Renal failure

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Significant loss of renal function is becoming an epidemic in the Western world. Main causes are hypertension and diabetic nephropathy. It is essential to standardize methods and measures of laboratory assays in order to follow-up the increasing population of individuals with chronic renal failure (CRF). Presenting symptoms include loss of appetite, nausea and vomiting. These features can be associated with advanced renal failure often needing the beginning of chronic dialysis treatment (HD). Severe renal failure with mental obtundation, myoclonic twitching and coma need instead prompt HD. Initial signs of renal failure are usually proteinuria and/hematuria. Incidental finding of raised serum creatinine can be detected as part of "routine" biochemical screen in patients without symptoms.

The first question to answer when we first see a patient with reduced renal function is: Acute or chronic? Pre-renal acute renal failure (ARF) need to be excluded. A simple and effective assay is to measure urine Na and K in extemporaneous urine samples. Higher levels of urine K compared to urine Na is a reliable indicator of pre-renal ARF. Management of CHR rely mainly on laboratory findings. Underlying diseases as glomerulonephritis need frequent proteinuria measures in order to identify disease progression or treatment effectiveness. Complications of chronic renal failure instead require accurate assessment of hyperparathyroidism, anaemia, acidosis, hyper lipidemia, and drug doses. Hyperparathyroidism is a major complication of CRF and is associated with bone disease, vascular and extra-articular calcification. Serum levels of calcium, phosphate and parathyroid hormone are essential laboratory measurements for Nephrologists. It is for treatment of CRF patients before and under HD, particularly those eligible for kidney transplantation. Anaemia can be treated with erythropoietin, vitamin B12, folate and iron supplements. Levels of serum vitamin B12, folate, iron, ferritin, transferrin and total iron binding capacity (TIBC) are essential for proper treatment and follow-up of anaemia in the course of CRF. Acidosis should be corrected in order to control bone disease and muscle wasting. Blood gas and bicarbonate levels need to be analyzed at monthly intervals particularly in HD patients. Hyperlipidemia is associated with the risk cardiovascular risk in renal failure. In our days cardiovascular disease accounts for approximately half of all deaths in HD patients regardless of age, gender, or primary renal disease. It is progressively worsening when we consider the increasing age of our HD patients and that diabetes is the major cause of CRF worldwide. Drug doses have to be adjusted in CRF or HD patients to avoid accumulation when they are cleared mainly by kidneys. Kidney transplantation is an emerging challenge for clinical and laboratory workers. Levels and dose adjustment of immunosuppressant as cyclosporine, tacrolimus, sirolimus and everolimus need increasing accuracy as they are associated to graft toxicity and higher infection susceptibility.

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