Screening and Treatment by the Primary Care Provider of Common Diabetes Complications

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KEYWORDS

- Microvascular complications • Diabetic retinopathy • Diabetic nephropathy
- Macrovascular complications • Diabetic peripheral neuropathy
- Cardiovascular disease

KEY POINTS

- Diabetes is the leading cause of end-stage renal disease, blindness, and nontraumatic lower-limb amputation.
- The largest reductions in cardiovascular events are seen when multiple risk factors such as hypertension, dyslipidemia, and hyperglycemia are addressed simultaneously.
- The benefit of aspirin as secondary prevention in patients with previous stroke or myocardial infarction has been well established.
- Regular, dilated eye examinations are effective in detecting sight-threatening diabetic retinopathy and have been shown to prevent blindness.
- The combined use of appropriate tools and clinical examination/inspection has been shown to provide greater than 87% specificity in the detection of diabetic peripheral neuropathy.
- Early treatment of risk factors, including hypertension, hyperglycemia, and dyslipidemia can delay or prevent diabetic nephropathy.

INTRODUCTION

Diabetes is the leading cause of end-stage renal disease, blindness, and nontraumatic lower-limb amputation. It is also a major cause of cardiovascular morbidity and mortality and the seventh leading cause of death in the United States. The economic cost of diabetes in the United States in 2012 was estimated to be $245 billion, of which $176 billion were direct medical costs related to diabetes.[1] Much of the disability and cost associated with diabetes are related to the care of chronic complications.

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Recent advances in knowledge, therapies, and technology have enhanced the ability to effectively care for patients with diabetes. In spite of these advances, patients with diabetes still experience suboptimal glucose, blood pressure, and cholesterol levels, putting them at risk for the development of acute and chronic complications.

CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD) is a major cause of morbidity and mortality in patients with diabetes mellitus and is the largest contributor to the direct and indirect costs of the disease. Patients with diabetes have a higher prevalence of coronary artery disease (CAD), a greater extent of coronary ischemia, and are more likely to have a myocardial infarction (MI).[2] In addition, patients with type 2 diabetes have a high rate of asymptomatic coronary disease and silent ischemia.[3] Recent evidence suggests an overall reduction in cardiovascular events in patients with diabetes mellitus.[4]

The largest reductions in cardiovascular events are seen when multiple risk factors, such as hypertension, dyslipidemia and hyperglycemia, are addressed simultaneously.[5,6] In all patients with diabetes, risk factors for CVD should be assessed on an annual basis. Patients with diabetes should have their blood pressure measured at every routine visit. Home blood pressure measurements may be useful in resolving discrepancies between office-based measurements and out-of-office values in selected patients. In addition to blood pressure screening, adult patients with diabetes should have a fasting lipid profile obtained on a yearly basis. Routine screening for CAD is not recommended in patients with diabetes who are asymptomatic. However, patients with typical or atypical cardiac symptoms or abnormal resting electrocardiogram are candidates for advanced or invasive cardiac testing. The effectiveness of computed tomography and cardiac MRI as screening tools for CAD in asymptomatic patients remains unclear.

The importance of glycemic control (hemoglobin A1c <7%) for the prevention of CVD has been established in patients with type 1 diabetes. The 9-year post-the diabetes control and complications trial (DCCT) follow-up trial, called the DCCT/Epidemiology of Diabetes Interventions and Complications (EDIC) trial, showed that participants previously randomized to the intensive arm of the DCCT had a 42% reduction in CVD and a 57% reduction in the risk of nonfatal MI, stroke, or cardiovascular death compared with those subjects in the standard arm.[7] The role of glycemic control for the prevention of CVD in patients with type 2 diabetes is not as clearly defined. Most of the randomized, clinical trials have not shown a beneficial effect of intensive glycemic control on macrovascular outcomes in patients with type 2 diabetes. In The UK Prospective Diabetes Study Group (UKPDS) trial there was a 16% reduction in cardiovascular complications in the intensive glycemic control arm, but the difference was not statistically significant.[8] Despite a loss of glycemic differences between the treatment and control groups, the long-term follow-up to the UKPDS showed a continued reduction in microvascular risk and emergent risk reductions for MI during the 10-year posttrial follow-up.[9] The veterans affairs diabetes trial (VADT), action to control cardiovascular risk in diabetes (ACCORD), and action in diabetes and vascular disease—preterax and diamicron modified release controlled evaluation (ADVANCE) trials were designed to compare the effects of intensive versus standard glycemic control on CVD outcomes in high-risk patients with established type 2 diabetes.[10–12] These long-term, randomized clinical trials failed to show the benefit of intensive control on cardiovascular outcomes.

Hypertension is a major risk factor for the development of CVD in patients with type 1 and type 2 diabetes. Several studies have shown that blood pressures greater than