London Acute Kidney Injury Network

Management of the patient with established AKI

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Medical management

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- Acidosis- can give bicarb/RRT

Medical management

- Neurological- elevated urea with haemodynamic instability/anaemia and electrolyte toxicity= drowsiness, coma, psychosis and seizures- monitor GCS closely
- Nutrition- Uraemia can cause nausea and vomiting, diarrhoea etc and therefore loss of appetite. Need review from dietician, enteral and sometimes parenteral nutrition- treat symptoms.
- Susceptible to infections- multiple invasive devices in situ and immunocompromised due to uraemia- remove unnecessary lines and maintain optimum infection control measures for asepsis etc, monitor for pyrexia, CRP, WCC
- Decrease in clotting factors- can cause bleeding- maleana, anaemia- PPI/H antagonist, transfuse, avoid aspirin

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- Review nephrotoxic medications
- Treat the cause of the AKI
- Daily weights
- Strict input/output monitoring
- Careful fluid/ volume assessment

Medical management

- Personal care-

  - mouth care, dry mucosa and in uraemia breakdown of urea in saliva= distortion of taste/metallic taste- ice cold mouthwash/ lip care

  -skin condition- easily breaks down in oedema and malnourishment

- Patient education and family-

  - explain cause, management, treatment, long term outlook. Symptoms of uraemia eg fatigue, nausea etc. Involve patient in decision making.

Not responsive to medical management…

- Metabolic acidosis- pH <7.1
- Pulmonary oedema
- Hyperkalaemia- persistently >6.5, ECG changes
- Fluid overload
- Symptoms of uraemia- neuropathy, encephalopathy
- Poisoning- lithium, methanol

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Types

- Haemodialysis
- Haemofiltration
- Haemodiafiltration
- Peritoneal dialysis

Access

- Arteriovenous- arterial catheter which allows blood to flow into circuit using the systemic blood pressure. Venous catheter returns blood.

Advantages- does not require blood pump.

Disadvantage- attendant risk of arterial embolization on puncture, not reliable on hypotensive patients or with severe PVD

Access

- Venovenous- both catheters or one dual lumen catheter placed in veins

Advantages- requires less systemic anticoagulation, faster and more reliable blood flow, does not require arterial puncture

Disadvantages- extracorporeal blood pump required

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Haemofiltration

- Uses a hydrostatic pressure gradient to induce the filtration (or convection) of plasma across the membrane of the haemofilter.
- Removes smaller and larger molecules (eg urea and electrolytes) in same concentration as plasma therefore no change of plasma concentrations is achieved= give substitution fluid- will lower the plasma concentration of solutes (eg urea and creatinine) by dilution
- Continuous, via vascath

Haemodialysis

- Solutes passively diffuse down a concentration gradient form one compartment to another.
- Efficiently removes smaller molecules eg urea, creatinine, potassium. Move from blood to dialysate and calcium and bicarb move from dialysate to blood.
- Intermittent- 3-4 times a week for 3-5hrs, via tunnelled line/ AV fistula
- Improved patient mobility, costs less

Haemodiafiltration

- Combines diffusion and confusion to aggressively remove small and large solutes. Volume of fluid ultrafiltered is large- requires replacement fluid.

Peritoneal dialysis

- Line is inserted into peritoneum and fluid instilled into peritoneal space.
- Allowed to dwell for a period of time- waste is diffused from the blood into the fluid
- Ultrafiltration occurs down a concentration gradient (fluid has higher osmolarity than plasma)
- Disadvantages- peritonitis, displacement of tube

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Contraindications- abdominal surgery, if rapid removal of poisons required

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Which one?

- CVVH if unstable with hypotension requiring inotropes.
- Dialysis for more stable patients- usually step down from ITU/HDU
- Think about indication- Haemofiltration for fluid removal, haemodialysis for solute removal
- CVVHDF for removal of larger solutes eg in spies where removal of inflammatory mediators is key

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Summary

- Manage each body system medically if possible
- Consider RRT if not improving
- Consider the indication for RRT to help decide the type of therapy to commence

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References

- Goldsmith, D et al, (2013), ABC of Kidney Disease, Wiley-Blackwell, Oxford