Care Medicine via Switchboard

Outside working hours

Medical Registrar on-call at Whittington (Bleep 3300)

Royal Free Renal Registrar (07908422116) or contact Royal Free via Whittington switchboard

➤ Abbreviations

ACE – Angiotensin Converting Enzyme inhibitor

AKI – Acute Kidney Injury

AKU – Acute Kidney Unit

ARB – Angiotensin Receptor Blocker

BJP – Bence Jones Protein

CCOT – Critical Care Outreach Team

CK – Creatinine Kinase

CKD – Chronic Kidney disease

CPAP – Continuous positive airways pressure

CVVH – Continuous veno-venous hemofiltration

ECF – Extracellular Fluid

HUS/TTP – Haemolytic uraemic syndrome / Thrombotic thrombocytopenic purpura

K – Potassium

LDH – Lactate Dehydrogenase

MAP – Mean Arterial Pressure

MEWS – Modified Early Warning Score

NCEPOD - National Confidential Enquiry into Patient Outcome and Death

PCR – Protein / Creatinine Ratio

RRT – Renal Replacement Therapy

USS – Ultrasound Scan

➤ **References (evidence upon which the guideline is based)**

North Central London Acute Kidney Injury Network – AKI protocols (2010)

NICE clinical guideline 50 (2007) Acutely ill patients in hospital: recognition of and response to acute illness in adults in hospital

Davenport A , Kanagasundaram S, Lewington A. (2008) Acute Kidney Injury – the Renal Association Guidelines on management.
<http://www.renal.org/Clinical/GuidelinesSection/AcuteKidneyInjury.aspx>

NCEPOD – AKI: Adding Insult to Injury Report (2009).
<http://www.ncepod.org.uk/aki>

➤ **Compliance with this guideline (how and when the guideline will be monitored e.g. audit and which committee the results will be reported to)**

NCEPOD recommend from the 2009 report that a clear pathway is adopted for management of acute kidney injury

An audit on AKI has been conducted in 2010 and presented at the Trust Audit meeting along with this guideline in Dec 2010

This will be followed by further re-audits.

Appendix A

Plan for Dissemination and implementation plan of new Procedural Documents

To be completed and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval.

Acknowledgement: University Hospitals of Leicester NHS Trust

Title of document:	AKI Guideline		
Date finalised:	Dec 2010, re-issued November 2014	Dissemination lead: Print name and contact details	Lok Yap Reviewed Dr M Harber and Dr J Kumaradevan with no change required
Date re-issued:			
Previous document already being used?	NO		
If yes, in what format and where?			
Proposed action to retrieve out-of-date copies of the document:			
To be disseminated to:	How will it be disseminated/implemen ted, who will do it and when?	Paper or Electronic	Comments
Intranet update	Dec 2010 Trust audit meeting	E	
Is a training programme required?	no		
Who is responsible for the training programme?			

