

CHOLESTEROL

INTRODUCTION

Cholesterol is a lipid (fat). It is manufactured by the liver from the fatty foods that we eat, and plays a vital part in allowing the body to function normally. Cholesterol is present in the membrane (outer layer) of every cell in the body. It insulates nerve fibres, and is an essential building block for hormones, such as the sex hormones, and the hormones of the adrenal cortex. It also enables the body to produce bile salts.

Cholesterol is carried in the blood by molecules called lipoproteins. There are several different lipoproteins, but the three main types are:

- **Low density lipoprotein (LDL).** This is often known as *bad cholesterol* and is thought to promote arterial disease. It carries cholesterol from the liver to the cells and can cause a harmful build-up if there is too much for the cells to use. Normally, the blood contains about 70% of LDL, but the level will vary from person to person.
- **High density lipoprotein (HDL).** This is often referred to as '*good cholesterol*', and is thought to prevent arterial disease. It takes cholesterol away from the cells and back to the liver, where it is either broken down, or is passed from the body as a waste product.
- **Triglycerides** are another type of fatty substance present in the blood. They are found in dairy products, meat and cooking oils. Triglycerides are also produced by the liver. Those who are overweight, have a diet that is high in fatty or sugary foods, or drink a large amount of alcohol, have an increased risk of having a high triglyceride level.

The amount of cholesterol present in the blood can range from 3.6 to 7.8 mmol/litre. A level above 6 mmol/litre is considered high, and a risk factor for arterial disease.

Evidence strongly indicates that high cholesterol levels can cause narrowing of the arteries (atherosclerosis), heart attacks, and strokes. The risk of coronary heart disease also rises as blood cholesterol levels increase. If other risk factors, such as high blood pressure and smoking, are present, the risk increases even more.

SYMPTOMS

High cholesterol is not a disease in itself, but it is linked to serious conditions, such as cardiovascular conditions (disease of the heart and blood vessels), angina, stroke, and mini-stroke, known as transient ischemic attack (TIA). A high level of cholesterol in your blood, together with a high level of triglycerides, can increase your risk of

developing coronary heart disease.

Coronary heart disease is caused by narrowing of the arteries that supply the heart with blood. This narrowing of the arteries is called atherosclerosis. Fatty deposits, such as cholesterol, cellular waste products, calcium and other substances build up in the inner lining of an artery. This build up, known as plaque, usually affects small and medium sized arteries. The flow of blood through the arteries is restricted as the inside diameter is reduced. Blood clots, which often happen in the coronary arteries during a heart attack, are more likely to develop when arterial walls are roughened by the build up of fatty deposits.

A high cholesterol level may only be revealed if you have symptoms of atherosclerosis. These can include:

- **Angina**, caused by narrowed coronary arteries in the heart,
- **Leg pain on exercising**, due to narrowing of the arteries that supply the lower limbs,
- **Blood clots and ruptured blood vessels**, which can result in a stroke or mini-stroke (transient ischemic attack (TIA)),
- **Ruptured plaques**, which can lead to a blood clot forming in one of the arteries delivering blood to the heart (coronary thrombosis), and may lead to heart failure if a significant amount of heart muscle is damaged, and
- **Thick yellow patches** (xanthomas) around the eyes or elsewhere on the skin. These are cholesterol deposits and can often be seen in people with inherited or familial cholesterol (where your family members have a history of high cholesterol).

CAUSES:

A number of different factors can contribute to high blood cholesterol:

1. *Lifestyle risk factors*

There are a number of preventable lifestyle-related risk factors that can increase your risk of developing high blood cholesterol. They include:

- **Unhealthy diet** - some foods contain cholesterol (known as dietary cholesterol) for example, liver, kidneys and eggs. However, dietary cholesterol has little effect on blood cholesterol. More important is the amount of saturated fat in your diet. Foods that are high in saturated fat include, red meat, meat pies, sausages, hard cheese, butter and lard, pastry, cakes and biscuits, and cream, such as soured cream and crème fraîche,
- **Lack of exercise or physical activity** - can increase your level of bad cholesterol (LDL), and decrease your level of good cholesterol (HDL),
- **Obesity** - if you are overweight you are likely to have an increased level of LDL and a decreased level of HDL, increasing your overall blood cholesterol level.

- **Smoking**, and
- **Drinking excessive amounts of alcohol** -the recommended amount is 3-4 units a day for men, and 2-3 units a day for women.

2. *Treatable risk factors*

- **Hypertension** (high blood pressure),
- **Diabetes**,
- **A high triglyceride blood level**, and
- **Medical conditions**, such as kidney and liver diseases, and an under-active thyroid gland.

3. *Fixed risk factors*

- **A family history of heart disease or stroke** - you are more likely to have high cholesterol if you have a close male relative (father or brother) aged under 55, or a female relative (mother or sister) aged under 65, who has been affected by coronary heart disease or stroke.
- **A family history of cholesterol related conditions** for example, if a close relative, such as a parent, brother, or sister has familial hypercholesterolemia, or combined hyperlipidaemia.
- **Being male**- men are more at risk of having high blood cholesterol than women,
- **Age**- the older you are, the greater the likelihood of developing atherosclerosis,
- **Early menopause in women**, and
- **Ethnic group** people who are of Indian, Pakistani, Bangladeshi, or Sri Lankan descent have an increased risk of high blood cholesterol.

If you have a fixed risk factor (or a number of fixed risk factors) it is even more important to ensure that you take steps to address any lifestyle, or treatable risk factors that you may also have.

