Reducing hyperlipidaemia and CHD

In the final article in our series on cholesterol, commissioned to prepare pharmacists for queries generated by the availability of over-the-counter simvastatin, Steve Ohlsen and David Rogers look at the health risks of abnormal lipid levels and the advice that pharmacists can give.

Coronary heart disease (CHD) accounts for 21 per cent of deaths in England and Wales and 24 per cent in Scotland. However, this disease is preventable and one way of reducing risk is to prevent or treat chronic risk factors such as hyperlipidaemia.

Hyperlipidaemia

Two thirds of men and women have blood total cholesterol (TC) levels over 5.0mmol/L. The prevalence of raised cholesterol increases with age. In men, the proportion with cholesterol levels over 5.0mmol/L increases from 23 per cent in those aged between 16 and 24 years to 82 per cent in those aged between 55 and 64. This compares with 27 per cent in women aged between 16 and 24 years and 91 per cent in those aged between 65 and 74.

The higher the TC and “bad” low-density lipoprotein (LDL) cholesterol, the higher the death rate from a heart attack. The higher the level of “good” high-density lipoprotein (HDL) cholesterol, the lower the risk of a heart attack.

Managing hyperlipidaemia in both primary and secondary care requires an understanding of how this condition is often linked to other CHD risk factors. In fact, many of these risk factors, such as hypertension, smoking and diabetes, are interrelated.

Diabetes

Hyperlipidaemias are common in patients with diabetes and further increase the risk of ischaemic heart disease, especially in patients with type 2 diabetes. The major chronic risk factors such as hyperlipidaemia. For example, the prevalence of angina, heart attack and stroke in Bangladeshi men in the UK is 9.9, 7.1 and 2.6 per cent, respectively, compared with the UK average of 5.3, 4.2 and 2.3 per cent.4 We also know that there is a three to five times higher prevalence of diabetes in Indian, Pakistani and Bangladeshi populations than in the white population in the UK. It would, therefore, be worthwhile to offer full lipid profiling and blood glucose testing to all members of Asian communities.

Pharmacists should also be aware that, according to Prodigy,4 coronary risk prediction charts have not been validated in some ethnic minority populations so may underestimate CHD risks. Therefore, for people originating from the Indian subcontinent it can be assumed that CHD risk is about 1.5 times higher than calculated from such charts.

Central abdominal obesity

We all know that people should aim to have a BMI less than 25 but it is now recognised that distribution of body fat is, perhaps, even more important in terms of CHD risk. For example, a waist to hip ratio of >0.91 is associated with a three-fold risk of CHD.5 This has been taken into account in the protocol for the sale of over-the-counter simvastatin (Zocor Heart-Pro). One of the self-reported risk factors that pharmacists can base a sale on is waist measurement, as follows:

- Men with a waist measurement over 40 inches (102cm)

However, multivariate analysis of the data strongly suggests that most of the relationship between body weight and CHD risk is mediated through hypertension, high TC, low HDL cholesterol and diabetes. So it has been questioned whether or not obesity is truly an independent risk factor for CHD. Nevertheless, if obesity induces several risk factors that are directly atherogenic, it could be a more significant cause of CHD than an independent risk factor alone.

Obesity is giving rise to an epidemic of type 2 diabetes across all social classes. In particular, central abdominal obesity is linked with insulin resistance, as are hypertension and abnormal TG levels. Insulin resistance is an impaired metabolic response to insulin. As a result, active muscle cells cannot take up glucose as easily as they should. In response, more insulin is produced, but this prevents fat cells from releasing energy. Hence weight loss can be difficult.

In addition to insulin resistance, atherogenic dyslipidaemia and a proinflammatory and prothrombotic state are also common in obese people.

Atherogenic dyslipidaemia

Atherogenic dyslipidaemia is a condition characterised by:

- Raised triglycerides
- Low HDL cholesterol
- High levels of small LDL particles

This profile is also known as the “lipid triad”. Small LDL particles have enhanced atherogenic properties and raised triglycerides commonly reflect the presence of remnant lipoproteins (complexes of fat and proteins), which are widely believed to be atherogenic.

