PRIMEVIEW

CHRONIC KIDNEY DISEASE

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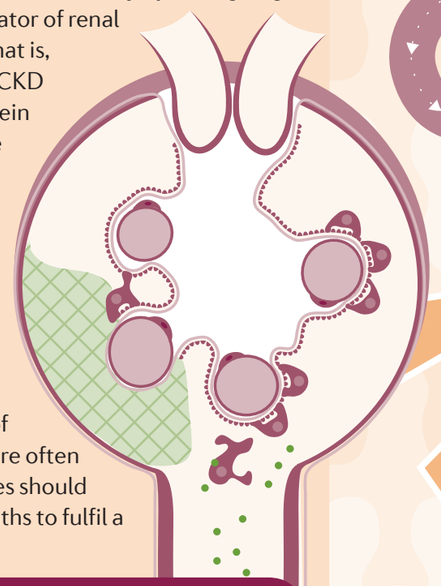
For the Primer, visit doi:10.1038/nrdp.2017.88

Chronic kidney disease (CKD) can generally be thought of as a loss of functional nephrons (the fundamental units of the kidney), which leads to persistent abnormalities in urine composition and volume or impaired excretory renal function. It has many possible causes, including toxic exposures, kidney-specific diseases and systemic diseases.

DIAGNOSIS

The guidelines of the Kidney Disease Improving Global Outcomes initiative have defined categories of CKD according to two important parameters: glomerular filtration rate (GFR) and proteinuria. GFR is a well-established marker of renal excretory function that declines with renal injury and ageing. Proteinuria is an indicator of renal barrier dysfunction (that is, glomerular injury); as CKD progresses, more protein is lost in the urine. The GFR and extent of proteinuria indicate the stage of CKD and give an indication of the likelihood of progressing to end-stage renal disease (ESRD). Although a single measurement of GFR and proteinuria are often used, the abnormalities should be present for ≥3 months to fulfil a diagnosis of CKD.

