



CLINICAL GUIDELINE

eGFRsupport Acute Kidney Injury - Investigations and Management

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Lead Author:	Cath Stirling, Kate Stevens
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Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Acute Kidney Injury (AKI)

Introduction

The definition of AKI is an abrupt and sustained decline in glomerular filtration rate (GFR). If creatinine is rising, GFR may be close to zero and therefore eGFR is of no value in the assessment of AKI. AKI is classed into three stages (table 1). Common risk factors for AKI are listed in table 2. This list is not exhaustive.

Box 1 – Stages of AKI

AKI stage	Definition
I	Rise in creatinine of ≥ 1.5 -1.9 from baseline
II	Rise in creatinine of ≥ 2.0 -2.9 from baseline
III	Rise in creatinine of ≥ 3 from baseline

Box 2 – AKI risk factors

Patients at risk of developing AKI

- Age
- Diabetes
- Chronic kidney disease (CKD)
- Chronic liver disease (CLD)
- Congestive cardiac failure (CCF)
- Those on polypharmacy

Other risk factors for AKI

- Hypotension
- Hypovolaemia
Drugs including ACEi/ARB/NSAIDs and contrast*
- Sepsis

*If contrast is necessary and a patient has an AKI or CKD with an eGFR ≤ 30 ml/min, the radiologist should be informed and consider administering 1 litre of saline in the 12 hours prior to and following the scan. Urgent and essential scans should not be delayed to allow fluid administration.

Aetiology of AKI

This can be separated into pre-renal, intrinsic renal and post-renal causes as highlighted in figure 1.

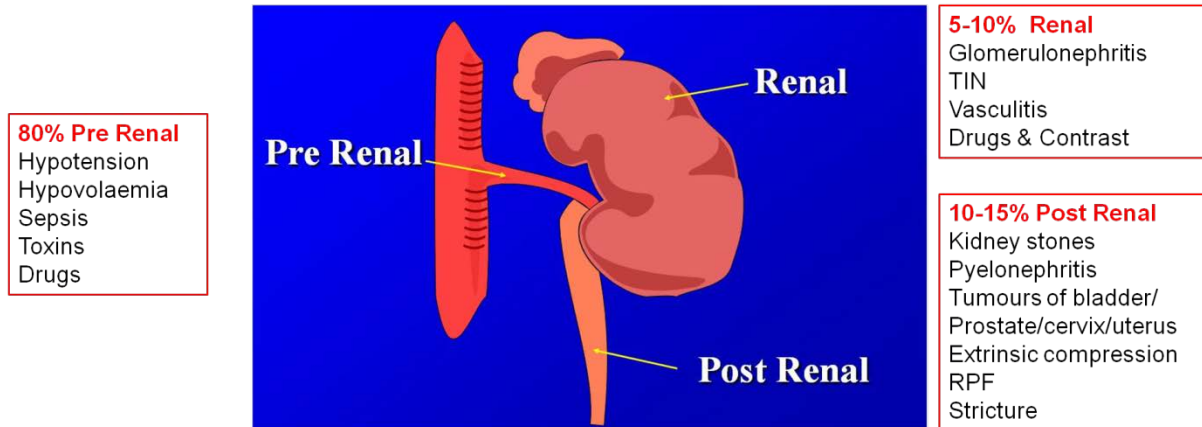


Figure 1: Aetiology of AKI

Assessment

GG&C introduced the eAlert for AKI in 2017 (figure 2). This is being rolled out across all wards and hospitals. The eAlert flags on both Portal and Trakcare when a patient has an AKI. Figure 2 is a representation of how the eAlert appears. If a patient has an AKI, consider **RENAL**:

Identify AKI EARLY

AKI stage 1 creatinine of >1.5x baseline	Remember RENAL Rule out Sepsis Exclude obstruction Note urinalysis Assess/chart fluid balance Look at drugs
AKI stage 2 creatinine of >2x baseline	
AKI stage 3 creatinine of >3x baseline	

MI • 297439a

- R**ule out sepsis
Exclude obstruction
Note urinalysis
Assess fluid balance
Look at drugs

Figure 2: The eAlert and RENAL

Clinical Documents Show MenuBar TrakCare Emergency Care Summary eForms Add to Share

Clinical Documents Urea & Electrolytes (6 weeks ago)

Showing 2015-04-18 to 2017-04-18
Group By Service Sort By Date

Clinical Information Summary
Past Medical History
Patient Notes
Patient In Shared Worklist
Add New Clinical Form

Biochemistry (6 / 9)

- 10-Mar-2017 ! Urea & Electrolytes
- 09-Mar-2017 ! Urea & Electrolytes
- 01-Jul-2015 Adalimumab Level
- 01-Jul-2015 Adalimumab AB Level
- 30-Jun-2015 ! Urea & Electrolytes
- 29-Jun-2015 ! Urea & Electrolytes
- 29-Jun-2015 ! Urea & Electrolytes
- 29-Jun-2015 ! Urea & Electrolytes

Urea & Electrolytes View Cumulative Results

Time Collected 10-Mar-2017 08:00 Time Received 10-Mar-2017 09:30
Time Reported 10-Mar-2017 09:48 Order Number B,17.0920795.C
Status Final Source System Telepath

