The Doctors' Handbook

You've Been **Bleeped:**

Acute Renal & Urology

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Brief overview of AKI management

1. **Assess** and **optimise** fluid balance
2. **Review** the drug chart
3. **Dip** the urine
4. **Consider** the need for scans

Assess fluid balance

- Strict input/output monitoring
- Avoid catheterisation where possible
- Assess overall fluid status
  - Heart rate
  - Blood pressure
  - Mucous membranes
  - Basal crepitations
  - Pedal oedema etc.
- Consider their weight and comorbidities, especially CCF, CKD or liver failure

Optimise fluid balance

Prescribe and titrate IV fluids based on initial fluid assessment

- If very dry with pre-renal AKI then give plenty of fluids. Titrate rate of IV fluids based on their response e.g. urine output
- If very overloaded from CCF then hold fluids and give diuretics

Switch from IV to oral fluids when able to minimise risk of iatrogenic complications e.g. hyperchloraemic acidosis or hypernatraemia from too much 0.9% NaCl

Review the drug chart

Nephrotoxics
May need to be stopped, continued or have dose adjusted e.g. an ACE inhibitor for HTN would be stopped, furosemide for CCF might be continued or potentially increased

Adjust dose of other medications according to renal function e.g. co-amoxiclav/ enoxaparin. Check the BNF app

Dip the urine

Checking for haemoproteinuria in intra-renal AKI – especially autoimmune causes. Whilst less common, these are **often treatable** if picked up early

Long-term renal function can be saved by **quick administration of steroids**

Consider the need for scans

Consider USS KUB for all AKIs that don't improve with IV fluids or cessation of nephrotoxics. Obstruction is often missed and may be asymptomatic

USS KUB can also be used if there is suspected structural damage e.g. renal scarring/abscesses in the context of urosepsis

CT + MRI – these are the most precise methods for identifying various forms of nephritis, abscess or necrosis

You've been **bleeped:** Scenario 1

74F admitted from nursing home with 2/7 hx of polyuria and dysuria

Generally unwell

PMHx

Dementia
HTN
Urinary incontinence

DHx

Ramipril
Amlodipine
Memantine

Scenario 1

HR	109	RR	97%	T°
97	57	22	RA	38.7

A Patent

B Chest clear on auscultation

C HS 1+2+0, CRT 2-3s, JVP NAD, calves SNT, no pedal oedema, mucous membranes slightly dry

D GCS 15, PEARL

E Tender supra-pubic region, renal angle tenderness, bowel sounds present

Scenario 1

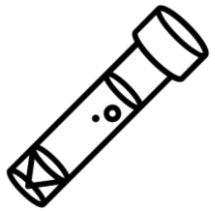
Investigations

Bloods

WBC	18
CRP	210
Creatinine	180 (90)
eGFR	29 (65)

Bladder scan

Shows 50ml



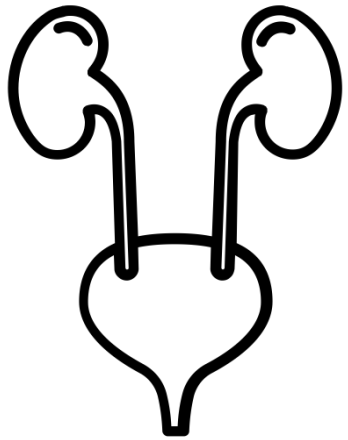
Urine dip

Nitrites ++
Leukocytes +++
Blood +

Scenario 1

Impression?

Impression



Pre-renal AKI

Secondary to urosepsis/pyelonephritis

Scenario 1

Management?

