Identify & Evaluate Patients with Chronic Kidney Disease

Urine and blood tests are used to detect and monitor kidney disease. Currently, the key markers used include abnormal urine albumin levels and a persistent reduction in the estimated glomerular filtration rate (eGFR). Identification of the etiology may help guide management. Diabetes and hypertension are the leading causes of CKD in adults. Many diseases that cause kidney failure may have their origins in childhood. Early detection and appropriate treatment may improve prognosis in all age groups.

Identify Patients with CKD

Screen people at risk for CKD, including those with

- diabetes mellitus type 1 or type 2
- hypertension
- cardiovascular disease (CVD)
- family history of kidney failure

The benefit of CKD screening in the general population is unclear.

The two key markers for CKD are urine albumin and eGFR. To screen for CKD:

- assess urine albumin excretion to diagnose and monitor kidney damage. Screen using a spot urine albumin-to-creatinine ratio.
- calculate eGFR from stable serum creatinine levels to assess kidney function. Use the Modification of Diet in Renal Disease (MDRD) Study Equation or the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.

CKD is generally diagnosed when there is evidence, for more than 3 months, of

- **kidney damage** (usually urine albumin > 30 mg/g creatinine, but includes other clinical findings such as hematuria, congenital malformations, etc.) and/or
- **decreased kidney function** (eGFR < 60 mL/min/1.73 m^2)

Staging

Staging systems for chronic disease should identify risk for progression and complications. The current staging system for CKD, based exclusively on eGFR, does not appear to reliably identify those people at greatest risk for progression. Emerging research suggests an approach that includes multiple factors, such as urine albumin, age, and diabetes status may better predict progression.

In addition, the current staging requires accuracy of eGFR above 60 mL/min/1.73 m^2. However, values above 60 calculated using the MDRD Study equation are not accurate. When using the MDRD Study equation, NIDDK encourages laboratories to report eGFR above 60 as age "≥ 60" rather than as numerical values. While the CKD-EPI equation has increased accuracy for eGFR values above 60 mL/min/1.73 m^2 compared to the MDRD Study equation, the influence of imprecision of creatinine assays on the uncertainty of an eGFR value is greater at higher eGFR values.

Although kidney function tends to decrease with age, this process has not been well investigated. Many people with age-related kidney function decline may not progress to kidney failure. Thus, the prognosis for a 75-year-old patient with an eGFR of 55 may be different than that for a 45-year-old patient with the same eGFR.

In addition, GFR may be too narrow a basis on which to assess risk for progression. The approach to staging is likely to evolve as it is informed by ongoing longitudinal research, e.g., the Chronic Renal Insufficiency Cohort Study.

Establish Cause of CKD

Because kidney damage is generally irreversible, it is important to identify the etiology as early as possible. Specific treatments are available in many cases (e.g., membraneous nephropathy, lupus nephropathy) and a diagnosis will guide management.

Although diabetes is the most common cause of CKD, it is important not to assume that a patient with diabetes and CKD has diabetic kidney disease. However, non-diabetic kidney disease is unlikely in a person with diabetes of long duration with other diabetic complications, physical findings of end-organ diabetic damage, and negative screening laboratory studies.

Suggested initial evaluation:

- complete urinalysis (U/A)
- urine albumin-to-creatinine ratio (UACR)
- creatinine with estimated GFR, blood urea nitrogen (BUN), electrolytes, glucose, calcium, phosphorus, albumin
- complete blood count (CBC)

For further evaluation, the following tests are often ordered, depending on clinical presentation:

- hepatitis B serology
- hepatitis C serology
- antinuclear antibody test (ANA)
- rheumatoid factor (RF)
- complement 3 (C3)
- complement 4 (C4)
- serum protein electrophoresis (SPEP) and urine protein electrophoresis (UPEP) (in patients over the age of 40)
- renal ultrasound to measure kidney size and to check for echogenicity and hydronephrosis
- dilated retinal exam

If a patient with diabetes has retinopathy, albuminuria, and negative screening tests listed above, it is reasonable to assume the diagnosis is diabetic kidney disease. Patients who do not conform to these criteria should be discussed with a nephrologist.

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Additional Links

- Quick Reference on UACR and GFR (PDF, 150.98 KB)
- Making Sense of CKD—A Concise Guide for Managing Chronic Kidney Disease in the Primary Care Setting (PDF, 3.66 MB)

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