London Acute Kidney Injury Network

NHS
London
Strategic Clinical Networks

My AKI

Guidance for patients with, or recovering from, acute kidney injury

Supporting the delivery of equitable, high quality AKI care through collaboration

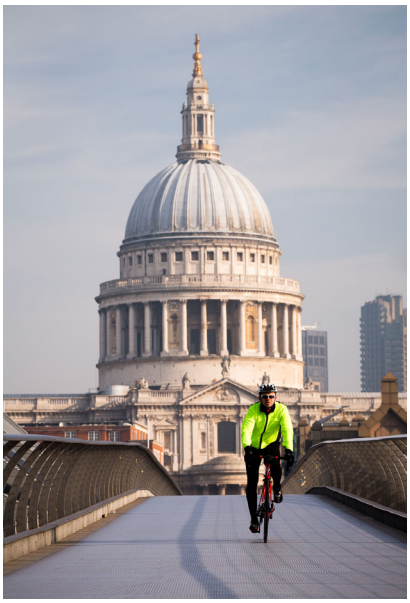
www.londonaki.net

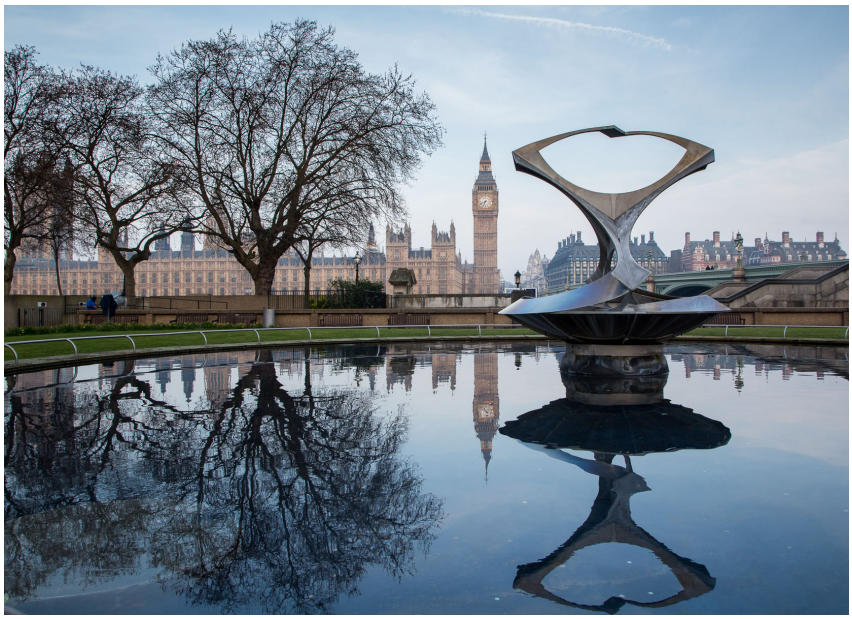
@LondonAKI

Overview

My AKI is a patient support resource for patients with, or recovering from, acute kidney injury (also known as 'AKI").

- This resource builds on 2012 materials previously available on londonaki.net (londonaki.net/clinical).
- This document may be printed out for patients. It may also be emailed or patients may be directed to this resource via the weblink www.londonaki.net/patients.
- Acute kidney injury is caused by a number of different insults and disease processes. Prognoses may differ and potential for preventive measures varies. As such generic guidance of this kind can only support face-to-face patient advice and guidance provided by a qualified healthcare professional.





What do the kidneys do?

The kidneys keep us healthy by maintaining the composition and volume of our body fluids and blood.

The kidneys receive a rich supply of blood from the circulation and use this to make urine. Urine drains from the kidneys out through tubes (called ureters) into the bladder. When the bladder fills we feel the urge to pass urine.

The production of urine allows our bodies to stay in overall balance (a process scientists call 'homeostasis').

The volume and composition of the urine is tightly controlled by the kidneys.

Urine removes waste products (mainly from the diet) that may be harmful to the body. These wastes includes urea, which we can measure in the blood, and acids. The kidneys also remove excess amounts of salts (such as sodium, potassium and phosphate) and some drugs.

The kidneys have a key role in determining our water balance, by adjusting the amount of water we pass in the urine according to our levels of hydration.

In addition the kidneys have hormonal functions. They activate vitamin D (from diet or sunshine), that in turn regulates the levels of calcium in the body. The kidneys also produce erythropoietin, that determines the amount of red cells our bone marrow produces.

Our kidneys work 24/7 to keep us healthy, consuming a quarter of our body energy to do their amazing work.

What is acute kidney injury, or AKI?

AKI is a sudden loss of kidney function. It does not mean that the kidneys have been damaged by trauma.

AKI, depending on the cause, is usually temporary. AKI used to be called 'acute renal failure' and can also be called 'acute kidney failure'. The term 'uraemia' has also been used to describe AKI patients who have metabolic complications of this condition (such as an accumulation of the waste product urea in the blood).

What causes AKI?

For AKI to develop there must be some form of acute insult to the health of the kidneys. London AKI Network categories these acute insults using the STOP acronym and these causes of AKI are outlined below.