Comments
AKI Alert stage 3 - Think RENAL
R - Rule out sepsis
E - Exclude obstruction (if concern)
N - Note urinalysis
A - Assess fluid balance
L - Look at drugs
REQUESTOR**aki test

Test	Result	Ref. Range (Units)	Abnormality
Sodium	* 132	133 - 146 mmol/L (mmol/L)	-
Potassium	4.5	3.5 - 5.3 mmol/L (mmol/L)	
Chloride	97	95 - 108 mmol/L (mmol/L)	
Urea	* 25.0	2.5 - 7.8 mmol/L (mmol/L)	+
Creatinine	* 500	40 - 130 umol/L (umol/L)	+
Estimated GFR	* 9	>60 ml/min (ml/min)	-

* Abnormal ** Not in use

NHS Greater Glasgow & Clyde PMS - 2014 - LIVE - Windows Internet Explorer provided by NHS Greater Glasgow and Clyde

CHI: 1402650000 Name: Labs One Dummpatient Gender: Female DOB: 14/02/1965 Age: 52 Yrs Phone: [Icons]

Atomic Results

Urea and Electrolytes

Status Final Request Start Date & Time 11/05/2017 16:4
Requesting Clinician Dr Iain Jones Specimen Collection Date & Time 11/05/2017 16:4
Request No. LNZFB7 Specimen Reception Date & Time 11/05/2017 16:5
Specimen Blood - Yellow Result Date & Time 11/05/2017 16:5

Test Item	Flag	Value	Units	Ref Range	Comments
Sodium		145	mmol/L	133 - 146	
Potassium		3.5	mmol/L	3.5 - 5.3	
Chloride		97	mmol/L	95 - 108	
Urea		5.0	mmol/L	2.5 - 7.8	
Creatinine	High	600	umol/L	40 - 130	
Estimated GFR	Low	6	ml/min	>60	

Set Comments
AKI alert - AKI stage 3 - think RENAL:
R - Rule out sepsis
E - Exclude obstruction (if concern)
N - Note urinalysis
A - Assess fluid balance
L - Look at drugs
Please note change to Abbott Enzymatic Creat method from 24/04/17

Previous Next

Figure 3: The eAlert as it appears on portal (top) and trakcare (bottom)

Assessment of AKI is reliant on a detailed history and examination, including urinalysis. History should include a thorough drug history including new or recent medications/supplements, illicit substances and specific questioning about oral intake, gastrointestinal symptoms, urine output, the presence of rash or joint symptoms and propensity to urinary tract infections.

The urine should be dipped and the result recorded in the notes. A urine specimen should be sent in a white top universal container for protein:creatinine ratio. In patients with symptoms and a positive urinalysis consider if it is appropriate to send a urine culture and/or a glomerulonephritis (GN) screen. A GN screen comprises rheumatoid factor, ANA, ANCA, anti-GBM antibody, complement, immunoglobulins and electrophoresis and a urinary bence jones protein. It is important to rule out obstruction; consideration should be given to renal tract ultrasound (USS), in all patients with an AKI. In some cases, an USS may not be necessary, for example, a patient with significant volume depletion who responds rapidly to fluid resuscitation. If there is any doubt, USS should be performed.

A crucial part of assessment is fluid balance. Is the patient 'wet' or 'dry' or euvolaemic? Clues from the history include asking about thirst and fluid losses. Examination includes looking at blood pressure (and comparing to the normal blood pressure of an individual patient), skin turgor, JVP and assessing for peripheral oedema, ascites and pulmonary oedema. Urine output needs to be monitored. Catheter is not a necessity but can be considered.

Management

Management of pre-renal AKI is largely supportive and the best evidence is for optimisation of fluid balance and cardiovascular support. Guidance on fluid prescription is outwith the scope of this guide but it is worth noting that if a patient is extracellularly fluid deplete, 5% dextrose is not a suitable replacement fluid on its own. If a patient is well-filled and hypotensive, consideration must be given to the use of inotropic support. Hyperkalaemia is a medical emergency and must be treated promptly.

Close attention should be paid to medication. Involve the ward pharmacist. Regular medication may need to be withheld or be prescribed at an altered dose. When prescribing new medication, consider if dose reduction is necessary. Take care with simultaneous prescriptions of medication which can affect the kidneys, for example, diuretics, analgesia and antibiotics. We are not advocating avoiding these but it is essential to consider any new prescription alongside current medication. Opiate

based analgesia can accumulate in AKI (and in CKD) and thus the risk of side effects is higher. A change in preparation/dose/both might be needed.

Certain types of GN can be treated. If there is a suspicion of GN or vasculitis then this should be discussed with the renal unit (#82417). Obstruction should be discussed with urology.

Indications for dialysis (and early discussion with the renal unit) are not absolute but would include resistant hyperkalaemia, hyperkalaemia in the setting of oliguria and fluid overload which is unresponsive to diuretics. The following are also reasons to contact the Renal Unit:

Indications to contact The Renal Unit

- Stage 3 AKI
 - Stage 2 AKI that is not resolving after 24/48hrs
 - Suspicion of vasculitis
 - Any transplant or dialysis patient
 - New nephrotic syndrome
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