ACUTE KIDNEY INJURY

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Learning Outcomes

To recap knowledge on kidney disease

To define and explain the progression of acute kidney injury (AKI)

To understand how to prevent and how to manage AKI

To be able to provide information on AKI to patients being discharged from the ward
RECAP Functions of the kidney – what are they?

- Fluid balance
- Excretion of waste (electrolyte and acid-base balance)
- BP control
- Erythropoietin production (red blood cells)
- Vitamin D3 (healthy bones)
Terminology

Chronic kidney disease (CKD) Stages 1-5

Established or Advanced Kidney Disease
(used to be called end-stage renal failure)

Acute kidney injury (AKI)
Can resolve in 6 weeks if the kidneys are going to recover
Acute Kidney Injury (AKI)

Think Kidneys – (Almost) everything you need to know about your kidneys

(Almost) everything you need to know about your kidneys

Most people have two kidneys
They are about the size of your clenched fist, they each weigh around 150g and are shaped like kidney beans.

They sit in your lower back under the bottom ribs
Only 50% of the population know that kidneys produce urine.

They filter your blood every minute of the day
Your blood goes through the kidneys 40 times in 24 hours. There are 140 miles of tubes and a million filters in your kidneys.

They are the hardest working organs in your body
They use 25% of the blood from every heartbeat.
NCEPOD

NCEPOD (National Confidential Enquiry into Patient Outcomes and Death) reported on AKI management in 2009

Deficiencies identified in 50% of cases including failures in AKI prevention, recognition, therapy and timely access to specialist services.

30% of cases were thought to be preventable had adequate measures been in place.

Why do we need to **Think Kidneys**?

https://www.thinkkidneys.nhs.uk/aki/
Prevention is better than cure

Up to 30% AKI maybe preventable by:

- volume replacement
- discontinuing and/or avoiding certain potentially nephrotoxic agents
- earlier recognition of conditions causing rapid progression of AKI
- Correctly completing and acting upon Early Warning Scores
Different categories of acute kidney injury

- Pre Renal
- Renal (or intrinsic)
- Post Renal
Pre renal failure

Hypertension
   - Total loss
     - GI loss (Vomiting, diarrhoea, surgical fistulae)
     - Haemorrhage (Visible and occult)
     - Renal loss (Diuretics, polyuria)
     - Skin loss (Excessive sweating, burns)
   - Volume redistribution
     - Reduced effective circulating volume
       - Acute, oedema, "3rd spacing", congestive cardiac failure
     - Altered vascular capacitance
       - Septic, shunting, vasodilatation, Hepatorenal syndrome (HRS)

Hypovolaemia
   - Reduced intravascular volume

Low cardiac output
   - Reduced cardiac output

Intrinsic renal failure

Glomerular
   - Glomerulonephritis

Tubular
   - Toxins
     - Ischaemic (Extreme pre renal, sepsis, pancreatitis)
     - Toxic (Renovascular disease, atheroembolic)

Interstitial
   - Large vessel (Renovascular disease, malignant hypertension)

Vascular
   - Small vessel (Vasculitis, HRS, neovascular, malignant hypertension)

Post renal failure

Obstruction

Intrinsic
   - Stones
   - Tumour

Extrinsic
   - Surrounding or infiltrating tumour
     - Large inflammatory abdominal aortic aneurysms

Blakeley (2008)
More simply......
• a rise in serum creatinine of 26 micromol/litre or greater within 48 hours
• a 50% or greater rise in serum creatinine known or presumed to have occurred within the past 7 days
• a fall in urine output to less than 0.5 ml/kg/hour for more than 6 hours in adults and more than 8 hours in children and young people
(NICE 2013)
Clinical course of AKI

- Initiation/onset Phase (few hours-few days)
- Oliguric Phase (5-15 days)
- Diuretic Phase
- Recovery Phase (up to several months)

Key Reference

Nursing care

Assess
https://www.youtube.com/watch?v=ntqOFj1YqGU

Identify/treat the cause

Manage hyperkalaemia (high potassium levels)
Manage volume overload/provide adequate hydration to patients at risk of dehydration

Communication with patient and family

Correct acidosis
Nutrition
Infection

Renal Replacement Therapies

**Key Message**
Carefully assess urine output – at least 0.5mls per kilo per hour (rule of thumb 30mls per hour)
A Care Bundle for patients in hospital

**AKI Post-discharge Guidance**

Added: 25/11/2019 in News  •  Share this on – Facebook / Twitter / Linked in

The RCGP has launched new national guidance for post-discharge care following acute kidney injury. This has been based on collaboration between primary and secondary care and through national partnerships.

The new guidance promotes tailored and timely discharge care for adults who have had a hospital admission complicated by AKI. In particular, it highlights a need to address poor outcomes following AKI for people with heart failure.

The **guidance table** and the ‘**Top Ten Tips**’ are designed to support safer transitions of care and are relevant to both hospital and general practice teams.

The guidance was produced in partnership between the RCGP and NIHR Collaboration for Leadership in Applied Health Research and Care Greater Manchester; NIHR Greater Manchester Patient Safety Translational Research Centre; the Academic Health Science Network (AHSN) for the North East and North Cumbria; Kent, Surrey and Sussex AHSN; Think Kidneys; NHS Education for Scotland; and Healthcare Improvement Scotland.

It has been endorsed by the British Society for Heart Failure and the Primary Care Cardiovascular Society.

1. **Place AKI in clinical and social context**

Before and after discharge, involve all patients (and where appropriate their families, carers, care coordinators and key-workers) in planning follow-up care.

Key elements of post-AKI care include:

- Timely clinical review of reason(s) for admission
- Identify and address social needs
- Understand AKI and the relevance of kidney health
- Ensure timely drugs review and kidney monitoring
- Support during future episodes of acute illness

3. **Accurate discharge hand over**

Hospital clinical teams should have a process in place to confirm or refute the AKI diagnosis prior to discharge. To support continuity and determine urgency of follow-up, key information to communicate to GPs include:

- AKI stage and reason(s)
- Degree of kidney recovery
- Baseline and discharge serum creatinine (Scr)
- Is Scr stable or improving?
- Reasons for medication changes
- Evidence of communication with patients/carers
COVID-19 rapid guideline: acute kidney injury (AKI)
(Last update: 6 May 2020)

Factors that further increase the risk of AKI:
- Chronic kidney disease
- Heart failure
- Liver disease
- Diabetes
- History of AKI
- Age 65 years or over

Assessments:
Fluid status by clinical examination:
For example, peripheral perfusion, capillary refill, pulse rate, blood pressure, postural hypotension, jugular venous pressure, pulmonary or peripheral oedema

Fluid status by fluid balance:
Fluid intake, urine output and weight

Electrolytes:
Sodium, potassium and bicarbonate

Useful links:
NICE has produced a guideline on acute kidney injury: prevention, detection and management
For help with fluid management, see the algorithms and composition of commonly used crystalloids in the NICE guideline on intravenous fluid therapy in adults in hospital
See Think Kidneys guidelines for medicines optimisation in patients with acute kidney injury
The previous slides are just an overview of AKI, but here is a link to a fuller slide set with activities.


This might be suitable after you have been on a renal ward for at least 4 weeks
Further reading


RCGP Toolkit
http://www.rcgp.org.uk/aki

NICE guidelines on AKI
https://www.nice.org.uk/guidance/cg169

Renal Association guidelines on AKI
http://www.renal.org/guidelines/modules/acute-kidney-injury

Think Kidneys report