Management of her sepsis

Fluids
Give IV fluids based on urine output and body weight
Monitor fluid input/output. In this instance catheterise (only way to monitor for this patient)

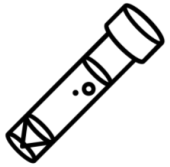
Give IV Abx, take cultures for blood **and** urine culture

Give O_2 and take a lactate (VBG)

Enlist senior support

Management of her AKI

Fluids
Give IV fluids based on urine output and body weight
Monitor fluid input/output. In this instance catheterise (only way to monitor for this patient)



Dip the urine (and in this case send for MSU)

Review the drug chart – hold her ramipril, reduced doses of enoxaparin and gentamicin

Consider an USS KUB – to check for structural damage secondary to the scarring from urosepsis

Scenario 1

Drugs to **avoid** in AKI?

Drugs to avoid in AKI

- ACE inhibitors
- ARBs
- NSAIDs
- Loop diuretics
- Metformin
- Trimethoprim
- Radiologic contrast

Though aspirin is fine

Scenario 1

Drugs to use with **caution** in AKI?

Drugs to use with caution/increased monitoring/dose adjustment in AKI

- Opioids – including codeine
- Aminoglycosides
- Anticoagulants
- Anticonvulsants e.g. phenytoin, gabapentin
- Antivirals e.g. acyclovir, ganciclovir
- Digoxin
- Immunosuppressants e.g. ciclosporin
- Hypoglycaemic medicines e.g. insulin

Scenario 1

Which antibiotics commonly used for urinary infections might you be **cautious with** or **avoid altogether** in a patient with an AKI or CKD?

Scenario 1

Cautious use of gentamicin – use a reduced dose and closely monitor levels

Avoid trimethoprim as it can worsen renal function and also cause hyperkalaemia

Avoid nitrofurantoin as it doesn't work with an eGFR <50

NB If you're unsure of which alternative to use, phone micro

You've been **bleeped:** Scenario 2

78F admitted with acute small bowel obstruction

Develops an intra-abdominal collection

Multiple CT AP's with contrast

Multiple doses of gentamicin

Miscommunication between teams over gentamicin (stat vs continued)

Incorrect timing of gentamicin

Scenario 2

Investigations

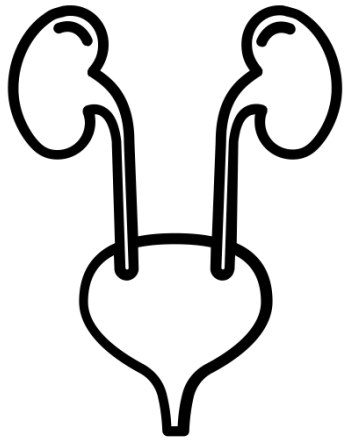
Bloods

Creatinine	332 (128)
eGFR	15 (57)
Na	normal
K	normal

Scenario 2

Impression?

Impression



Intra-renal AKI

Caused by iatrogenic gentamicin overdose

Scenario 2

Management?

Immediate management

- IV fluids – watch out for post-AKI diuresis
- Catheterise with strict input/output monitoring
- Cross off nephrotoxics/adjust dosages of others
- Discuss with micro about Abx in context of AKI
- Dip the urine
- Renal review – needs consideration of a stint in HDU for haemofiltration

Additional management

Duty of Candour
Patient must be informed and apologised to on behalf of the team. If you don't feel comfortable doing this, then discuss with one of your seniors

Comfort your FY1 colleague

Datix

Disseminate learning points to the MDT involved (doctors, nurses, pharmacists etc)

NB **Learn not to blame**

Scenario 2

If you are already concerned about a patients' renal function prior to sending them for CT with contrast, what can you do to **mitigate** the risk?

Follow trust protocol, which will usually involve **pre-hydration**

Consider risk of fluid overload e.g. CCF/frailty

- **Titrate accordingly** e.g. 250ml bolus instead of 500ml, or omit altogether. Discuss with senior if unsure
- **Administer orally** if possible. 1L PO same as 1L IV but with less risk

Some hospital protocols advise NAC however, mixed evidence and widespread disagreement

You've been **bleeped:** Scenario 3

82M with dementia admitted from nursing home having not passed urine for 2 days

Unable to verbalise but appears to be in distress. Nursing home staff say that he is off his baseline, more confused and agitated than normal

