



AADE POSITION STATEMENT Diabetic Kidney Disease

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Introduction

Diabetic kidney disease (DKD) is a long-term complication of diabetes that has wide-ranging adverse effects. Providing education in diabetes self-management (DSM) education to reduce the risk of diabetic complications and to promote optimal health if complications do arise, are components of the American Association of Diabetes Educators' (AADE) 7TM Self-Care Behaviors.¹

A significant proportion (20%–40%) of all patients with diabetes (whether type 1 or type 2) will develop kidney disease, characterized by a progressive urinary excretion of albumin and declining glomerular filtration rate (GFR) estimated from serum creatinine (eGFR). The earliest sign of DKD is the presence of abnormal amounts of albumin in the urine (i.e., >30 mg/day, microalbuminuria), followed by gradual decline in GFR. Each year in the United States, more than 100,000 people reach end-stage renal disease (ESRD), or kidney failure, a serious condition in which the kidneys fail to remove sufficient body wastes to sustain life. DKD accounts for approximately 45 percent of all patients who develop ESRD.² African Americans, American Indians, and Hispanics develop diabetes, DKD, and kidney failure at rates higher than Caucasians.³

Despite these alarming numbers, *most* people with diabetes *do not* develop DKD or progress to kidney failure. Several key studies have demonstrated that in persons with diabetes, the onset of DKD may be preventable and progression to ESRD can be slowed. Achievement and maintenance of optimal blood glucose (BG) control, blood pressure (BP) normalization, and use of an angiotensin converting enzyme inhibitors (ACEs) and angiotensin receptor blockers (ARBs) are major components in the prevention of DKD and its consequences.⁴⁻⁶

This position statement provides diabetes educators with basic information about DKD and may serve as a guide for the educator to provide DKD education.

AADE maintains the following positions:

1. The diabetes educator is in a unique position to incorporate kidney education while providing continuity of self-management skills and education to patients.
2. Each person with diabetes and DKD needs a personalized education plan, which incorporates kidney content into the AADE 7TM Self-Care Behaviors.
3. Those patients who will require renal replacement therapy will be well-served by early DKD education and discussion about renal replace therapy options.

Background/Definitions

Diabetes mellitus leads the list of known causes of irreversible kidney failure.⁷ Duration of diabetes before signs of DKD and subsequent progression of DKD are similar in type 1 and type 2 diabetes.^{8,9} Over the past quarter-century, both type 2 diabetes and 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.¹⁰ 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 determination of whether diabetes *is* the cause of kidney disease. Toward that end, it is helpful to note that in diabetes there is more than a 95% correlation between diabetic retinopathy or retinal vascular disease and kidney disease. Therefore, it is unlikely that kidney disease is caused by diabetes in a patient with a normal retinal examination.

After five or more years of diabetes, the earliest change signaling DKD is an excretion of 30 to 299 mg of albumin per day termed microalbuminuria. When albumin excretion rises above 300 mg per day the proteinuria is called macroalbuminuria. Those with microalbuminuria who progress to macroalbuminuria are likely to deteriorate to ESRD. This sequence can be delayed or prevented by applying a regimen of renoprotection consisting of BG control, normalizing hypertensive blood pressures, correcting dyslipidemia, and restriction of dietary protein to 0.8 to 1.0 g per kg of body weight.¹⁰ In nonpregnant proteinuric diabetic patients, treatment with ACEs and/or ARBs in both type 1 and type 2 patients with microalbuminuria, delays progression to macroalbuminuria as well as progression of nephropathy. Elevated LDL cholesterol can effectively be treated with statins reducing the high risk of cardiovascular disease, the greatest cause of death in individuals with diabetes.¹¹ Concurrent life style modification including cessation of smoking, regular exercise, and weight reduction where applicable, facilitates the maintenance of health.

The course of kidney disease has been divided into five stages, with diagnostic and management guidelines for each, by the National Kidney Foundation Kidney Disease Outcomes Quality Initiative.¹¹ These stages are based upon estimated GFR (eGFR) as well as assessments of urine albumin, which can be another sign of kidney disease.

- Stage 1 CKD: may have evidence of kidney damage with a normal GFR.
- Stage 2 CKD: has kidney damage and a mild decrease in eGFR to 60 to 90 ml/min.

