

NYSCHP

New York State Council of Health-system
Pharmacists

RESEARCH AND
EDUCATION
FOUNDATION



Cholesterol and Heart Disease

The Truth About High Cholesterol

Why all the national publicity about high cholesterol? National surveys estimate that about 20 percent (almost 38 million) of adult Americans have high cholesterol, one cause of coronary heart disease (CHD). CHD is a medical term that refers to a group of medical problems ranging from angina pectoris (chest pain) to a myocardial infarction (heart attack). You can also have CHD if, after a coronary angiogram, your doctor has told you that you have poor circulation in one of your coronary (heart) arteries. Almost 14 million Americans have some form of CHD, which accounted for \$259 billion dollars in direct and indirect medical costs in 1997.

Scientists have determined that many events (heart attacks, etc) caused by CHD are linked to buildup of cholesterol in the coronary arteries. High cholesterol is one of the risk factors associated with heart disease; the others being cigarette smoking, diabetes, high blood pressure, family history, low HDL cholesterol and obesity. This article will focus on the relationship between cholesterol and heart disease and what you can do to lower your risk of a coronary event.

Cholesterol is a soft, waxy substance found among the blood fats (lipids) and in every cell of your body. The body uses cholesterol to make cell membranes for growth and repair. Cholesterol is also used in the manufacturing of bile acids for digestion and in the synthesis of many of the body's hormones. Normally your body makes cholesterol in the liver to supplement dietary cholesterol. There are many mechanisms that regulate the manufacturing and metabolism of cholesterol. Many Americans are blessed with the capacity to eat a fatty meal, digest the fats and cholesterol, and not accumulate blood fats. Some of us, however, are not as fortunate.

A normal cholesterol level is considered to be less than 200 milligrams per deciliter (mg/dL) and levels above 240 mg/dL are considered to be high. Americans with high levels either consume too much dietary cholesterol or do not have the ability to use the cholesterol they make or eat. It is this population that is at greater risk for the

development of coronary artery disease. By adding one or more of the other risk factors previously mentioned, the risk increases astronomically.

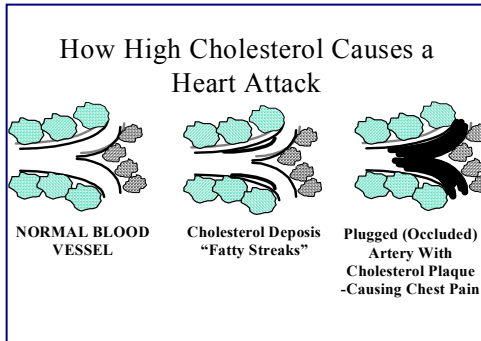
When you go to your doctor to have a fasting lipid profile drawn, three values are measured and two are calculated. First of all, you will receive a total cholesterol reading, which is a sum of all the various lipid components in your blood. Your doctor will also measure a triglyceride and HDL-cholesterol level. Triglycerides are made from the fatty foods you eat and are elevated if you have too much fat in your diet, eat too many sweets, are diabetic, or drink too much alcohol. HDL-cholesterol is made in the body and is also known as the "good cholesterol." The job of HDL is to circulate throughout the blood stream "sponging up" extra cholesterol and helping the body to prevent coronary heart disease.

From the cholesterol, triglyceride, and HDL-cholesterol measurement we calculate an LDL-cholesterol. This is also known as the "bad cholesterol" because it is responsible for the process of atherosclerosis (forming cholesterol plaques in coronary and other arteries). Depending upon your risk factor profile, your LDL-cholesterol target may be 100 mg/dL, 130 mg/dL or 160 mg/dL. Ask your doctor what level is your appropriate target. Some doctors calculate a ratio of the total cholesterol divided by the HDL-cholesterol. If this ratio is below 4.5 the first time it is measured, you are considered to be at low risk for CHD. However, a lowering of the ratio may not reflect a lowering of your coronary risk.

High levels of LDL-cholesterol begin to cause changes in the arteries beginning in the early 20s for men. As levels of LDL cholesterol remain high, the blood fat is changed by the body's defense mechanisms. This changed LDL becomes recognized as a foreign body, (like a virus) and is removed by the defense cells of the body by forming a fatty deposit on the walls of heart and other arteries. Over time these "fatty streaks" become more mature plaques. Eventually, these can bulge out and fill up the inside (lumen) of the heart arteries.

By the fourth decade of life, these lesions become more mature and have a cholesterol core surrounded by other tissue substances. This plaque can grow to the size where it fills (occludes) the inside of the artery and, like a hose nozzle, restricts the fluid trying to flow "through the pipe."

The picture below shows the development of a plaque to the stage where it causes stenosis (restricted flow) or occlusion of a coronary artery. This deprives the heart tissue of necessary oxygen flow and results in heart



tissue damage. When the heart is deprived of its nourishment, the result is intense chest pain (angina).

The occluding plaque theory does not explain all heart attacks. There are other causes, one of which is referred to as the "vulnerable plaque." This mature lesion can rupture and release LDL-cholesterol into the circulation. The release process can cause a clot to be formed on the wall of the blood vessel or block flow in the blood vessel. It has also been demonstrated that elevated levels of LDL-cholesterol cause the cells lining the blood vessel to function abnormally. When the body needs the blood vessel to open wider and provide more blood to the heart tissues, these "spastic" vessels will instead constrict and deprive the heart of oxygen. Medical names for the conditions associated with this process include unstable angina, acute coronary syndrome and myocardial infarction. It is still possible to have a heart attack despite a normal cholesterol level. This is likely due to the presence of other risk factors or inflammation that promote vessel wall instability or blood clotting. These risk factors include diabetes, cigarette smoking, and high blood pressure.