PMHx

T2DM
HTN
OA

DHx

Metformin
Ramipril
Ibuprofen

Scenario 3

HR	134	RR	97%	T°
75	57	16	RA	37

A Patent

General appearance: patient appears generally well. Healthy BMI

B Chest clear on auscultation

C HS 1+2+0, CRT <2s, JVP NAD, calves SNT, no pedal oedema, mucous membranes slightly dry

D GCS 13/15 – confused, making unintelligible sounds, PEARL, BM 6

E Abdomen tender +++ in suprapubic region, firm

Scenario 3

Which **immediate** bedside investigation would you ask for?

Scenario 3

Investigations

Bladder scan

Shows 2000ml

Scenario 3

Investigations

Bladder scan

Shows 2000ml

Bloods

Creatinine	230 (123)
eGFR	17 (42)
Electrolytes	NAD

Scenario 3

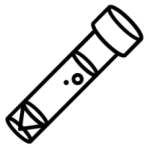
Management?

Management

Catheterise

IV fluids **after** catheterisation

Strict fluid input/output monitoring



Urine dip (first catch from newly inserted catheter)

Review drug chart – cross off ibuprofen, metformin and ramipril, reduce dose of clexane

USS KUB to check for hydronephrosis – done in all cases where obstruction is the suspected cause

Scenario 3

The nurse tells you that because the patient has BPH, it is therefore a difficult/complex catheterisation and so a doctor must do it.

How do you approach a **difficult catheterisation**?

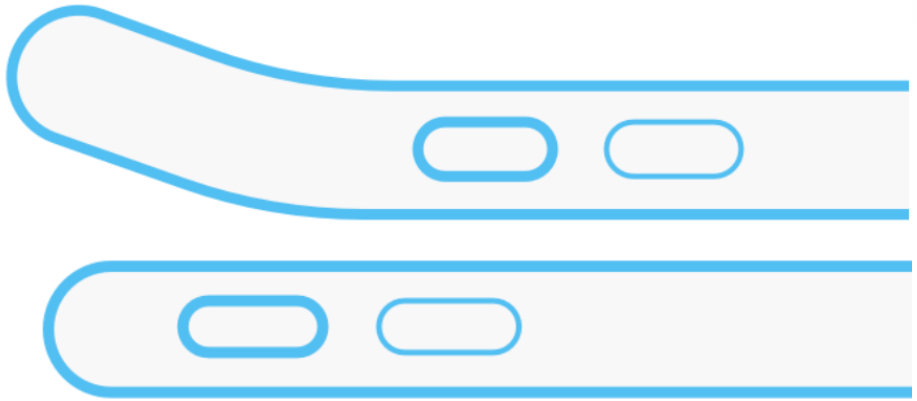
Approaching a difficult catheterisation

1. Pull the penis **upright**, towards the direction of the ceiling, at a **right angle** to the patient
2. 3 x instillagels. Hold the urethral meatus **closed** for a minute to stop the instillagel from leaking back out
3. Insert the Foley catheter

If this **fails**, what do you do?

Scenario 3

Coudé Tip



Straight Tip

Scenario 3

Phone **surgical theatres/CEPOD** and ask for a curved 'Coudé tip' catheter or phone **Urology SpR** to find out where one is kept

Keep the small raised lump at the far distal end of the catheter raised superiorly towards the ceiling. This will ensure that the curved tip of the catheter is also aimed in the same direction

Keep the penis pulled perpendicular to the patient towards the direction of the ceiling

If you meet resistance, pull out slightly then continue to push forward

If this doesn't work, what **next**?

