Hyperlipidaemia

Lipid is another word for fat. Lipids are easily stored in the body and serve as a source of energy. Cholesterol and triglycerides are lipids. When the concentration of triglycerides or cholesterol in your blood is too high, it is called hyperlipidaemia. Having a lipid level that is too high increases your risk of heart attacks and strokes. A healthy diet and medicines can help lower your lipid levels.

What is cholesterol?

Cholesterol is a fat chemical (lipid) that is made in the liver from fatty foods that we eat. A certain amount of cholesterol is present in the bloodstream. You need some cholesterol to keep healthy. Cholesterol is carried in the blood as part of particles called lipoproteins. There are different types of lipoproteins but the most relevant to cholesterol are:

- **Low-density lipoproteins carrying cholesterol - LDL cholesterol.** This is often referred to as bad cholesterol, as it is the one mainly involved in forming atheroma. Atheroma is the main underlying cause of various cardiovascular diseases (see below). Usually about 70% of cholesterol in the blood is LDL cholesterol but the percentage can vary from person to person.
- **High-density lipoproteins carrying cholesterol - HDL cholesterol.** This is often referred to as good cholesterol, as it may actually prevent atheroma formation.

See separate leaflet called Cholesterol for more details.

What are triglycerides?

Triglycerides are the main form of fat stored in the body. When you think of fat on your hips or stomach, you're thinking of triglycerides.

Triglycerides are the end product of digesting and breaking down the bulky fats that are present in our food. Any food we eat that isn't used for energy immediately - carbohydrates, fat, or protein - is also converted into triglycerides. They are bundled into globules and transported through the blood by lipoproteins, like cholesterol. The triglycerides are taken up by fat (adipose) cells, to be used for energy if food isn't available later.

What are normal levels of lipids?

Fat chemicals (lipids) are measured in millimoles per litre which is a measure of how concentrated they are in 1 litre of blood. It is usually written as mmol/L. The following levels are generally considered desirable. However, a doctor or nurse will advise on the level for you to aim for. They will consider any other diseases or risk factors that you may have (see later):

- Total cholesterol (TChol) - 5.0 mmol/L or less.
- LDL cholesterol after an overnight fast: 3.0 mmol/L or less.
- HDL cholesterol: 1.2 mmol/L or more.
- TC/HDL ratio: 4.5 or less. That is, your TChol divided by your HDL cholesterol. This reflects the fact that, for any given TChol level, the more HDL, the better.
- Triglycerides (TGs): 1.7 mmol/L or less after an overnight fast.
Generally, the higher the LDL cholesterol level, the greater the risk to health. However, your level of cholesterol has to be viewed as part of your overall cardiovascular health risk. The cardiovascular health risk from any given level of cholesterol can vary, depending on the level of your HDL cholesterol and on other health risk factors that you may have.

Why do I have hyperlipidaemia?

Hyperlipidaemia is often found when people are overweight or have an unhealthy diet. It can also be the result of drinking too much alcohol.

It can be something that you may have inherited through your family genes (known as primary) and approximately 1 person in 500 will have this cause.

It may be because of another medical condition that you may have, such as diabetes, when it is known as secondary. Other causes include:

- An underactive thyroid (hypothyroidism).
- Obstructive jaundice.
- Cushing’s syndrome.
- Anorexia nervosa.
- Nephrotic syndrome.
- Chronic kidney disease.

Some prescribed medicines can affect your cholesterol level, including:

- Thiazide diuretics (used to control blood pressure).
- Glucocorticoids (steroids).
- Ciclosporin (used after organ transplants).
- Antiretroviral therapy (used to treat HIV infection).
- Beta-blockers (used to control heart rate).
- The combined oral contraceptive pill.
- Atypical antipsychotics (used in some mental health problems).
- Retinoic acid derivatives (used in some skin conditions).

How common is hyperlipidaemia?

Hyperlipidaemia is quite common and is known to be a risk factor for cardiovascular disease such as heart attacks and strokes.

The UK population is known to have the highest average cholesterol levels in the world. Two out of every three people in the UK will have higher than recommended cholesterol levels.

What are atheroma and cardiovascular diseases?

Patches of atheroma are like small fatty lumps that develop within the inside lining of blood vessels (arteries). Atheroma is also known as...
inside lining of blood vessels (arteries). Atheroma is also known as atherosclerosis and hardening of the arteries. Patches of atheroma are often called plaques of atheroma.

Over months or years, patches of atheroma can become larger and thicker. So in time, a patch of atheroma can make an artery narrower. This can reduce the blood flow through the artery. For example, narrowing of the heart (coronary) arteries with atheroma is the cause of angina.

Sometimes, a blood clot (thrombosis) forms over a patch of atheroma and completely blocks the blood flow. Depending on the artery affected, this can cause a heart attack, a stroke, or other serious problems.

