THE EFFECTIVE PHYSICIAN

Diabetes Mellitus and Chronic Kidney Disease

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Background

Diabetes is the leading cause of chronic kidney disease (CKD) in the United States, as well as in the entire developed world. To help address this common and costly problem, the National Kidney Foundation recently released guidelines for the diagnosis and management of patients with diabetes and chronic kidney disease.

Conclusions

Approximately 7% of the U.S. population has diabetes mellitus; more than 90% of these patients have type 2 disease. The prevalence of diabetes, especially type 2, is increasing worldwide.

Disparities in the prevalence of diabetes in African Americans, Native Americans, and Hispanic Americans, and the increased rate of comorbidities of diabetes in older adults, emphasize the need for particular screening and treatment vigilance in these populations.

Diabetes accounts for roughly 45% of the prevalence of kidney failure in the United States; this is a dramatic increase from a reported 18% in 1980. Approximately 43% of U.S. diabetes patients have microalbuminuria, and 8% have macroalbuminuria. Microalbuminuria is defined as an albumin to urinary creatinine ratio of 30-300 mg/g, and macroalbuminuria is defined as a ratio of more than 300 mg/g.

The diagnosis of diabetic kidney disease (DKD) can usually be made with careful clinical and laboratory assessment, but kidney biopsy might be required to prove the presence of diabetic glomerulopathy. Macroalbuminuria—or microalbuminuria in a patient with type 1 diabetes for more than 10 years or diabetic retinopathy—is highly suggestive of DKD.

Patients with diabetes and CKD are at high risk for worsening of kidney disease and the development of major cardiovascular events. Treatment of the shared risk factors is important to reduce the likelihood of these complications.

Implementation

Screening for microalbuminuria should begin 5 years after the diagnosis of type 1 diabetes and at the time of diagnosis of type 2 diabetes, and be repeated at least annually.

Results of spot urine testing for albumin excretion can vary by up to 40%; a minimum of two out of three samples with concordant abnormal results is recommended in order to classify a patient as having DKD.

The measurement of serum creatinine and the calculation of estimated glomerular filtration rate should be performed annually in patients with diabetes; these data are most useful for the stratification of stage 3 (defined as a GFR of 30-60 mL/min) and worse DKD.

Patients with CKD without diabetic retinopathy or with rapidly declining kidney function, rapidly increasing proteinuria, refractory hypertension, active urine sediment, and/or a greater than 30% fall in glomerular filtration rate within 3 months of the initiation of an ACE inhibitor (or angiotensin II receptor blocker [ARB]) should be assessed for causes of CKD other than diabetes.

Hemoglobin A_{1c} levels should be targeted to less than 7%, regardless of the presence of CKD.

Patients with diabetes, hypertension, and CKD stages 1-4 should be treated to achieve a target blood pressure of less than 130/80 mm Hg with a regimen including an ACE inhibitor or ARB medication. The addition of a diuretic and/or other medications may be required to achieve blood pressure control.

Treatment of normotensive patients with DKD and macroalbuminuria should include an ACE inhibitor or ARB, and similar medications should be considered in patients with DKD and microalbuminuria. The treatment goal for this intervention is reduction in albuminuria.

The use of ACE inhibitors and ARBs in women with DKD who are not pregnant but are planning to become pregnant might improve outcomes for these women and their infants, but these medications should be discontinued as soon as a menstrual period is missed and/or after a positive pregnancy test.

A statin should be used to reduce the LDL cholesterol level to under 100 mg/dL in patients with diabetes and CKD stages 1-4. Treatment to a goal of under 70 mg/dL is also reasonable.

Routine monitoring of liver and muscle enzymes in patients with type 2 diabetes who are taking statins is not recommended in the absence of drug interactions, symptoms, or baseline liver and/or muscle abnormalities.

Dosage adjustments may be required for patients with moderate to severe kidney disease treated with fibric acid derivatives, fluvastatin, lovastatin, rosuvastatin, or simvastatin. No adjustment is needed for atorvastatin, bile acid sequestrants, ezetimibe, niacin, or pravastatin.

Patients with type 2 diabetes on maintenance hemodialysis should not have statin treatment initiated in the absence of specific cardiovascular indications. Prospective and observational data do not show a reduction in cardiovascular events with statin treatment in this specific patient population.

Dietary protein intake should be targeted to the recommended daily allowance of 0.8 g/kg of body weight per day in patients with diabetes and stage 1-4 CKD. Ideal body weight (body mass index of 18.5-24.9 kg/m^2) should be a goal for patients with diabetes and CKD.