1st line	3-way catheter
2nd line	Coudé tip
3rd line	Flexi-cyst guided
4th line	Suprapubic

Allows washout for patients with clots

NB *steps 3 and 4 are for urology SpR's/specially trained doctors only*

Scenario 3

NB Be sure to record the **post-void residual volume**

This is the volume of urine in the catheter bag 15 minutes after catheterisation

Document clearly in the notes, try to ensure it gets into the discharge summary – very useful for **TWOC clinic**

You've been **bleeped:** Scenario 4

You're the FY1 on a Care of the Elderly ward

You are looking after a 82F admitted with chest sepsis which is now resolving

PMHx End-stage renal failure with 3x weekly dialysis

You are asked to see her urgently after she's passed approx. 200ml of melaena

Her BP has dropped from SBP 100 down to 86

Scenario 4

What **fluid resuscitation** would you give?

Scenario 4

100-200ml STAT bolus then immediately reassess BP and fluid status

Most dialysis patients are on a **fluid restriction** of 1L IV fluid intake per day due to the risk of developing pulmonary oedema – especially in anuric patients

If they have low BP due to volume depletion, give a **reduced fluid challenge** to avoid fluid overload

Scenario 4

When this patient initially came in with a chest infection, she was put on IV co-amoxiclav.

What **consideration** would have been made when prescribing the co-amoxiclav?

Reduced dose for renal function

Follow local hospital guidelines on antibiotic prescribing in renal failure

If in doubt ring the dialysis unit/pharmacist/renal SpR for advice. Sometimes the dialysis unit will prefer to administer certain drugs themselves rather than you doing it on the ward

Scenario 4

Would you use **trimethoprim** in this patient?

Scenario 4

No, just as with AKI avoid in cases of advanced CKD

Can cause **hyperkalaemia** or **creatinine rise**

Scenario 4

This patient has really difficult venous access. You are asked to re-cannulate her and see the very appealing fistula pulsating away.

Can you place the cannula **there**?

Absolutely **not**.

Scenario 4

Later this patient arrests and need IV access.

Can you cannulate the fistula in **this** instance?

Yes, it’s an **emergency**

How not to give people AKI's with **gentamicin**

What is gentamicin?

Indications

Side effects to watch out for

Drug interactions to watch out for

Actual Body Weight **vs** Ideal Body Weight

Calculation **shortcut**

Getting the patients' **weight**

What is gentamicin?

Aminoglycloside antibiotic

Active against gram negative aerobic bacteria

Most common indications are for pyelonephritis, complicated UTI or sepsis of unknown origin

Gentamicin

Side effects to watch out for

- **Nephrotoxicity**
- **Ototoxicity**

Common drug interactions

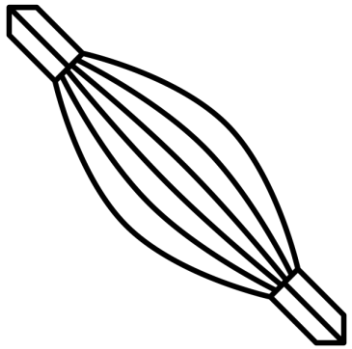
Furosemide

Vancomycin

When co-prescribed with gentamicin increase the risk of ototoxicity and nephrotoxicity

Gentamicin

Contraindication



Myasthenia gravis

Calculating the **loading dose**

The most commonly messed-up part

Calculated based on weight – however, it is calculated based on **Ideal Body Weight** (IBW) not Actual Body Weight (ABW)

Gentamicin is **lipophobic**, so giving a large dose to an obese patient will result in AKI

Calculating the **loading dose**

Your patient has no documented weight on the system

They also have very poor mobility, requiring the assistance of 2 people to get them out onto the chair that serves as the weighing scales

You are short-staffed for nurses and HCA's on the ward and the patient is acutely septic, requiring urgent administration of gentamicin

How might you **obtain** their weight to calculate the dose?

Obtaining a weight

1. Ask the patient
2. Weigh the patient
3. Phone the care home
4. Phone the GP
5. Estimate – ask a nurse/HCA to help

Calculating the **loading dose**

When calculating the loading dose use the **Trusts' intranet calculator**

All you need is their **height**, **weight**, **creatinine**, **age** and **sex**

Calculating it yourself using the multi-stage equation is time-consuming and prone to errors

Feedback

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