



Cholesterol: what about it?

Most people have now learned that a high cholesterol level in the blood is associated with an increased risk of coronary heart disease. They also know that in industrialised societies, such as Australia, the cholesterol level is higher than in non-industrialised societies, and that the cholesterol level parallels the prevalence of coronary heart disease. This is considered to be due to excess food intake, excess saturated fat (animal fat) in that food and reduced physical activity. A genetic inheritance also influences the level of cholesterol.

What is cholesterol?

Cholesterol is a fatty substance without which survival is impossible. Cholesterol is made from fats by the liver and then released into the circulating blood. Because fats and cholesterol are not soluble in water (or in blood), they are transported coupled with protein, which is soluble. Hence they are transported in the blood in the form of 'lipoprotein'. Lipoprotein particles consist of aggregated packages of various fats (triglycerides), cholesterol itself and protein.

The lipoprotein released from the liver is in the form of a large particle or package. As fats and oils are lighter than water, lipoprotein has a low density. If one spins blood in a centrifuge, the lowest density particles remain near the centre, while the higher density particles move outwards. Thus we have low density lipoprotein cholesterol (LDL), which is delivered through the blood to meet the needs of all tissues. This is the type of cholesterol considered to be dangerous.

Why is cholesterol harmful?

Too high an LDL cholesterol level is dangerous because some of the excess LDL cholesterol may be dumped into the walls of blood vessels. A high HDL cholesterol is good because it carries away excess cholesterol back to the liver.

Excess cholesterol is likely to be deposited under the lining of artery walls, particularly at bends and divisions in arteries. It may be seen as being forced into the walls of the artery, having passed between the inner lining cells of the artery wall. Once deposited, it changes in character (becoming oxygenated or denatured). This leads to attempts to remove it from the artery wall. Cells move in to remove it and changes occur in cells nearby.

Fatty 'foam' cells, filled with cholesterol, start breaking down, forming a lipid pool. Inflammation occurs with cells being attracted to the area to fight the foreign material. These cells can also produce fibrous tissues to seal off the cholesterol lipid deposit. Other cells soften the area in an attempt to remove the deposit. This is the basis for coronary and other artery diseases. Cholesterol deposits form plaques in the walls of arteries. Breakdown of a plaque leads to clotting in the artery and may thereby lead to heart attack or stroke.

How can you lower your cholesterol levels?

The first step in lowering LDL cholesterol is to reduce the intake of fat in the diet, particularly saturated or animal fats. Unsaturated or mono-unsaturated fats of vegetable origin do not raise the cholesterol level and hence are preferred. Weight loss also leads to lower LDL cholesterol. Regular physical activity, including walking, also helps. You can attend to these matters yourself and thereby acquire credits through delaying or preventing heart disease and stroke.

There are drugs now available, which are powerful and effective in lowering LDL cholesterol. Your doctor can attend to that, if your LDL cholesterol level is high. The most commonly used drugs are referred to as 'statins'. They interfere with the formation of LDL cholesterol in the liver so that the LDL cholesterol level falls rapidly. The drug needs to be continued long term; otherwise the LDL cholesterol level rises again. Statins have few adverse side effects. They can, however, sometimes interact with other drugs. If such an interaction occurs, the statin may be stopped and other older drugs may be used. Also there are new effective drugs being introduced and tested.

What do the numbers mean?

The amount of cholesterol in the blood is reported in the form of mmol/litre. When we are born, the total cholesterol level is about 3.0mmol/l. In rural areas of non-industrialised countries this level is maintained. In Australia the level rises over the years so that the average level for an adult Australian is 5.5mmol/l. This gradual rise is because we are over-nourished and eat too much saturated fat. The gradual rise is not normal; it is usual. Men have higher cholesterol than do women up to the menopause. The level in women then rises somewhat abruptly.

We have come to learn that the lower the total cholesterol level, the better for us. It used to be thought that we should all aim for less than 6.5mmol/l. In recent years we have learned that the level is better at less than 5.5mmol/l. Now we know that it is better if the level is less than 4.5mmol/l. In general we now believe the lower the cholesterol level, the better. However, there is no evidence to suggest that it would be best below 3.5mmol/l and nobody recommends that figure. That figure would take us back to the levels of infancy, to starvation and to recurrent infections. Remember that there is benefit from having a high HDL cholesterol, but that harm may come from a high LDL cholesterol. That is why both are usually measured or calculated and reported to your doctor by the pathology laboratory.

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