There are few symptoms in Stage 1 or 2 CKD, though there may be high blood pressure, blood or protein in the urine, a family history of kidney disease such as polycystic kidney disease, and higher than normal levels of creatinine or other wastes such as urea in the blood are common.

- Stage 3 CKD: reduced eGFR of 30 to 59 ml/min, anemia and early bone disease may be detected (and can be treated).

● Stage 4 CKD (severe): further reduction in eGFR of 15 to 29 ml/min; most patients have complaints of fatigue, difficulty sleeping at night, reduced concentrating ability, and a loss of sexual drive. Consultation with a nephrologist once Stage 4 CKD is evident, can delay the onset of ESRD, reduces overall treatment cost and improves the quality of care.¹²

Advice from a nephrologist may also assist in deciding to perform a kidney biopsy when there is doubt as to whether diabetes is responsible for nephropathy, especially in the absence of retinopathy, rapidly increasing proteinuria, and/or hematuria.

- Stage 5 CKD: overt kidney failure with an eGFR of less than 15 ml/min; symptoms can include continuous illness, nausea, itching, reversed sleep pattern (inability to sleep through the night while falling asleep during the day), muscle and fat loss, and orange-brown skin coloration.

While such staging systems might be useful to some, they do have limitations, specifically related to staging patients with an eGFR greater than or equal to 60 mL/min/1.73 m² (above which, due to imprecision in the measurement of serum creatinine in the near-normal range, eGFR becomes unreliable). An eGFR of less than 60 is an appropriate cut off for abnormal, and might be a sign of kidney disease, although age, race and albuminuria need to be taken into account. As people age, their GFR typically declines, although this process has not been well investigated. Thus, a 75-year-old person who has an eGFR of 55 may not require the attention needed by a 50-year-old person with the same eGFR. The current five-stage system could be modified in the future to better identify patients at greatest risk of progression, and kidney failure or ESRD.¹³

Recommendations

- Assess GFR and urine albumin excretion in adults with type 1 and type 2 diabetes yearly.^{11,14}

The urine albumin-to-creatinine ratio (UACR) should be used to assess the level of urine protein.

Monitoring changes in urine albumin can help providers assess treatment success, and can also serve as a valuable educational tool for patients.

- Many of the therapeutic interventions for DKD are similar to those required for optimal diabetes care (e.g., control of blood pressure and blood glucose, and use of ACE inhibitors or ARBs).

- The patient should be instructed on the importance of taking prescribed medications, eating a healthy diet, engaging in physical activity to maintain cardiac health, and engaging in other risk reduction behaviors. Concurrent lifestyle modification including cessation of smoking, and weight reduction, where applicable, facilitates the maintenance of health.

- Screen for co-morbid conditions (especially when eGFR is below 50 ml/min), discuss use of aspirin therapy, review immunization status (influenza, pneumococcal and hepatitis B) and provide immunization accordingly.

- Consider dietary modification (reduction in sodium, potassium, protein restriction).

- Educate patients about the progressive nature of DKD and refer to kidney organizations for further assistance and patient/family support.

Role of the Diabetes Educator

Diabetes educators can play a key role in educating patients about their risk for DKD, and the importance of engaging in ongoing monitoring and risk reduction behavior. Because of the need for multiple specialties, the patient can be at risk for receiving fragmented care. Thus, educating the patient/family about communicating with healthcare team members and ensuring that team members communicate amongst themselves will go a long way in reducing unfortunate communication problems.

Educating clients about diabetic kidney disease involves all members of the healthcare team. Collaboration facilitates sharing information about patient care and provides feedback for focusing on areas that require changes or improvements. The team, along with the patient, should develop clear goals and objectives, which should be reassessed on a regular basis. The patient's motivational level, health beliefs, and health literacy also need to be assessed so that the educator can provide counseling consistent with patient needs and abilities.¹⁵

The scheduling and purpose of laboratory tests (e.g., eGFR and UACR) used to monitor kidney function should be discussed and their relevance to the treatment regimen and medication explained. Client assessment of understanding of the purpose of medications, medication regimens, and dietary changes are vital to patient empowerment and fostering patient compliance.^{16, 17}

The following is an example of kidney education topics which can be incorporated into the AADE 7 Self-Care Behaviors content:

Kidney Education Topics: ¹⁷⁻²¹

1. Connection between diabetes and kidney disease

- What are the kidneys' functions?
- What is DKD?
- Why are you at risk?
- What are the benefits of early detection?
- What can you do about it?

