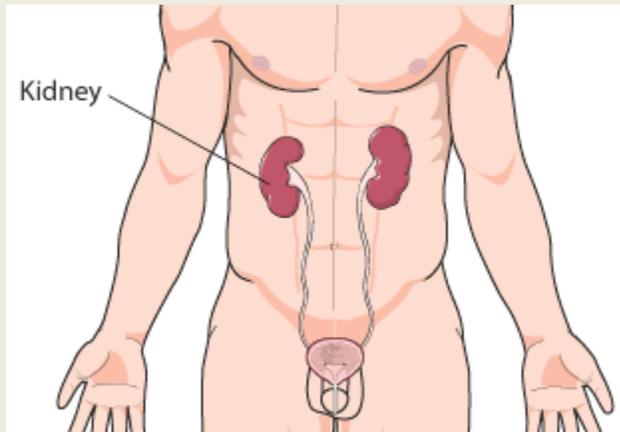


Medicine for Managers

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What is Kidney Failure?

We probably rather take our kidneys for granted, viewing them as the organs that make urine. Actually they do a lot more than that and not only get rid of waste products but also control the body's electrolytes, influence blood pressure and stimulate red blood cell manufacture.



The kidneys can be found in the abdomen on either side of the spine supplied with blood directly from the aorta. If their functions are compromised the kidneys start to fail.

Kidney (or renal) failure can occur from an acute event or as a result of chronic progressive disorders. Acute failure depends on whether the problem occurs outside the kidney or in the kidney itself. A key acute cause outside the kidney is compromise of the blood flow to it such as occurs with severe dehydration from diarrhoea or vomiting, or with obstruction of the blood vessels supplying the organs. It may also occur with blood loss

(hypovolaemia) and is therefore a significant complication of surgery and obstetrics. Acute external causes may also obstruct the outflow from the kidney resulting in a damming back of the urine which raises the pressure in the kidneys resulting in damage and shut down. Causes include prostatic enlargement in men, and tumours of the bladder or abdomen that surround and obstruct the ureters (the tubes leading from kidney to bladder). Kidney stones normally affect only one kidney and, although they may cause serious damage on the affected side, do not result in kidney failure whilst the other kidney is working normally.

Acute failure may also occur as a result of diseases affecting the kidney itself. Causes include the use of some medications, such as ibuprofen and naproxen, some antibiotics, lithium and statins. Multiple myeloma is a cancer which develops in bone marrow cells and the abnormal cells make large amounts of antibody protein which damages the kidneys as it passes through. Other diseases which inflame the filtering mechanism in the kidney (acute glomerulonephritis) also cause failure. Sepsis which overwhelms the body's

immune system causes inflammation and shutdown of the kidneys. The kidneys themselves may be damaged or destroyed by crush injuries, trauma or burns.

Chronic renal failure usually develops over years and is associated with a gradual decline in kidney function. It occurs as the result of poorly controlled diabetes, poorly controlled blood pressure and chronic kidney infections. It may also result from the congenital disorder polycystic kidney disease, and chronic obstructive conditions such as prostatic hypertrophy.

Clearly acute kidney failure will be part of a complex of other symptoms and will contribute to body collapse and shutdown. Patients are seriously ill and many die.

Chronic renal failure, on the other hand, is asymptomatic in the early stages. As it progresses the patient loses the ability to regulate water and electrolyte balance resulting in the development of dependent oedema. The patient becomes lethargic, weak, breathless and generally increasingly unwell. Inability to get rid of potassium results in rising blood levels which can disturb heart rhythm and can be fatal. The level of urea also rises in the blood causing the development of uraemia, which results in confusion due to encephalopathy and inflammation of the heart (pericarditis). Other effects include anaemia (which tends not to respond to treatment) and loss of appetite.

Kidney failure is usually diagnosed initially by blood tests including measurements of urea and creatinine (both waste products), electrolytes and the estimated Glomerular Filtration Rate (eGFR). eGFR is a proxy for the degree of function of the kidneys and is

classified into five stages. Stage 1 is essentially normal kidneys and stage 5 is very severe kidney failure.

Stage	GFR	Description	In QOF
1	90+	Normal function but evidence of potential kidney disease	No
2	60-89	Mild reduced kidney function - evidence of kidney disease	No
3	30-59	Moderately reduced kidney function	Yes
4	15-29	Severely reduced kidney function	Yes
5	<15	Very severe or established kidney failure	Yes

Urine tests may also be used to identify kidney disease. Injured kidneys leak protein. They may also leak red and white blood cells. Comparing concentrations of electrolytes in blood and urine can be used as a measure of how effectively the kidney is filtering the blood.

The nature of the kidney disease may be established by the use of ultrasonic or radiological scans, which identify the size of the kidneys and any associated pathology such as multiple cysts. During the investigation of the kidneys in hospital a biopsy, using a needle inserted into the kidney, takes a small sample of kidney tissue which can be viewed under the microscope to make an accurate diagnosis.

The QOF recognises kidney disease with a total of 36 points for diagnosis, initial and on-going management. For the nerds who want details they are as follows:

Indicator	Points	Payment stages
CKD1 Register of patients over 18 with CKD 3-5	6	
CKD2. Patients on register with BP in preceding 15 months	4	50-90%
CKD3 Patients with BP in preceding 15 months less than 140/85	11	45-70%
CKD5 Patients on register with hypertension or proteinuria treated with ACE inhibitor or ARB	9	45-80%
Patients whose notes have record of urine albumin:creatinine ratio in preceding 15 months	6	45-80%

The management of chronic kidney disease has as its goal to prevent further deterioration. Aggressive control of diabetes and hypertension is paramount. Other treatment includes diet to reduce the demand on the kidney and medication to reverse the tendency to anaemia.

Once the kidneys fail completely the options lie between dialysis and transplantation. There are two types of dialysis. In **haemodialysis** blood flows through a machine outside the body where a complex filtration mechanism separates waste products and cleans the blood. Such dialysis sessions normally occur about three times a week and last six to eight hours. In **peritoneal dialysis**, a catheter into the abdomen is used to run dialysis fluid into the abdominal cavity where it remains for a few hours before being drained. Waste products in the blood leak through

abdominal blood vessels into the dialysis fluid and are drained away with the fluid. Patients may live for many years with dialysis.

Kidney transplant is the alternative to dialysis. Simply, a suitable donor (often a family member) is found. At operation the diseased kidney is removed and the new kidney is inserted. The patient has to take medication to prevent rejection of the kidney and this brings with it disadvantages because the patient has reduced ability to fight infection. Transplants can provide good quality of life and 19 out of 20 are still working after one year.

The moral of the story. Don't allow yourself to have high blood pressure left untreated or diabetes left uncontrolled. If you do you can expect progressive kidney deterioration and ultimately failure. If you are lucky you may not be so bad that you need dialysis or transplant. With failure comes chronic ill-health and progressive deterioration sometimes resulting in sudden death due to cardiac arrhythmias. Be good to your kidneys and they will be good to you.

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