



Diabetes and Cholesterol

Cholesterol is a soft, waxy substance found in fats made by the liver and other organs and carried by the blood. Cholesterol plays an important role in forming cells, hormones, and other necessary tissues. Although cholesterol is made by the liver in the human body, it is also found in animal fats in meat, poultry, eggs, and dairy products. All foods that contain saturated and trans fats can raise blood cholesterol levels. High blood cholesterol is a major risk factor for heart and blood vessel disease.

When cholesterol levels are too high, some cholesterol gets deposited on the walls of the blood vessels. Over time, these deposits can build up and become hard lumps called plaque. This can cause the blood vessels to narrow, harden and decrease blood flow, possibly leading to other serious health risks including hypertension, problems with blood clotting, heart attack or stroke.

There are two main types of cholesterol. Low Density Lipoprotein (LDL) is known as the “bad cholesterol” and it can clog the arteries. High Density Lipoprotein (HDL) is the “good cholesterol” which transports some cholesterol back to the liver to be broken down. It is recommended to have lower LDL levels and higher HDL levels.

Triglycerides are another type of blood fat that acts as temporary storage units of fat. High triglyceride levels can also contribute to plaque formation in the arteries.

Diabetes and Cholesterol Connection

According to the American Diabetes Association, people with diabetes have higher rates of cholesterol abnormalities than the rest of the population and this contributes to the higher rates of heart disease in people with diabetes.

- Glucose (or sugar) attaches to LDLs in the blood. LDLs coated with glucose stay in the bloodstream longer. This causes sticky plaques to form and those with diabetes get more damage from these types of LDLs than those without diabetes. People with diabetes often have low levels of HDL and higher levels of triglycerides. Together these can raise the risk of heart attack or stroke.
- Cholesterol management aimed at lowering LDL cholesterol, raising HDL cholesterol and lowering triglycerides has been shown to reduce diseases of the major blood vessels and mortality rates in those with diabetes.

Cholesterol goals for those with diabetes

- LDL less than 100 mg/dL
- HDL more than 40 mg/dL men and more than 50 mg/dL women
- Triglycerides less than 150 mg/dL

The National Cholesterol Education Program’s Adult Treatment Panel III concluded that people with diabetes are at highest risk for cholesterol-related problems. The American Diabetes Association recommends that all people with diabetes have a fasting blood cholesterol test at least once per year.

How to make improvements in cholesterol levels

Lifestyle changes are your first line of defense in improving your cholesterol levels. Decreasing your fat intake, maintaining a healthy weight and increased physical activity have been shown as necessary tools to lower cholesterol levels.

Eat smart

Decreasing the amount of total fat, saturated fat, trans fats, and cholesterol you eat is a healthy first step. Diets low in saturated fats and cholesterol have been shown to decrease cholesterol levels. Saturated fat intake is the major dietary factor that affects cholesterol levels. Moderate weight loss is also beneficial in lowering elevated cholesterol levels. Five to ten pounds of weight lost can lower LDLs by as much as 5-10%.

The American Heart Association recommends to limit your saturated fats (those coming from animals) to less than 7% of your total daily calories; eat less than 200 mg of cholesterol per day and avoid trans fat in your diet.

Example: For a 2,000 calorie diet, saturated fat intake would be less than 16g

Substitutions to lower cholesterol and saturated fat intake:

- Use more egg whites than whole eggs (cholesterol is in the yolk)
- Choose lean meats such as turkey and chicken breast and leaner beef cuts such as sirloin, chuck, loin and round. Choose "choice" or "select" grades rather than "prime." Select lean or extra lean ground meat
- Try meatless meals a couple days a week.
- Low fat dairy products: skim or 1% milk, fat-free yogurt, reduced fat cheese, frozen yogurt instead of ice cream

Using monounsaturated and polyunsaturated fats may also help lower your cholesterol. Monounsaturated and polyunsaturated are found in olive, corn, canola, and safflower oils, nuts, and seeds. However, all fats are high in calories and can cause weight gain, so use in moderation. Fiber also helps lower cholesterol and is only found in plant-based foods like fruit, vegetables, beans, legumes, seeds, nuts and whole grains. It is recommended to eat 20-40 grams per day by the National Institute of Health.

Plant sterols and stanols can also significantly help lower your cholesterol. Small amounts of sterols and stanols occur naturally in vegetables, fruits, and whole grains. However larger amounts have been supplemented in certain cholesterol lowering spreads like Benecol™, Take Control™ and Smart Balance™ spreads.

