Commentary

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Guiding Kidney Health: How Nephrologists Manage and Treat Kidney Disease

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Description

The kidneys are vital organs responsible for maintaining homeostasis by filtering blood, regulating fluid balance, electrolyte levels and excreting waste products. They play a vital role in controlling blood pressure and producing essential hormones like erythropoietin, which stimulates red blood cell production. Given the kidneys' importance, any dysfunction or disease can have significant implications for overall health, making nephrology a critical field of medicine. A nephrologist is a physician who specializes in the treatment of kidney diseases. These professionals diagnose and manage conditions such as Chronic Kidney Disease (CKD), Acute Kidney Injury (AKI), glomerulonephritis, nephrotic syndrome and electrolyte imbalances. Nephrologists also oversee the care of patients undergoing dialysis and those who have received kidney transplants. Nephrology is closely linked with other medical specialties, particularly cardiology, endocrinology and internal medicine, as the kidneys affect multiple organ systems. For instance, many kidney diseases are associated with cardiovascular complications. The exchange between kidney function and other systems underscores the complexity of managing nephrological conditions.

Chronic kidney disease

CKD can be caused by diabetes, hypertension, glomerulonephritis, or genetic conditions like polycystic kidney disease. CKD is often asymptomatic in its early stages and the diagnosis is frequently made through blood tests showing elevated creatinine levels or decreased Glomerular Filtration Rate (GFR). CKD progresses through five stages, with the final stage known as End-Stage Renal Disease (ESRD). At this point, the kidneys can no longer function adequately to maintain life and patients require dialysis or kidney transplantation. Managing CKD involves controlling the underlying conditions, such as managing blood sugar in diabetes or reducing high blood pressure. AKI is a sudden decline in kidney function, typically occurring days. It can result from several causes, including severe infections, dehydration, or exposure to nephrotoxic drugs. AKI is a common complication in hospitalized patients, especially those in critical care settings. While AKI can be reversible, it is associated with a high risk of mortality and can lead to CKD if not properly managed.

Treatment of AKI involves addressing the underlying cause, maintaining hydration and supporting kidney function through dialysis if necessary. It can be caused by infections, autoimmune diseases, or genetic factors. Symptoms include blood in the urine (hematuria), protein in the urine (proteinuria) and swelling (edema). Treatment depends on the underlying cause and may involve immunosuppressive medications, controlling blood pressure and managing fluid retention. In severe cases, glomerulonephritis can progress to CKD or ESRD. Nephrotic syndrome is characterized by high levels of proteinuria, low blood albumin levels and significant fluid retention. It can be caused by a variety of conditions, including glomerular diseases like minimal change disease or membranous nephropathy. Management involves controlling the underlying condition, using medications to reduce proteinuria and addressing complications like edema and high cholesterol levels.

Dialysis: A lifesaving treatment

For patients with ESRD, dialysis becomes essential for survival. Dialysis is a process that artificially removes waste products and excess fluids from the blood when the kidneys are no longer able to do so. Hemodialysis involves circulating the patient's blood through a machine equipped with a special filter (dialyzer) that removes waste products. This process typically occurs three times per week for several time, either in a hospital or a dialysis center. Peritoneal dialysis uses the patient's abdominal lining (the peritoneum) as a natural filter. A cleansing fluid (dialysate) is introduced into the abdominal cavity through a catheter, where it absorbs waste products before being drained. This process can be done at home, offering greater flexibility compared to hemodialysis. Kidney transplantation is the preferred treatment for patients with ESRD, offering a better quality of life compared to long-term dialysis. The procedure involves surgically implanting a healthy kidney from a living or deceased donor into the patient. While a successful transplant can significantly improve the patient's prognosis, lifelong immunosuppressive therapy is required to prevent organ rejection. Not all patients are candidates for kidney transplantation and the availability of suitable donor kidneys remains limited. Additionally, even with a successful transplant, there are risks of complications, including infections, rejection and cardiovascular events.