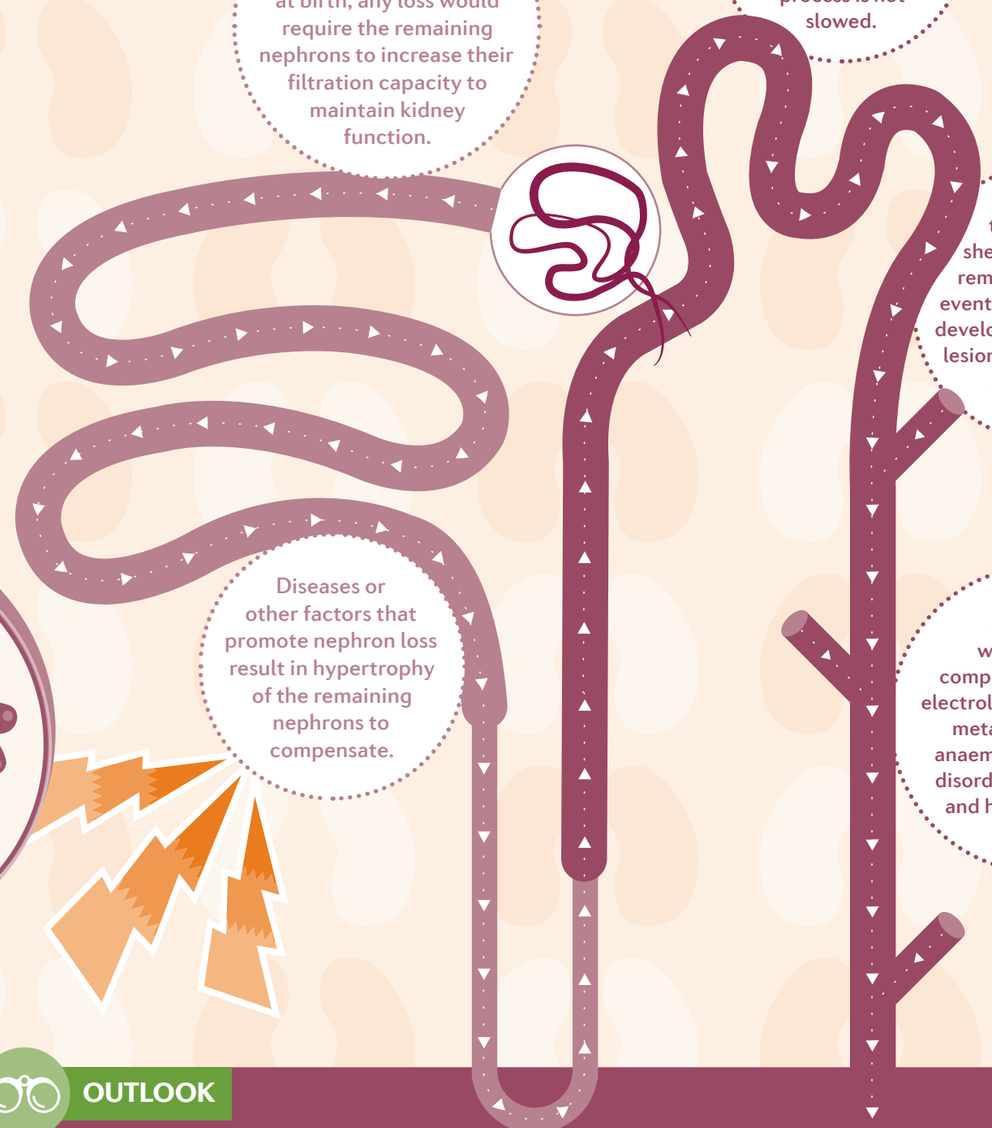


Patients with early stages of CKD are usually asymptomatic, but as CKD progresses, patients can experience weakness related to anaemia and polyuria (production of a large volume of urine with consequent frequent urination).

MECHANISMS

As the number of nephrons an individual has is set at birth, any loss would require the remaining nephrons to increase their filtration capacity to maintain kidney function.

What results is a vicious cycle that further reduces nephron number and leads to ESRD if the process is not slowed.



However, the effects of shear stress on the remaining nephrons eventually results in the development of sclerotic lesions in the glomeruli and nephron atrophy.

Diseases or other factors that promote nephron loss result in hypertrophy of the remaining nephrons to compensate.

CKD is associated with systemic complications such as electrolyte abnormalities, metabolic acidosis, anaemia, mineral bone disorder, hypertension and hyperuricaemia.

OUTLOOK

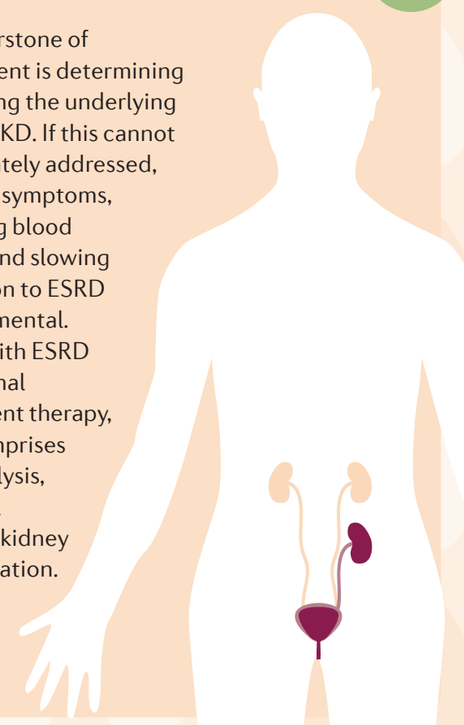
Key areas for development in the field of CKD are to improve its diagnosis, reduce the frequency and impact of its risk factors, improve the understanding of its causes and complications, improve outcomes and develop and test new therapeutic strategies.

EPIDEMIOLOGY

The prevalence of CKD is in the range ~7–12% in the different regions of the world; over the past 25 years, CKD as a cause of death has increased and now contributes 1.35% of the global burden of disability-adjusted life years lost. In high-income countries, the most common underlying diseases associated with CKD are diabetes mellitus and obesity; for example, ~30–40% of those with diabetes have CKD. In low-income countries, CKD is associated with infectious diseases and inappropriate use of medications (such as nephrotoxic traditional remedies, antibiotics and NSAIDs). Low birthweight (due to preterm birth or intrauterine growth restriction) is associated with CKD later in life.

MANAGEMENT

The cornerstone of management is determining and treating the underlying cause of CKD. If this cannot be adequately addressed, managing symptoms, controlling blood pressure and slowing progression to ESRD are fundamental. Patients with ESRD require renal replacement therapy, which comprises haemodialysis, peritoneal dialysis or kidney transplantation.



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Article number: 17089; doi:10.1038/nrdp.2017.89; published online 23 Nov 2017

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