DIAGNOSIS

To measure cholesterol, a simple blood test is often carried out. Before the test is done, you may be asked not to eat for 12 hours (usually including night time when you are asleep). This ensures that all food is completely digested and will not affect the outcome of the test. Your GP, or practice nurse, can carry out the blood test, and will take a sample either using a needle and a syringe, or by pricking your finger.

The blood sample that is taken during the blood test will be used to determine the amount of LDL (bad cholesterol), HDL (good cholesterol), and triglycerides in your blood. Blood cholesterol is measured in units called millimoles per litre of blood (mmol/litre). It is recommended that you have a total blood cholesterol level of less than 5mmol/litre, and an LDL cholesterol level of under 3mmol/litre.

Anyone can have their blood cholesterol level tested, but it is particularly important to

have it checked if:

- **You are aged over 40.**
- **You have a family history of cardiovascular disease** for example, if your father or brother developed heart disease, or had a heart attack, or a stroke before the age of 55, or if your mother or sister had these conditions before the age of 65.
- **A close family member has a cholesterol related condition**, such as familial hypercholesterolemia, or combined hyperlipidaemia.
- **You are overweight or obese.**
- **You have high blood pressure** (hypertension), or
- **You have a medical condition**, such as a kidney condition, an under-active thyroid gland, or acute inflammation of the pancreas (acute pancreatitis). This is because these conditions can cause an increased level of cholesterol.

In assessing your risk of cardiovascular disease, heart attack, or stroke, your cholesterol ratio should not be taken on its own. A number of lifestyle factors should also be taken into consideration. For example:

- Smoking.
- Diet.
- BMI (body mass index - your weight in relation to your height).
- Treatable risk factors, such as high blood pressure (hypertension) and diabetes, and
- Fixed risk factors, such as your age, sex, and ethnicity.

TREATMENT

If you have been diagnosed with high cholesterol, the first method of treatment will usually involve making some changes to your diet (adopting a low fat diet), and ensuring that you take plenty of regular exercise. After a few months, if your cholesterol level has not dropped, you will usually be advised to take cholesterol lowering medication.

DIET

Ensuring that you have a healthy diet by changing to one that is low in saturated fats can reduce your level of LDL or bad cholesterol. If you are in a high risk category of getting cardiovascular disease, altering your diet will not lower your risk. However, eating a healthy, balanced diet has many other health-related benefits as well as reducing your cholesterol level.

A healthy diet includes foods from all of the different food groups carbohydrates (cereals, wholegrain bread, potato, rice, pasta), proteins (for example, from lean meat, such as chicken and oily fish, like mackerel or sardines), and fats (varieties that unsaturated, such as low fat mono- or poly-unsaturated spreads, and vegetable or sunflower oil). You should also eat at least five portions of a variety of different fruit and vegetables each

day.

CHOLESTORAL LOWERING MEDICATION

There are several different types of cholesterol lowering medication which work in different ways. Your GP will be able to advise you about the type of treatment that is most suitable for you.

Commonly prescribed medication includes:

- **Statins** (HMG-CoA reductase inhibitors). Statins, such as simvastatin and atorvastatin, work by blocking the enzyme (chemical) in your liver that is needed for making cholesterol. Statins are used to reduce your cholesterol to less than 4 mmol/l and your LDL cholesterol to less than 2 mmol/l. They are therefore useful in preventing and treating atherosclerosis which can cause chest pain, heart attacks, and strokes. Statins sometimes have mild side effects which can include constipation, diarrhea, headaches, and abdominal pain.
- **Aspirin** may be recommended, depending on your age and a number of other factors. A low daily dose of aspirin can prevent blood clots from forming. (Children under 16 years of age should not take aspirin).
- **Niacin** is a B vitamin that is found in foods and in multi-vitamin supplements. In high doses, available by prescription, niacin lowers LDL cholesterol and raises HDL cholesterol. Minor side effects include flushing or tingling skin, itching, and headaches.
- **Other medications**, such as cholesterol absorption inhibitors (ezetimibe), and bile-acid sequestrants, are also sometimes used to treat high cholesterol. However, they may be less effective than other forms of treatment and have more side effects.

*(These medications are all available at Whelehan's pharmacy)

If you have high blood pressure (hypertension), your GP may also prescribe medication to lower it.

COMPLICATIONS

High cholesterol levels can be made worse by any other medical conditions you may have. Medical problems such as an under-active thyroid gland, an overactive pituitary gland, liver disease, or kidney failure, can all contribute to high cholesterol levels.

Some people have inherited disorders, such as familial hypercholesterolemia, or combined hyperlipidaemia, that prevent fats from being used properly and eliminated from the body. This allows the level of cholesterol to build up in the blood.

The major complications of raised blood cholesterol are heart attacks, strokes and arterial disease. The risks of all of these are increased if:

- You are overweight.
- Smoke.
- Have high blood pressure.
- You have a strong family history of these conditions, or
- You are diabetic.

PREVENTION

You can help prevent high blood cholesterol by eating a healthy, balanced diet that is low in saturated fat. Including a small amount of unsaturated fats in your diet can be a healthy choice, as this type of fat can actually reduce cholesterol levels. Current thinking is that the traditional Mediterranean diet, with its emphasis on raw olive oil in many foods, and low animal-fat content, is effective in ensuring cardiovascular health (the health of the heart and blood circulation).

Foods high in unsaturated fats include:

- Oily fish,
- Avocados,
- Nuts and seeds,
- Sunflower, rapeseed and olive oil, and
- Vegetable oils.