Cardiovascular diseases are diseases of the heart (cardiac muscle) or blood vessels. However, in practice, when doctors use the term cardiovascular disease they usually mean diseases of the heart or blood vessels that are caused by atheroma.

In summary, cardiovascular diseases caused by atheroma include angina, heart attack, stroke, transient ischaemic attack (TIA) and peripheral arterial disease. There are separate leaflets dealing with these.

In the UK, cardiovascular diseases are a major cause of poor health and the biggest cause of death.

How will I know if I have hyperlipidaemia?

Hyperlipidaemia is often found during routine screening when your doctor is trying to assess your risk of having heart attacks or strokes. This may be as part of an annual health check if you are over 40 years of age, or if you have a close relative who had these problems at a young age.

Usually, the diagnosis is made after a fasting blood test. Fasting means at least 12 hours when you have not eaten. You are allowed to drink water.

There are also changes that may be visible on your body if you have the inherited form of hyperlipidaemia:

- **Premature arcus senilis** - this is a white or grey ring that is visible when your doctor looks at the front of your eyes.
- **Tendon xanthomata** - these are hard nodules that you may find in the tendons of the knuckles and the Achilles (at the back of your ankle).
- **Xanthelasmas** - fatty deposits in the eyelids.

See separate leaflet called Familial Hypercholesterolaemia for more details.

What can I do to lower my lipid levels?

Changing from an unhealthy diet to a healthy diet can reduce a cholesterol level. However, dietary changes alone rarely lower a cholesterol level enough to change a person's risk of cardiovascular disease from a high-risk category to a lower-risk category. However, any extra reduction in cholesterol due to diet will help.

A healthy diet has other benefits too apart from reducing the level of cholesterol.

Briefly, a healthy diet means:

- **AT LEAST five portions, or ideally 7-9 portions, of a variety of fruit and vegetables per day.**
- **A THIRD OF MOST MEALS** should be starch-based foods (such as cereals, wholegrain bread, potatoes, rice, pasta), plus fruit and vegetables.
- **NOT MUCH** fatty food such as fatty meats, cheeses, full-cream milk, fried food, butter, etc. Use low-fat, mono-unsaturated or polyunsaturated spreads.
- INCLUDE 2-3 portions of fish per week, at least one of which should be oily (but, if you are pregnant, you should not have more than two portions of oily fish a week).
- LIMIT SALT to no more than 6 g a day (and less for children).
- If you eat red meat, it is best to EAT LEAN RED MEAT, or eat poultry such as chicken.
- If you do fry, choose a VEGETABLE OIL such as sunflower, rapeseed or olive.

Foods that contain plant sterols or stanols can reduce total blood cholesterol level and LDL cholesterol by about 10%. There does not seem to be much evidence, however, that this has an effect on preventing cardiovascular disease. The National Institute for Health and Care Excellence (NICE) therefore does not recommend that these products should be used routinely until more information is available.

What treatments are available?

If you are at high risk of developing a cardiovascular disease then medication is usually advised along with advice to tackle any lifestyle issues.
This usually means:

- Medication to lower your cholesterol or triglyceride level, usually with a statin medicine. There are several brands of statin medicines. They work by blocking a chemical (enzyme) which is needed to make cholesterol in the liver. See separate leaflet called Statins and Other Lipid-lowering Medicines for details.

There is no actual target level for people who do not already have cardiovascular disease. However, for those who do have a cardiovascular disease, the aim, if possible, is to reduce TChol to less than 4.0 mmol/L and LDL cholesterol to less than 2.0 mmol/L.

If it is only your triglyceride level that is high, you might be advised to take omega-3 acid or fibrate tablets instead of a statin. If your triglyceride level is more than 10.0 mmol/L your GP might advise you to see a specialist.

- Advice on lifestyle to reduce your risk of cardiovascular disease:
  - Stop smoking if you smoke.
  - Eat a healthy diet.
  - Keep your salt intake to under 6 g a day.
  - Keep your weight and waist in check.
  - Take regular physical activity.
  - Cut back if you drink a lot of alcohol.

Further reading & references

- Lipid modification - cardiovascular risk assessment and the modification of blood lipids for the prevention of primary and secondary cardiovascular disease; NICE Clinical Guideline (July 2014)
- Identification and management of familial hypercholesterolaemia; NICE Clinical Guideline (August 2008 - last updated July 2016)
- 2016 ESC/EAS Guidelines for the Management of Dyslipidaemias; European Society of Cardiology (2016)
- Lipid modification - CVD prevention; NICE CKS, October 2015 (UK access only)
- Report of the Joint British Societies for the Prevention of Cardiovascular Disease; JBS3, 2014

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