Smaller, more frequent meals have been shown to decrease LDL cholesterol, in addition to help keep blood glucose levels more normalized. For further help with lowering cholesterol, talk to a registered dietitian at McKinley Health Center who can develop a personalized plan just for you.

Get moving

Being active will not only help lower your blood glucose-it will also help lower your cholesterol levels. Regular exercise is the best way to raise HDL cholesterol and it can help you lose weight if you are overweight or obese. Physical activity also strengthens the heart, and decreases blood pressure and stress. Talk to your McKinley provider before you begin any new exercise program.

The American Heart Association (AHA) recommends at least 30 minutes of **daily** aerobic exercise or 30-60 minutes four to six times per week for heart disease prevention. Aerobic exercise is any exercise which increases your heart rate and may include walking, jogging, swimming, biking, or whatever aerobic activities that you enjoy. The AHA also recommends weight training two to three times per week to strengthen the arms, shoulders, chest, trunk, back, hips, and legs. Those with pre-existing heart disease should discuss appropriate exercises with their doctor.

Cholesterol medication

If lifestyle changes are not enough to improve your cholesterol or triglyceride levels, then medications may need to be considered. Several medications are available now to help lower blood cholesterol. However, drugs do not replace the lifestyle changes that need to be made. Your doctor or diabetes educator can help you find the right balance.

The American Diabetes Association has developed medical guidelines for physicians to lower LDL cholesterol below 100 mg/dL. When diet and exercise are not enough to keep the LDLs < than 100 then statins are the drug of choice for those with diabetes.

There are 6 types of statins currently available on the market: Atorvastatin (Lipitor), Fluvastatin (Lescol), Lovastatin (Mevacor or Altacor), Pravastatin (Pravachol), Rosuvastatin (Crestor) and Simvastatin (Zocor).

The side effects associated with statin drugs **are usually mild. The most common side effects are muscle and stomach pain.** Statins and certain other cholesterol-lowering drugs may also increase the risk for liver problems. All people should have liver tests before and while they are using statin therapy. When taking statins with other drugs such as gemfibrozil, erythromycin, antifungal medications, nefazodone, cyclosporine or niacin, there is an increased risk for muscle aching and tenderness. Women who are pregnant or may become pregnant should not use statins. When statins are not effective, other drugs to lower LDL levels may be used.

Bile acid sequestrants are the second drug of choice for lowering LDL levels and raising HDL levels for those with diabetes. The bile acid sequestrates currently available include Cholestyramine (Prevalite, Questran, Questran Light), Colesvelam (Welchol) and Colestipal (Colestid). These drugs may interact with other drugs and can cause nausea and constipation. Blood glucose levels may be affected if you take these medications with the diabetes medication-glipizide.

Fibric Acid derivatives (also called fibrates) are another kind of medication which can lower triglycerides. Two fibrate drugs that are currently available are Fenofibrate (Tricor) and Gemfibrozil (Lopid). Common side effects from the fibrates are heartburn, stomach pain, diarrhea, skin rash, muscle pain, and gallstones. Fibrates can also thin your blood and can cause hypoglycemia in those taking repaglinide (Prandin). The second choice drug for lowering triglycerides is called nicotinic acid or niacin. They are the preferred agent in those with triglyceride levels over 250 mg/dl because the bile acid sequestrants may raise triglyceride levels. Niacin can also raise HDLs and lower LDLs, but it also can affect blood glucose levels.

Other side effects of niacin include skin flushing, gout, upset stomach, tiredness, diarrhea, and liver damage. Over the counter Niacin dietary supplements should never substitute prescription-strength niacin.

Another cholesterol lowering medication is called Ezetimide (Zetia) which can reduce LDL cholesterol, total cholesterol, triglycerides and increases HDL levels. Side effects of ezetimides include tiredness and stomach pain.

Your McKinley provider will determine which medication is appropriate for you if lifestyle modification is not enough to lower your cholesterol. For further information on cholesterol and diabetes call the Health Education Unit at 333-2714 to make an appointment with our Certified Diabetes Educator.

Reference

"Cholesterol and Diabetes" Diabetes Forecast, Supplement. American Diabetes Association. May, 2006
American Heart Association web site: <http://www.americanheart.org>

If you are a registered University of Illinois student and you have questions or concerns, or need to make an appointment, please call: **Dial-A-Nurse at 333-2700**

If you are concerned about any difference in your treatment plan and the information in this handout, you are advised to contact your health care provider.

Visit the McKinley Health Center Web site at: <http://www.mckinley.illinois.edu>