Perinatologists and nephrologists should comanage pregnant patients with diabetes and CKD. Insulin should be used for glycemic control in pregnant women with CKD and diabetes.

References

National Kidney Foundation. KDOQI clinical practice guidelines and clinical practice recommendations for diabetes and chronic kidney disease. Am. J. Kidney Dis. 2007;49(suppl. 2):S10-180.

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Atrial Fib More Likely In Diabetic Patients

BY MITCHEL L. ZOLER
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ORLANDO — Patients with poorly controlled and long-standing diabetes were about twice as likely to develop atrial fibrillation as people without diabetes in a case-control study with a total of more than 2,000 people.

This finding comes from the first reported study to examine in detail a link between diabetes and atrial fibrillation (AF), Dr. Sascha Dublin said while presenting a poster at a conference on cardiovascular disease epidemiology and prevention sponsored by the American Heart Association.

Diabetes may be linked to an increased vulnerability to developing AF through chronic inflammation, diastolic dysfunction and left atrial enlargement, or by the link of diabetes with obesity, which can lead to obstructive sleep apnea, a disorder that may increase the risk for AF, said Dr. Dublin, a physician at the Veterans Affairs Puget Sound Health Care System in Seattle.

The study involved people enrolled in a large Seattle-area HMO who were aged 30-84 years, and included men with hypertension and women with or without hypertension. The analysis focused on 877 patients who were newly diagnosed with AF in October 2001–September 2003, and 1,336 controls selected as a stratified, random sample.

The overall prevalence of diabetes was 23% among the patients with AF and 18% among the controls, a difference that was not statistically significant. In an analysis that focused on the efficacy of hyperglycemia control and on the duration of diabetes, patients with diabetes for more than the median (7.8 years) as well as a hemoglobin A_{1c} level that was greater than the median (7.7%) were 2.1-fold more likely to have AF, compared with control individuals, a statistically significant difference. This analysis controlled for several possible confounders, including age, gender, calendar year, body mass index, and treatment for hypertension.

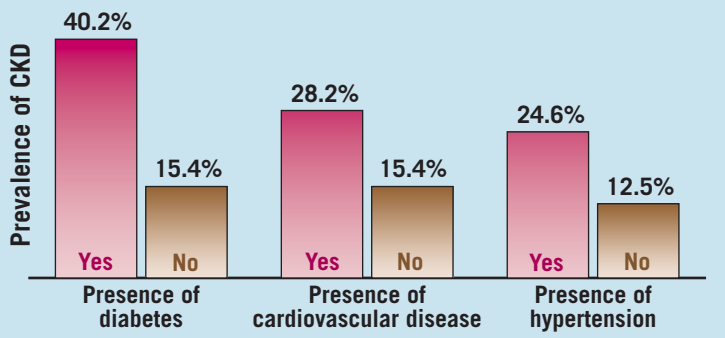
A second analysis of the prevalence of treated diabetes that controlled for all of these confounders as well as coronary artery disease and cardiovascular disease risk factors showed that patients with treated diabetes were significantly more likely to also have AF, compared with people without diabetes. Because this is the first evidence linking diabetes and AF, it's premature to make strong recommendations for revised patient management based on the findings, but it would be reasonable for physicians to have a heightened awareness for AF in patients with diabetes, especially if patients with diabetes present with new symptoms of fatigue, shortness of breath, or other symptoms of AF, Dr. Dublin said in an interview. Physicians should also be alert to the presence of heart-exam abnormalities in patients with diabetes and look for AF if an abnormality is found. It's also reasonable to screen patients with AF for diabetes with a fasting glucose test.

A possible link between diabetes and AF may also have treatment implications. It's currently not known whether any oral hypoglycemic medications affect AF. Some evidence exists that ACE inhibitors and angiotensin-receptor blockers, which are often used to treat diabetes, may decrease the risk of developing AF, but this possible effect needs further study.

Another issue to keep in mind is that β-blockers, a drug class that's often used for heart rate control in patients with AF, may worsen glycemic control in patients with diabetes. This also needs more study, Dr. Dublin said. ■

DATA WATCH

Chronic Kidney Disease More Often Comorbid With Diabetes Than With Cardiovascular Disease



Notes: Based on data from the National Health and Nutrition Examination Survey 1999-2004. Patients may have multiple diagnoses.
Source: Centers for Disease Control and Prevention

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