Sepsis and hypoperfusion

AKI may be caused by reduced delivery of blood or oxygen to the kidneys. This is most commonly caused by severe infection but can also be a consequence of severe dehydration, major surgery, trauma or due to cardiac or liver failure.

Toxicity

AKI may also be caused by damage to the kidneys caused by drug toxicity. This may be due to patients consuming excess amounts of a drug but may be a side effect of drug that has been taken at the right doses. Sometimes AKI from drug reactions may be completely unexpected and part of an adverse 'drug reaction'. Prescribing clinicians, pharmacists and nurses are aware of these effects and when risks of kidney toxicity are higher will make arrangements for careful monitoring of kidney function. As well as drug toxicity AKI may occur when higher risk patients receive injections called 'radiological contrast' required for some x-rays and procedures. Finally toxicity is recognized due to some environmental insults or industrial exposures.

Obstruction

The urinary tract is made up of the kidneys, ureters and bladder. The ureters are pipes which collect urine form the kidneys and drain it to the bladder, which we drain when we pass urine.

To work properly the kidneys must be able to drain urine freely from the urinary tract. When the urnary tract becomes blocked, the kidneys don't work properly as pressure builds up and they are unable to filter the blood.

The urinary tract may become blocked at any level. Stones, inflammation and tumours may all block drainage. Obstruction to the drainage of the bladder is, in men, commonly caused by enlargement of the prostate gland, which sits around the bladder neck. Sometimes the urinary tract isn't actually blocked but there are problems with the way it works and this may affect drainage. An example would be abnormal muscular function in the bladder after a spinal injury.

AKI may also be caused by specific, acute kidney diseases such as glomerulonephritis (an inflammatory, immunological disease) or haemolytic uraemic syndrome (sometimes caused by food poisoning). Finally AKI may be caused when the drainage system of the kidneys (the ureters or bladder) is blocked.

Patients who have chronic kidney disease are particularly at risk of AKI. This is because the kidneys of these patients are more vulnerable to damage and because they have less background 'reserve' of kidney function.

Primary renal disease

AKI may also be caused by specific kidney diseases that affect the health of the substance of the kidneys. These diseases may cause inflammation or scarring of kidneys, block the kidney filters or cause damage to the small blood vessels inside the kidney. Diseases that do this include glomerulonephritis, tubulointerstial nephritis, myeloma kidney and haemolytic uraemic syndrome. It usually requires specialist input to treat these conditions and sometimes a kidney biopsy will be required to make a diagnosis.

What are the complications of AKI?

Most AKI is self-limiting and mild. In more severe cases the loss of kidney function may result in clinical complications. These include the accumulation of waste products, salts (such as sodium, phosphate and potassium), water and (in some cases) drugs.

Accumulation of waste products such as urea in the blood may lead to nausea, vomiting, fatigue, drowsiness or confusion. Salt and water retention can lead to swelling (or oedema), breathlessness and high blood pressure. The blood may become more acidic, which may also cause breathlessness. All these complications are treatable.

If you are suffering from AKI you may (but not always) notice a reduction in your urine volume. When your kidneys start recovering you may actually start passing more urine than normal and you may notice this from having to get up in the night to pass urine.

Though most patients recover from AKI developing this condition may extend your hospital stay and mean that follow up is required. A small proportion of patients do not recover kidney function completely and this results in long-term effects (see below). We also know that patients who have has AKI once are more likely to get it again.

How do clinical teams diagnose AKI?

Doctors measure the blood level of a substance called creatinine. This is produced by body muscles at a fairly constant rate and is removed by the kidneys. If there is a reduction in kidney function the creatinine levels will rise. Doctors use this phenomenon to diagnose AKI. Doctors and nurses also monitor kidney function by measuring urine volumes in patients who are particularly at risk. This often requires catheterisation of the bladder. Blood tests will also detect complications of AKI such as increased acidity of the blood.

How is AKI investigated and treated?

The medical team will initially treat any immediate complications of AKI.

They will then endeavour to find the cause of AKI. This will involve taking background details of recent symptoms, medical history and medication history. A full examination will be performed. Basic investigations include blood tests and dipstick tests of the urine (to look for signs of inflammation). An ultrasound scan or CT scan of the kidneys is often performed to exclude obstruction of the kidney's drainage system. Occasionally a kidney biopsy is undertaken to clarify the diagnosis. This is a local anaesthetic procedure performed with ultrasound and allows pathologists to examine kidney tissue, and any abnormalities, in detail.

Treatment is then directed at the underlying cause and this will vary. Antibiotics are given if the AKI has been caused by infection. Hydration is assessed and intravenous fluids are given as appropriate. Drug prescriptions are reviewed. Some drugs may be stopped while others require a dose adjustment to account for the loss of kidney function (as many drugs are eliminated by the kidneys). If AKI has been caused by obstruction this can be relieved by catheterization of the bladder or other procedures. If the cause is primary renal disease the specialist nephrology team may need to treat you with specific therapies such as steroids or immunosuppressant drugs.

