
10. Hyperlipidemia and Hypertension

Patients with diabetes have accelerated atherosclerosis and an increased incidence of premature cardiovascular events. Epidemiologic studies and major clinical trials have shown that cardiovascular risk factors—including hypercholesterolemia, hypertension, and cigarette smoking—have an increased impact on the incidence and progression of cardiovascular events. These risk factors often coexist as key components of the metabolic syndrome. In particular, patients with type 2 diabetes have an increased prevalence of lipid abnormalities (>80%, based on current goals) and hypertension (>60%). Moreover, patients with type 1 diabetes that is accompanied by renal disease and those with type 2 diabetes that is poorly controlled have additional lipid abnormalities, including high triglyceride levels and low HDL cholesterol levels.

Because of the markedly increased risk of cardiovascular disease in patients with diabetes and the established evidence for improved outcome with optimal management, various clinical practice guidelines (of the American College of Physicians [ACP], the American Diabetes Association, the American Heart Association, and others), advocate stricter goals for such patients than for those without diabetes. According to available recent national statistics, however, the control of glycemia, blood pressure, and LDL cholesterol is not being achieved in most patients with diabetes.

Hyperlipidemia

Patients with diabetes are at high risk for cardiovascular disease, even in the absence of established coronary artery disease (CAD). Multiple studies have shown that lipid-lowering therapy in patients with type 2 diabetes leads to a 22% to 24% reduction in major cardiovascular events. The class of drugs whose use is supported by the best evidence is statins.

Although advisory bodies agree on the benefit of statins in reducing cardiovascular risk in diabetes, specific recommendations vary. For example, the National Cholesterol Education Program Adult Treatment Panel III (ATP III) recommends a goal of less than 100 mg/dL for the LDL cholesterol level in patients with diabetes. For patients with diabetes and CAD, ATP III recommends an even lower target of <70 mg/dL. Evidence from the Heart Protection Study and Collaborative Diabetes Atorvastatin Study (CARDS) supports the use of statins in patients with diabetes and CAD regardless of the baseline LDL cholesterol level. Similarly, ACP recommends that persons with diabetes take at least moderate dosages of statins but does not specify LDL cholesterol targets.

Combination therapy using a statin with either a fibrate or niacin to lower the level of triglycerides or raise the level of HDL cholesterol may be considered in high-risk patients, including those with CAD or multiple risk factors, but evidence regarding the risks and benefits of such an approach is lacking until the completion of ongoing clinical trials.

Statins and fibrates are contraindicated during pregnancy and lactation.

What are the lipid goals for patients with diabetes?

Although consensus has not been reached, the following lipid goals are reasonable for patients with diabetes:

- Lipid goals for adults with diabetes and no additional cardiovascular risk factors:
 - LDL cholesterol level <100 mg/dL
 - Triglyceride level <150 mg/dL
 - HDL cholesterol level >40 mg/dL in men and >50 mg/dL in women

- In patients age 40 years or older who have diabetes but no cardiovascular disease, consider pharmacologic therapy, preferably with a statin, to achieve an LDL cholesterol goal of <100 mg/dL. In patients younger than 40 years who have diabetes but no cardiovascular disease, consider pharmacologic therapy to achieve this goal if additional risk factors are present.
- In patients with diabetes and cardiovascular disease, consider pharmacologic treatment to achieve an LDL cholesterol goal of <70 mg/dL, regardless of age.
- Test annually, or more often if needed to achieve lipid goals.
- Refer to a dietitian for dietary and exercise counseling.
- If lipid-lowering medications are prescribed, provide written information about the name, dosage, timing, and side effects, as well as when to take for maximum effectiveness.
- Because of financial or other concerns, many patients choose to take one of their medications but not others. Stress the action and synergistic nature of multiple medications.
- Ask that patients contact you about side effects rather than stopping the medication.
- Provide instructions on how to handle forgotten and missed doses.

Lifestyle interventions to reduce lipid levels include reducing saturated fat and cholesterol intake, smoking cessation, weight loss (if indicated), and increased physical activity. Suggestions for helping patients make such changes are discussed in Chapter 5 (Helping Patients Make Lifestyle Changes) and Chapter 12 (Complications of Diabetes).

What do I need to teach patients about lipid management and diabetes?

- Stress the link between diabetes and heart disease. Although heart disease is the leading cause of death for people with diabetes, most patients do not recognize this as a complication of diabetes.
- Stress the importance of blood glucose management along with lipid management as a strategy to prevent heart disease.
- Provide information about lipid goals for people with diabetes and explain the importance of HDL cholesterol (levels should be high), LDL cholesterol (levels should be low), and triglyceride levels, along with specific strategies to improve each reading.

Hypertension

Improved blood pressure control in patients with diabetes markedly reduces cardiovascular events and overall mortality. The occurrence of microvascular complications, including retinopathy and renal disease, is reduced when blood pressure control is improved.