2. Diagnosis

- What laboratory tests are involved in detecting and monitoring CKD?

3. Treatment

- How can we slow progression of kidney damage?
- What type of nutrition and lifestyle changes do you need to make?
- Where can you learn more? What are some organizations that can help?

5. Renal Replacement therapy

- What are the options in renal replacement therapy?
- What are the different types of dialysis?
- What are the different ways to get a kidney transplant?

References

1. Mulcahy K, Maryniuk M, Peeples M. et al. Diabetes self-management education core outcome measures. *Diabetes Educator*. 2003;29:780,790-791.
2. U.S. Renal Data System. *USRDS 2007 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States*, National Institutes of Health. 2007. http://www.usrds.org/adr_2007.htm. Accessed March 31, 2009.
3. www.kidneyurology.org/Library/KidneyHealth/KidneyDiseaseofDiabetes.php (accessed 1/28/08)
4. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New England Journal of Medicine* 1993;329:977-986.
5. Perkins BA, Ficociello LH, Kristen H, et al. Regression of microalbuminuria in type 1 diabetes. *New England Journal of Medicine*. 2003;348:2285-93.
6. American Diabetes Association, Inc. Implications of the United Kingdom Prospective Diabetes Study. *Diabetes Care*. 2002;25:S28-S32.
7. Centers for Disease Control and Prevention. National diabetes fact sheet: general information and national estimates on diabetes in the United States. 2005. http://www.cdc.gov/DIABETES/pubs/pdf/ndfs_2005.pdf. Accessed March 31, 2009.
8. Ritz E, Orth SR. Nephropathy in patients with type 2 diabetes mellitus. *N Engl J Med*. 1999;341:1127.
9. Ritz E, Stefanski A. Diabetic nephropathy in type II diabetes. *Am J Kidney Dis* 1996;27:167.
10. Friedman EA, Friedman AL. Is there really good news about pandemic diabetic nephropathy? *Nephrol Dial Transplant*. 2007;22:681-3.
11. KDOQI. KDOQI clinical practice guidelines and clinical practice recommendations for diabetes and chronic kidney disease. *Am J Kidney Dis*. 2007;49:S12-S154.
12. Levinsky NG. Specialist evaluation in chronic kidney disease: too little, too late. *Ann Intern Med*. 2002;137:542-543.
13. Bauer C, Melamed ML, Hostetter TH. Staging of chronic kidney disease: time for a course correction. *J Am Soc Nephrol*. 2008;19:844-846.
14. American Diabetes Association Clinical Practice Recommendations 2008. *Diabetes Care*. 2008;31:S29-S30.

15. Funnell MM, Brown TL, Childs BP et al. National standards for diabetes self-management education. *Diabetes Care*. 2008;31: S97–S104.
16. Hinson J, Riordan K, Hemphill D et al. Hypertension education: an important and neglected part of the diabetes education curriculum? *Diabetes Educator*. 1997;23:166-170.
17. National Kidney Foundation. “Are You at Increased Risk for Chronic Kidney Disease?” 2007. <http://www.kidney.org/atoz/pdf/atriskckd.pdf>. Accessed March 31, 2009.
18. National Kidney Foundation. “About Chronic Kidney Disease, A Guide for Patients and Their Families.” 2006. <http://www.kidney.org/ATOZ/atozItem.cfm?id=100>. Accessed March, 31, 2009.
19. National Kidney Foundation. “Quality of Life with Diabetes and Chronic Kidney Disease.” 2005. <http://www.kidney.org/Atoz/atozItem.cfm?id=188>. Accessed March 31, 2009.
20. American Association of Kidney Patients. 1999. www.aakp.org. Accessed March 31, 2009.
21. National Kidney Disease Education Program. 2009. www.nkdep.nih.gov. Accessed March 31, 2009.

Further Reading and Resources

American Association of Kidney Patients: www.aakp.org

National Kidney Disease Education Program: www.nkdep.nih.gov

Dirks JH, de Zeeuw D, Argarwal SC, Atkins RC, et al. Prevention of chronic kidney and vascular disease: Toward global health equity -the Bellagio 2004 Declaration." *Kidney International*. 2005;68:S1-S6.