Patients with AKI are have their physical signs (blood pressure, pulse and temperature), urine volumes and blood tests regularly monitored.

It is essential that your clinical team explain what is happening and agree your treatment plan with you. Sometimes multiple teams may be involved in the care of AKI patients and you must be kept up to date and informed of any changes to your treatment plan.

After an AKI illness it is essential that you are aware what follow up is required. This may require return visits to a follow up clinic or a trip to your GP for further blood tests.

You should be advised as to whether there is anything you can do to help your recovery and prevent further episodes. This depends on what caused your AKI. Such advice should be provided by a suitably qualified professional who is familiar with your case.

What is kidney dialysis and when is it required?

Kidney dialysis is a technique which removes substances that accumulate in kidney failure from the blood. This may include potassium, phosphate, sodium, water and protein breakdown products such as urea. Dialysis also provides a means to infuse substances (such as bicarbonate) that renal failure patients are lacking (rather like an intravenous drip).

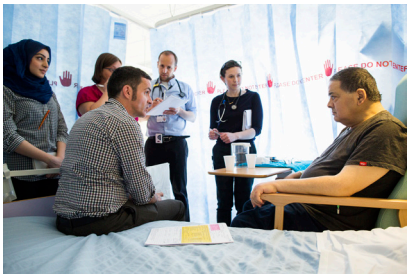
Kidney dialysis in AKI usually takes two to four hours. It may be performed initially on a daily basis but this may be reduced to less frequent treatments (often three times a week). Dialysis in AKI usually requires the insertion of a dialysis catheter, under local anaesthetic, into a large vein in the neck or groin. Blood is then removed and passed through tubes to the 'artificial kidney' and then returned to the patient.

Patients who need artificial kidney treatment in critical care units normally have a different form of treatment called haemofiltration. This uses different technology and often runs continuously over twenty-four hours. This allows the critical team to purify the blood in unstable, critically ill patients more slowly and with tighter control.

These treatments are needed for the minority of AKI patients who develop more serious complications. It is usually undertaken on a temporary basis prior to restoration of kidney function through treatment. Some patients do, however, need treatment for several weeks, or even months.

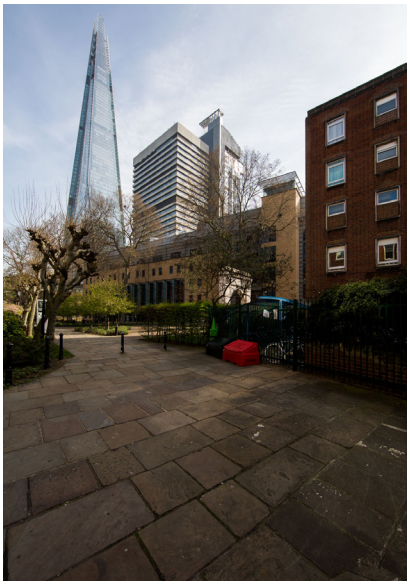
What are the long-term affects of acute kidney injury?

If you have had AKI you need to be followed up by your medical team to ensure your kidney function has returned to normal. This may involve ongoing follow up in a hospital or community clinic or follow up by your GP.



Some patients develop a degree of scarring of the kidneys after AKI and need long term follow up and management of chronic kidney disease. A very small minority of AKI patients suffer irrevocable damage to the kidneys and need ongoing dialysis or, longer term, kidney transplantation. Such patients will have ongoing care from a specialist renal team.

Its essential that you or your carers clearly understand what follow up you should be having and why. It can be helpful to track your recovery by keeping copies of your blood tests.



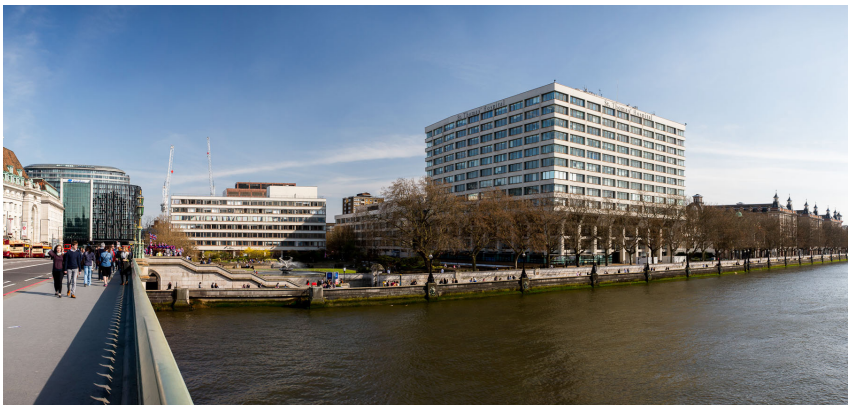
Your clinical team should advise you as to whether you need to make any lifestyle modifications and whether there is anything you can do to prevent further episodes of AKI.

Further information

1. British Kidney Patients Association Patient Information
   http://www.britishkidney-pa.co.uk/patient-info

1. Think Kidneys Information for The Public
   https://www.thinkkidneys.nhs.uk/aki/information-for-the-public/

1. Londonaki.net/patients (including links to other resources)



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