

Approach to the Patient with Renal Disease



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INTRODUCTION

Chronic kidney disease (CKD) may be defined as having an estimated glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² for at least 3 months. Most of these patients are seen in the outpatient setting, and the focus of their care is on determination of the cause of renal injury, preservation of kidney and cardiovascular function, prevention of the long-term complications of kidney disease, and provision of renal replacement therapy once kidney function deteriorates to the extent that it can no longer sustain an appropriate quality of life. In contrast, most patients with acute kidney injury (AKI) are hospitalized. The focus of their care also starts with accurate determination of the cause of renal failure, but over a period of days to weeks it is important to reverse the kidney failure if possible, replace kidney function if needed, and manage the many potential adverse consequences of AKI.

Because of the widespread use of automated systems for serum chemistry analysis, an elevated serum creatinine concentration is the most common initial manifestation of kidney disease. This test is performed as a screen for renal function abnormalities in most metabolic panels; in most cases, an elevated serum creatinine concentration reflects reduced filtration function of the kidney. After ensuring that intravascular volume is appropriate, the approach to the patient depends on whether renal insufficiency is thought to be acute or chronic. Accordingly, the initial step in evaluating an elevated serum creatinine level is to assess the time course and duration of the changes so as to distinguish AKI from CKD.

A careful history, physical examination, and laboratory evaluation, including imaging studies, are all fundamental to this process. The highest priority is to address acute dehydration, bleeding, and other causes of intravascular volume loss. Evidence of preceding kidney disease may be discovered by searching the records for prior abnormalities of serum creatinine, proteinuria, abnormal urine sediment, or anatomic features such as the presence of multiple cysts in both kidneys. Similarly, a call to the primary care doctor may provide clues to suggest the presence of kidney disease at an earlier time.

Small kidney size, as assessed by ultrasound, can be highly suggestive of CKD. The size of the kidney depends on the height of the patient, but in general, a kidney length on ultrasound images of less than 9 cm in an adult male is considered small. The presence of normal-sized or even large kidneys does not exclude the diagnosis of CKD. In fact, it is common in patients

with diabetic nephropathy for kidneys to be 11 or 12 cm long. Radiography of clavicles or hands is not commonly performed but may demonstrate renal osteodystrophy and suggest the presence of CKD.

Anemia is common in both AKI and CKD and therefore is not a differentiating feature. Rarely, if the initial evaluation is unrevealing, a kidney biopsy may be required to distinguish AKI from CKD and to define the etiology of injury.

APPROACH TO THE PATIENT WITH CHRONIC KIDNEY DISEASE

If the elevated creatinine concentration is thought to be chronic in nature, the history and physical examination should focus initially on detection of diabetes (e.g., diabetic retinopathy) and hypertension, the two most common causes of CKD. In all cases, the evaluation also includes laboratory testing of renal function, serum electrolytes, complete blood count, testing for albuminuria, and microscopic urine sediment analysis. Kidney ultrasound is almost always obtained early in the evaluation to eliminate ureteral or bladder obstruction, a cause of reversible renal failure. In addition, the ultrasound provides important information about kidney size, symmetry, and echogenicity. Kidney biopsy may be needed in some patients, but parenchymal scarring is common in many forms of CKD so the biopsy may not be diagnostic.

Because diabetes and hypertension are common causes of kidney disease, it is important to recognize the associated presentations. To establish a likely diagnosis of diabetic nephropathy, a long-standing history of documented diabetes mellitus is typical, and the presence of diabetic retinopathy, albuminuria, and large kidneys on ultrasound is expected. The urinary sediment is usually unremarkable, so the presence of red blood cell (RBC) casts or a significant number of dysmorphic erythrocytes should initiate a careful evaluation for other causes of CKD. In cases of hypertensive nephrosclerosis, established hypertension typically antedates the diagnosis of renal failure for many years, and the presence of hypertensive retinopathy or cardiovascular disease (e.g., left ventricular hypertrophy) is common. Proteinuria is typically minimal or absent (<2 g/day), and the kidneys are symmetrically small on ultrasound.

In patients with chronic renal failure, it is important not to assume that diabetes and hypertension are the cause. The implication, rather, is that no other identifiable cause of kidney disease is apparent after a thorough evaluation. Notably, in individuals