What are the blood pressure goals for patients with diabetes?

As with lipid management, organizations agree on the importance of treating hypertension in patients with diabetes, but they have minor differences in their specific recommendations. The ACP advocates a target blood pressure of no more than 135/80 mm Hg for persons with diabetes, whereas the 7th Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) recommends a target blood pressure of 130/80 mm Hg for such persons.

The JNC-7 emphasizes the importance of systolic blood pressure as a cardiovascular risk factor, particularly in persons older than 50 years. However, the optimal systolic blood pressure

target in patients with hypertension and diabetes is not known with certainty. The United Kingdom Prospective Diabetes Study (UKPDS) showed that lower risk occurs with a systolic blood pressure below 120 mm Hg, although no actual threshold was observed for any endpoint. For each 10 mm Hg decrease in systolic pressure, the study found a 12% reduction for any complications related to diabetes.

The minor differences in blood pressure target recommendations should be considered in the context of the fact that only 31% of persons in the United States with hypertension and diabetes have a blood pressure lower than 140/90 mm Hg.

- Blood pressure should be measured at each visit.
- Patients with diabetes often develop autonomic insufficiency. In patients with signs of end-organ damage and in those reporting dizziness, orthostatic blood pressure measurements should be monitored.

How do I treat hypertension in my patients with diabetes?

Lifestyle Interventions

In patients with systolic pressures of 130 to 139 mm Hg and diastolic pressures of 80 to 89 mm Hg, lifestyle and behavioral therapy may be attempted for 3 months, although some authorities believe the risk of hypertension in diabetes is so great that pharmacologic therapy should be instituted initially along with lifestyle modifications. (See Chapter 5, Helping Patients Make Lifestyle Changes.) Weight loss, salt restriction, and exercise are all important. The National Heart, Lung, and Blood Institute developed an excellent, effective diet known as the *Dietary Approaches to Stop Hypertension (DASH)* eating plan. If goals are not met, pharmacologic treatment should be instituted.

Pharmacologic Treatment

The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) found that high-risk patients, including patients with diabetes, have better cardiovascular outcomes when started on thiazide monotherapy rather than on an angiotensin-converting enzyme (ACE) inhibitor. However, nearly all patients with diabetes and hypertension will require the addition of an ACE inhibitor and an angiotensin II receptor blocker (ARB) to attain blood pressure goals.

ACE inhibitors and ARBs have been shown to provide renal protective benefits in diabetes. The ACP suggests a thiazide diuretic or an ACE inhibitor as a first-line agent for blood pressure control in patients with diabetes. ACE inhibitors and ARBs are contraindicated during pregnancy.

Consider referral to a nephrologist if any of the following are present:

- Lack of blood pressure control, despite multiple drugs
- A progressive decline in glomerular filtration rate
- Marked hyperkalemia

What do I need to teach patients about blood pressure management and diabetes?

Some steps to help patients with diabetes manage their blood pressure include:

- Stress the links between diabetes and hypertension, cardiovascular disease, and stroke.
- Stress the importance of blood pressure management and blood glucose management as strategies to prevent both the microvascular and macrovascular complications of diabetes.

- Provide information about blood pressure goals for people with diabetes and the importance of both systolic and diastolic readings.
- Refer to a dietitian for dietary and exercise counseling.
- If antihypertensive medications are prescribed, provide written information about the name, dosage, timing, and side effects, as well as when to take the drugs for maximum effectiveness.
- Because of financial or other concerns, many patients choose to take one of their medications but not others. Stress the action and synergistic nature of multiple medications.
- Ask that patients contact you about side effects rather than stopping the medication.
- Provide instructions on how to handle forgotten and missed doses.
- Are you having trouble paying for any of your medications?
- About how often do you miss taking your medications?
- Are you taking any vitamins or herbal or natural products?
- Do you have difficulty taking your medications? What specific problems have you encountered? What have you tried to solve this problem? What other options do you think may be effective?
- How well do you think your treatment plan is working to manage your cholesterol levels and blood pressure?
- Do you have any questions about your medications?
- How can I help most?

What should I ask patients about their lipid and hypertension medications at each visit?

Monitoring patients' compliance with their lipid and antihypertensive therapy should be part of each visit. Suggested questions to ask follow:

- Are you having any side effects? (Ask men specifically about erectile dysfunction as a side effect of antihypertensive agents.)

A handout that patients can use to record their test results and dates—along with their individualized treatment goals—is provided in Chapter 10 of the *Diabetes Care Guide Toolkit (Your Diabetes Test Record)*. Because this form contains personal medical information, patients must consciously decide who will have access to it. Also in the toolkit, *The ABCs to Good Diabetes Self-Care* lists the recommended frequency of essential examinations, immunizations, and medications. This tool includes a place to record self-management goals that you can discuss with the patient.

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