



Diabetic Kidney Disease
AADE Practice Advisory
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Major risk factors for kidney disease include high blood pressure, diabetes, cardiovascular disease and family history of kidney failure. Additional risk factors include obesity, autoimmune diseases, urinary tract infections, systemic infections, and kidney loss, damage, injury or infection. Diabetes is the leading cause of kidney failure, accounting for 44% of all new cases of kidney failure in 2008.¹ Duration of diabetes before signs of diabetic kidney disease (DKD) and subsequent progression of DKD are similar in type 1 and type 2 diabetes.² Over the past quarter-century, both type 2 diabetes and end-stage renal disease (ESRD) attributable to diabetes have become global pandemics. Greater awareness and earlier diagnosis of DKD, along with more routine application of renoprotective management practices, now appear to be reversing this trend—offering hope of further reduction in diabetes-related ESRD.³ Adding to the difficulty of defining the specific impact of DKD in any individual patient is the reality that those with diabetes also risk other causes of kidney disease. Thus, a key step in evaluating each patient with diabetes and kidney disease is to determine whether diabetes is the cause or to identify other modifiable factors contributing to kidney disease. In most patients with diabetes, chronic kidney disease (CKD) may be attributable to diabetes if albuminuria and retinopathy are present and a screening evaluation for non-diabetic causes is negative.⁴

Substantial underdiagnosis of both diabetes and chronic kidney disease (CKD) leads to lost opportunities for prevention, and inadequate or inappropriate care of patients with diabetes and CKD may contribute to disease progression.⁵ Despite the growing burden of kidney disease due to diabetes, patients are inadequately educated about the kidney complications of diabetes and as a result outcomes suffer. Less than 20% of people with moderate to severe kidney disease are aware of their condition.⁶ Even among patients followed by a nephrologist, educational gaps are large with almost one third of patients acknowledging they do not understand their diagnosis, potential complications, or treatment options.⁷ There are great

opportunities for diabetes educators to address this educational deficiency and promote self-management.

Reducing the burden of kidney disease due to diabetes requires intervention early in the course of disease, well before referral to a nephrologist. Life style, nutritional, and pharmacologic interventions are effective in slowing the progression of kidney disease even in those with diabetes and may prevent or delay the development of complications and need for renal replacement therapy (dialysis or transplantation).² As trusted providers of information and advice on self-management, diabetes educators are in a unique position to assist patients in coping with the fear and complexity of kidney disease. Appropriate care for patients diagnosed with DKD requires collaborative, interdisciplinary care involving the full spectrum of healthcare professionals in the primary care. Collaborative management by primary care providers and consultants can maintain continuity of care and improve outcomes. Diabetes educators play a significant role in identifying and educating patients about diabetic kidney disease and its management.

Recommendations

1. Identify CKD due to diabetes and educate the patient about their kidney test results. Identify and monitor people with diabetes and kidney disease.²

- Assess and monitor estimated glomerular filtration rate (eGFR) and urine albumin-to-creatinine ratio (UACR).⁸
 - eGFR estimates kidney function.
 - Persistent levels < 60 are considered CKD.
 - UACR > 30 mg/g is considered as kidney damage.
 - An elevated UACR should be confirmed in the absence of urinary tract infection with 2 additional tests collected over the next 3 to 6 months.
 - Patients with high levels of urine albumin, also known as albuminuria, are at greatest risk of rapid progression to kidney failure.⁹
 - Other common names for UACR include microalbumin, urine albumin, albumin-to-creatinine ratio and microalbumin/creatinine ratio.

2. Slow the progression of DKD.

- Blood pressure control is key to slowing progression.²
- Limit dietary sodium to 1500 – 2400 milligrams per day
 - Do not replace salt with salt substitutes such as potassium chloride.
 - Lower sodium products may use potassium chloride in place of salt.
- Recommend protein intake of 0.8 - 1gm/kg per day.¹⁰
- Medications such as angiotensin converting enzyme inhibitors and angiotensin receptor blockers affect the renin-angiotensin-aldosterone system (RAAS) and increase risk of hyperkalemia.
 - Monitor serum potassium levels.

- Limit dietary potassium when serum level is elevated.
 - Control blood glucose.
 - The A1C goal is individualized. Good control of newly diagnosed diabetes may delay the onset or progression of CKD.
 - Tight control in diabetes of long duration may not slow progression.¹¹
 - An unexplained improvement in glucose control may reflect CKD progression.
 - Insulin requirements may be lower due to reduced insulin clearance by the kidneys.
 - Treat hypoglycemia appropriately.
 - Use low potassium juice (such as apple or cranberry as opposed to orange) when hyperkalemia is present.
 - Reduce urine albumin, an indicator of kidney damage.^{12, 13}
 - Medications that affect the RAAS (ACE inhibitors and ARBs) may lower urine albumin.
 - Lower dietary sodium, planned weight loss, lower protein intake, tobacco cessation may help lower albuminuria.
 - Treat risk factors for cardiovascular disease, the leading cause of mortality for people with CKD.¹⁴
 - Treat dyslipidemia.
 - Nontraditional risk factors are important in CKD and should be evaluated and managed. They include:
 - Anemia
 - Urine albumin
 - Abnormal mineral and electrolyte metabolism (calcium, phosphorus, and potassium)
 - Educate patients that the degree of risk of CV events or progression to ESRD increases as albuminuria levels rise, and as eGFR falls.
3. Collaborate with the primary care provider (PCP) to identify and monitor CKD complications.
- Anemia may develop due to reduced erythropoietin synthesis by the kidneys.
 - Assess hemoglobin and iron indices.
 - Supplemental iron may be required.¹⁵
 - Hyperkalemia may develop earlier in people with diabetes.
 - Angiotensin converting enzyme inhibitors and angiotensin receptor blockers increase risk of hyperkalemia, however, the PCP may continue use due to their anti-proteinuric effect.
 - Limit dietary potassium when serum level is elevated.
 - Hypoalbuminemia is common and multifactorial in CKD.
 - The patient may report an aversion to meat as the eGFR declines. Evaluate protein and calorie intake.
 - Poor oral health is associated with inflammation and poor intake. Refer for dental care if appropriate.
 - Metabolic acidosis, defined as serum CO₂ < 22 mEq/L, may develop.
 - Maintaining serum CO₂ > 22 mEq/L may be beneficial.
 - Reducing animal protein intake may result in an increase in serum bicarbonate, as animal protein is a source of metabolic acids.
 - Acidosis may be treated with supplemental bicarbonate.

- Monitor blood pressure closely when sodium bicarbonate is used to treat acidosis.
 - Abnormal mineral metabolism and bone disease are common¹⁶
 - Monitor calcium, phosphorus, vitamin D, parathyroid hormone
 - Vitamin D supplementation may increase risk of hypercalcemia and hyperphosphatemia
4. Promote Self-Management
- Talk to patients about their kidneys, CKD, and their risk.
 - Communicate the importance of testing and how CKD is diagnosed.
 - Explain the progressive nature of CKD and the basics of treatment.
 - Begin to speak about dialysis and transplantation.

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