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Medical Encyclopedia: Cholesterol test

URL of this page: http://www.nlm.nih.gov/medlineplus/ency/article/003492.htm

Alternative names

Total cholesterol; Lipid test; Lipoprotein test; Lipid profile

Definition

A cholesterol test measures the amount of cholesterol and triglycerides in serum (part of the blood).

How the test is performed

Blood is drawn from a vein, usually from the inside of the elbow or the back of the hand. The puncture site is cleaned with antiseptic, and an elastic band or blood pressure cuff is placed around the upper arm to apply pressure and restrict blood flow through the vein. This causes veins to fill with blood.

A needle is inserted into the vein, and the blood is collected in an air-tight vial or a syringe. During the procedure, the band is removed to restore circulation and prevent bruising. Once the blood has been collected, the needle is removed, and the puncture site is covered to stop any bleeding.

Note that veins and arteries vary in size from one patient to another and from one side of the body to the other. Obtaining a blood sample from some people may be more difficult than from others.

The area is cleansed with antiseptic and punctured with a sharp needle or a lancet. The blood may be collected in a pipette (small glass tube), on a slide, onto a test strip, or into a small container. Cotton or a bandage may be applied to the puncture site if there is any continued bleeding.

How to prepare for the test

To get accurate results, you should fast for 9 to 12 hours before the test. The health care provider may advise you to stop taking drugs that can affect the test. (See "Special considerations.") You may drink water during the fast, but other beverages such as coffee, tea, or soda may affect results.

For infants and children:

The preparation you can provide for this test depends on your child's age and previous experiences. For specific information regarding how you can prepare your child, see the following topics:

- Infant test or procedure preparation (birth to 1 year)
- Toddler test or procedure preparation (1 to 3 years)
- Preschooler test or procedure preparation (3 to 6 years)
- Schoolage test or procedure preparation (6 to 12 years)
- Adolescent test or procedure preparation (12 to 18 years)

How the test will feel

When the needle is inserted to draw blood, some people feel moderate pain, while others feel only a prick or stinging sensation. Afterward, there may be some throbbing.

Why the test is performed

This test is often performed to evaluate risks for heart disease.

Cholesterol is an important normal body constituent, used in the structure of cell membranes, synthesis of bile acids, and synthesis of steroid hormones. Since cholesterol is water insoluble, most serum (the noncellular portion of blood) cholesterol is carried by lipoproteins (chylomicrons, VLDL, LDL, and HDL).

The term "LDL" usually refers to LDL-cholesterol and "HDL" means HDL-cholesterol. The term "cholesterol" usually means total cholesterol (VLDL + LDL + HDL). However, total cholesterol measurements are not used as much these days to determine risk for heart disease.

Chylomicrons are lipoproteins that are present shortly after a meal but disappear within about 2 hours in "normal" individuals.

Triglycerides are another component commonly measured in a lipid or cholesterol test. Triglycerides are compounds used by the body to move fatty acids (formed when fats or oils are consumed) through the blood. These fatty acids may be used by the body for energy or stored (as fat) for later use.

Excess cholesterol in the blood has been correlated with cardiovascular disease. High triglycerides are now associated with heart disease as well. LDL is sometimes referred to as "bad" cholesterol, because elevated levels of LDL correlate most directly with coronary heart disease.

HDL is sometimes referred to as "good" cholesterol since high levels of HDL reduce risk for coronary heart disease. This is because one of the functions of HDL is to take excess cholesterol to the liver for excretion in the bile. In fact, a high HDL (defined below) will take away one risk factor you may have for coronary disease.

Normal Values

In 2001, guidelines from the National Cholesterol Education Panel recommended that all lipid tests be performed after fasting and should measure all four cholesterol components: total cholesterol, HDL, LDL, and triglycerides.

The total cholesterol measurement, as with all lipid measurements taken at all laboratories, will be listed as milligrams per deciliter (mg/dL). In most cases, the higher your total cholesterol, the higher your risk for heart disease. A value of less than 200 mg/dL is desirable, placing you at less risk for heart disease. Levels over 240 mg/dL may put you at almost twice the risk of heart disease as someone with a level less than 200 mg/dL.

High LDL cholesterol levels may be the best predictor of risk of heart disease. If you have known heart disease, peripheral vascular disease (blockages in the blood vessels of the extremities), or diabetes, your LDL cholesterol should be below 100 mg/dL. If you have 2 or more heart-disease risk factors (smoking, high blood pressure, low HDL, a family history of heart disease, are a man over 45 or woman over 55), your LDL should be below 130 mg/dL. If you have none or 1 of the risk factors listed, your LDL cholesterol should be below 160.

HDL cholesterol levels more than or equal to 60 mg/dL will take away the increased risk from one risk factor and decrease your risk of heart disease. Levels below 40 mg/dL add a risk factor.

Triglyceride levels are also becoming an important predictor of risk for heart disease. Even if you have low LDL and high HDL cholesterol, high triglyceride levels may put you at risk. Normal triglyceride levels are less than 150 mg/dL and can be incorrectly elevated if a 9-12 hour fast was not completed.

It is important to discuss your results with your doctor to determine the best therapy given your risk factors and

lifestyle.

What abnormal results mean

High LDL, low HDL, and or high triglyceride levels may put you at increased risk for heart disease. By depositing in blood vessels, including the coronary arteries, these components may cause blockages (atherosclerosis) leading to a heart attack or cell death in legs or toes, requiring amputation.

Elevated cholesterol levels may be caused by:

- Biliary cirrhosis
- Familial hyperlipidemias
- High-cholesterol diet
- Hypothyroidism
- Nephrotic syndrome
- Uncontrolled diabetes

Low cholesterol levels may be caused by:

- Hyperthyroidism
- Liver disease
- Malabsorption (inadequate absorption of nutrients from the intestinal tract)
- Malnutrition
- Pernicious anemia
- Sepsis

Additional conditions under which the test may be performed:

- Arteriosclerosis of the extremities
- Familial dysbetalipoproteinemia
- Familial hypercholesterolemia
- Hypothyroidism; primary
- Hypothyroidism; secondary
- Type 1 or type 2 diabetes
- Primary biliary cirrhosis

What the risks are

- Excessive bleeding
- Fainting or feeling light-headed
- Hematoma (blood accumulating under the skin)
- Infection (a slight risk any time the skin is broken)
- Multiple punctures to locate veins

Special considerations

Pregnancy is usually associated with elevated cholesterol.

Removal of the ovaries may increase cholesterol levels.

Drugs that may increase cholesterol measurements include ACTH, anabolic steroids, beta-adrenergic blocking agents, corticosteroids, epinephrine, oral contraceptives, phenytoin, sulfonamides, thiazide diuretics, and Vitamin

D.

Drugs that may decrease cholesterol measurements include allopurinol, androgens, captopril, chlorpropamide, clofibrate, colchicine, colestipol, erythromycin, isoniazid, lovastatin, MAO inhibitors, neomycin, niacin, and nitrates.

Update Date: 6/1/2005

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