Why Treat High Cholesterol?

Recent large trials studying patients with high cholesterol have shown that using diet plus medications have reduced the amount of admissions for heart attacks and other procedures associated with coronary heart disease. Other population data shows that by simply controlling your coronary risk factors, you can reduce your risk of heart disease; meaning, if you have one of the previously mentioned risk factors, working with your doctor to change these (better sugar control, lowering high blood pressure, losing weight and following a low-fat diet) can reduce your risk for heart disease.

What About Age and High Cholesterol?

Should we be treating all of our seniors with high cholesterol? First we must divide our population into those adults who have never had a heart attack or any form of heart disease, and those adults who have had a coronary event. Scientific data shows that patients who have CHD or risk factors for CHD can benefit from preventative strategies up to the age of 84. Therefore, there are no rules defining "how old is too old" to treat and the decision should be based upon the patient's risk factors, other concurrent medical problems and an assessment of the patient's current life span and quality of life.

Do You Need to Take Medication?

The first approach to treating a patient with high cholesterol is to examine the person's lifestyle and implement changes as necessary. Eating habits are important and easily changed. The American diet is often loaded with saturated fat and excess calories. An average daily caloric requirement is 1800 calories for women and 2000 calories for men. If weight loss is your goal, consult with your physician or a dietitian to determine your ideal caloric requirements.

The American Heart Association recommends lowering your cholesterol intake to less than 300 mg per day. However, it is even more important to lower your intake of total fat. To simplify the equation, it is recommended to consume 30% of your total caloric intake as fat. This works out to be about 55-65 grams of fat per day for patients with an abnormal cholesterol value; for patients with both high cholesterol and triglycerides, 50 grams of total fat or less is desired.

Lowering your fat intake is now very easy. Most grocery stores sell "fat counter" books that list the amounts of fats contained in common foods. In addition, the new food label clearly highlights the total amount of fat in each portion size. The trick is to limit your portion sizes and not to go overboard.

Exercise is recommended for all seniors. Walking is encouraged at 15-30 minute intervals three times a week. Even low impact activities, if done daily, can help to reduce your risk. Examples include gardening, yard work, housework, dancing, and prescribed home exercise.

Eliminating cigarette smoking, both first and second-hand, is essential for lowering your heart attack risk. Moderate alcohol ingestion is desirable to prevent CHD. In general, two 12-ounce bottles of beer, two 4-ounce glasses of wine, or two 1 1/2-ounce shots of 80-proof spirits all contain the same amount of alcohol (one half ounce) and constitute the allotted daily amount... and no more.

The American Heart Association recommends a daily aspirin to prevent damage from a heart attack. Folic acid and Vitamin B supplements may also lower your risk of heart disease. Garlic may also lower cholesterol levels but the results are unpredictable. The scientific data no longer supports vitamins or vitamin cocktails such as Vitamin E, Beta-Carotene, Selenium and Vitamin C to reduce the risk of CHD.

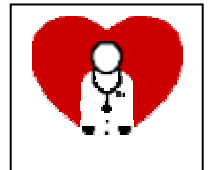
Medications to Lower Cholesterol

The newest class of drugs being recommended to treat high cholesterol are referred to as the HMG-CoA-Reductase Inhibitors, also commonly called 'statins.' The drugs in this class are Zocor[®], Mevacor[®], Pravachol[®], Lescol[®], and Lipitor[®]. They are very powerful tools in the battle against high cholesterol. They work by interfering with the body's cholesterol production and force the liver to take in more cholesterol from the blood, resulting in a lower cholesterol level. Other drugs include niacin (Niaspan[®]), bile acid resins (Colestid[®], Questran[®], and Welchol[®]), absorption blockers (Zetia[®]) and fibrates (Lopid[®] and Tricor[®]). These are often used in combination with the statins to lower cholesterol.

There are many advertisements and TV commercials promoting these medications. Each drug has its own risk of side effects, advantages, and disadvantages, and it is impossible to state that one is truly better than another. If diet and exercise alone does not lower your cholesterol to desired levels, you may need medication. However, this decision should be carefully made under the close supervision of your physician.

Summary

A lot of information has been written about high cholesterol, and each week a newflash is televised that places a different spin on the story. What is clear is that high cholesterol increases the risk for heart disease. By addressing cholesterol levels using diet and medications (if needed), you can control one of the important risk factors for CHD and reduce your likelihood of a coronary event.



This information was prepared by:

Kenneth A. Kellick Pharm.D.

Clinical Pharmacy Coordinator & Director of Buffalo VA Lipid Clinic

For more information about Heart Disease contact:

The American Heart Association at <http://www.amhrt.org> and

The National Heart Lung and Blood Institute at <http://www.nhlbi.gov>.

If you would like a clinical pharmacy practitioner to speak to your organization on this or any other medication-related topic, please contact the New York State Council of Health-system Pharmacists Research and Education Foundation at (518) 456-8819.