10.9 Chronic Kidney Disease (CKD) in Adults Clinical Practice Guideline

This guideline is intended to assist the practitioner in clinical decision-making and attempt to define clinical practices that apply to most patients in most circumstances. The treating practitioner should make the ultimate decision regarding the care of a particular patient.

Goals

1. Evaluate all individuals during health encounters to determine whether they are at increased risk of having or of developing CKD.
2. Provide clinical evaluation of patients at increased risk of CKD.
3. Treat reversible factors through improving cardiovascular outcomes.

Clinical Highlights and Recommendations

A. Definition

CKD can be defined as:
1. Kidney damage for > 3 months, as defined by structural or functional abnormalities of the kidney, with or without glomerular filtration rate (GFR), manifest by either:
   - Pathological abnormalities; or
   - Markers of kidney damage, including abnormalities in the composition of the blood, urine, and abnormalities in imaging tests.
2. GRF <60 mL/min/1.73m2 for > 3 months, with or without kidney damage.

B. Causes and Risk Factors

The most common cause of renal failure is diabetes.
Individuals at increased risk of CKD include:
- Aged > 60
- African Americans, Native Americans, Asian-Americans
- Patients with diabetes or hypertension
- Family history of kidney disease

Disease Risk for Chronic Kidney Disease (CKD)

Type of Risk Factor	Definition	Examples
Susceptibility Factors	Increased susceptibility to kidney damage	Older age, family history of CKD, reduction in kidney mass, low birth weight, racial or ethnic minority status and low income/education
Initation Factors	Directly initate kidney damage	Diabetes, high blood pressure, autoimmune diseases, systemic infetions, urinary tract infections, urinary stones, lower urinary tract obstruction, drug toxicity and hereditary diseases

Progression Factors	Causing worsening kidney damage and faster decline in kidney function after initiation of kidney damage	Higher levels of Proteinuria, higher blood pressure level, poor glycemic, possible dyslipidemia and smoking
End-stage factors	Increase morbidity and mortality in kidney failure	Lower dialysis dose (kt/V), temporary vascular access, anemia, low serum albumin, high serum phosphorus and late referral

C. Stages of CKD

The presence of CKD should be established, based on presence of kidney damage and level of kidney function (glomerular filtration rate (GFR), irrespective of diagnosis. Among patients with CKD, the stage of disease should be assigned based on the level of kidney function.

Stage	Description	GFR (mL/min/1.73m^2)
1	Kidney damage with normal or high GFR	≥90
2	Kidney damage with mild GFR	60 - 89
3	Moderate GFR	35 - 59
4	Severe GFR	15 - 29
5	Kidney Failure	<15 (or dialysis)

D. Clinical Evaluation

Laboratory testing is essential in detecting early stages of CKD. Treatment of earlier stages of CKD is effective in slowing the progression toward kidney failure.
End-stage Renal Disease (ESRD) occurs when the kidneys are no longer able to function at a level that is necessary for day to day life. Chronic renal failure usually worsens to the point where kidney function is less than 10% of normal. By this time kidney function is so low that without dialysis or kidney transplant, complications are multiple and severe. Death will occur from accumulation of fluids and waste products in the body.

1. Glomerular Filtration Rate (GFR)

Estimates of glomerular filtration rate (GFR) are the best overall indices of the level of kidney function. Obtain at least yearly measurements of serum creatinine for estimation of GFR. The serum creatinine concentration alone should not be used to assess the level of kidney function. The rate of GFR decline should be assessed to predict the interval until the onset of kidney failure.

The level of GFR should be estimated from prediction equations that take into account the serum creatinine concentration and some or all of the following variables: age, gender, race, and body size. The following equations provide useful estimates of GFR:

- In adults, the modification of diet in renal disease (MDRD) Study and Cockcroft-Gualt equations.
- Clinical laboratories should report an estimate of GFR using a prediction equation, in addition to reporting the serum creatinine measurement.
- Autoanalyzer manufacturers and clinical laboratories should calibrate serum assays using an international standard.

2. Proteinuria

Normal individuals usually excrete very small amounts of protein in the urine. Persistently increased protein excretion is usually a marker of kidney damage. Guidelines for detectio and monitoring of proteinuria in adults and children differ because of differences in the prevalence and type of chronic kidney disease.

Guidelines for Adults

- When screening adults at increased risk for chronic kidney disease, albumin should be measured in a spot urine sample using either:
  - Albumin-specific dipstick;
  - Albumin-to-creatinine ratio.
- When monitoring proteinuria in adults with chronic kidney disease, the protein-to-creatinine ratio in spot urine samples should be measured using:
  - Albumin-to-creatinine ratio;
  - Total protein-to-creatinine ratio is acceptable if albumin-to-creatinine ratio is high (>500 to 1,000 mg/g).

Guidelines for Patient with CKD

- Serum creatinine to establish GFR.
- Protein-to-creatinine ratio or albumin-to-creatinine ratio in a first morning or random untimed "spot" urine specimen.
- Examinations of the urine sediment or dip stick for red blood cells and white blood cells.
- Imaging of the kidneys usually by ultrasound.
- Serum electrolytes (sodium, potassium, chloride, and bicarbonate).

E. PreventionPrevention

Historically, the evaluation and management of chronic kidney disease has focused on diagnosis and treatment of specific kidney diseases and dialysis or transplantation for kidney failure. Both type 1 and type 2 diabetes cause chronic kidney disease. Because of the higher prevalence of type 2 diabetes, it is the more common cause of diabetic kidney disease. Diabetic kidney disease usually follows a characteristic clinical course after the onset of diabetes, first manifested by microalbuminuria, then clinical proteinuria, hypertension, and declining GFR. An action plan for patients with chronic kidney disease also requires interventions during the earlier stages of kidney disease, irrespective of the cause of kidney disease. This includes evaluation and management of comorbid conditions, slowing progression of kidney disease, cardiovascular disease risk reduction, preventing and treating complications of chronic kidney disease, and preparation for kidney replacement therapy.

Interventions proven to be effective include:

1. Strict glucose control in diabetes.
2. Strict blood pressure control.
3. Angiotensin-converting enzyme inhibition (ACE) and angiotensin-2 receptor blockade (ARB) therapy.
4. Periodically assessment of central and peripheral neurologic involvement.
5. Evaluation for anemia which should include measurement of hemoglobin level.
6. Assessment of dietary protein, nutritional status and energy balance (amount of energy ingested related to the amount of energy expended).
7. Evaluation for bone disease and disorders of calcium and phosphorus metabolism.
8. Establish a baseline and monitor changes in function and well-being.
9. Over time establish interventions and assess their effectiveness.

Based on:
National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF KDOQI TM) or KDOQI TM Executive Summary

The guideline in its entirety can be found at:
http://www.kidney.org/professionals/kdoqi/guidelines.cfm

Adopted by the Quality Medical Management Committee (QMMC) November 2008.