This profile is particularly found in people from South Asia (eg, see Table 1). Therefore, race can also be considered a cardiovascular disease risk factor. For example, the prevalence of angina, heart attack and stroke in Bangladesh men in the UK is 9.9, 7.1 and 2.6 per cent, respectively, compared with the UK average of 5.3, 4.2 and 2.3 per cent.4 We also know that there is a three to five times higher prevalence of diabetes in Indian, Pakistani and Bangladeshi populations than in the white population in the UK. It would, therefore, be worthwhile to offer full lipid profiling and blood glucose testing to all members of Asian communities.

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Identify knowledge gaps

1. List three foods that may help reduce cholesterol levels.
2. Which ethnic group are most at risk of coronary heart disease?
3. When should statins be prescribed on the NHS?

Before reading on, think about how this article may help you to do your job better. The Royal Pharmaceutical Society’s areas of competence for pharmacists are listed in “Plan and record”, (available at: www.rpsgb.org/education). This article relates to “common disease states” and “health education and promotion” (see appendix 4 of “Plan and record”).
Pharmacists can help assess CHD risk by taking a waist measurement

- Women with a waist measurement over 35 inches (88cm)

Types of hyperlipidaemia

Hyperlipidaemias can be classified in terms of the lipid that is elevated (eg, hypercholesterolaemia, hypertriglyceridaemia or mixed hyperlipidaemia) or in terms of lipoprotein abnormality, evaluated by ultracentrifugation and electrophoresis. The latter classification is used by the World Health Organization and classifies “hyperlipoproteinaemias” into six types: I, IIa, IIb, III, IV and V.

Hyperlipidaemias can also be described as primary (as a result of a genetic defect) or secondary (as a result of a disease or drug therapy, eg, with thiazide diuretics or corticosteroids). Primary hypercholesterolaemia can be further classified as polygenic or familial. Polygenic hypercholesterolaemia (also known as WHO types IIa and IIb) has a lipid profile with TC greater than 6.5, LDL cholesterol greater than 4.0 and TG less than 2.3. Familial hypercholesterolaemia has a lipid profile with TC greater than 7.5, LDL cholesterol greater than 5.0 and TG less than 2.3. People with familial hypercholesterolaemia are at a high risk of ischaemic heart disease. Familial mixed hyperlipidaemia has a lipid profile including TC greater than 7.0 and TG greater than 2.3.

Advice for patients

The National Service Framework for CHD aims to reduce death rates from heart disease and related illnesses by at least 40 per cent by 2010. It defines risk thresholds for intervention as the likelihood of a CHD event occurring over 10 years.

Community pharmacists can help people reduce their risk of CHD, in conjunction with local GP surgeries. Helping people to reduce their cholesterol is a good way of doing so. The good news is that cholesterol can be reduced by lifestyle changes (eg, following a cholesterol-lowering diet, losing weight [if BMI>25], quitting smoking and increasing physical activity) or drug therapy.

Panel 1 lists some useful websites.

Lifestyle changes

Patients wishing to improve their lipid profile must do their best to change their lifestyle. This can be difficult for many people, but pharmacists can play a motivational as well as an advisory role. Offering periodic lipid testing can be a great motivational tool because people can see an improvement.

Cigarette smoking

Smoking is the number one cause of preventable deaths. It increases your risk of a heart attack by three-fold, lowers HDL cholesterol levels and increases blood pressure. However, this information can hold little weight with smokers and lipid profiling is valuable. It is typical for a person who gives up smoking to see a 10 to 20 per cent increase in their HDL cholesterol levels after three or six months — an indication that his or her cardiovascular health is improving.

Body mass index

Shedding excess weight can help raise HDL cholesterol and lower LDL cholesterol. (See PJ, 25 May, 2002, p720 for how pharmacists can contribute to obesity management.)

Panel 2: Dietary fats

Saturated fats

In Britain, approximately 14 per cent of people’s total calorie intake comes from saturated fat. These are found in animal products and some oils and contain three types of fatty acid:

- Palmitic acid (found in beef and pork and widely used in commercial baking) increases LDL cholesterol levels
- Myristic acid (found in dairy foods) raises LDL cholesterol
- Stearic acid (found in cocoa butter and beef) only marginally raises LDL cholesterol

Polyunsaturated fats

Polyunsaturated fats are liquid fats found in vegetable and fish oils. They contain two types of fatty acids:

- Omega-3 fatty acid (found in fish and fish oil supplements) lowers triglyceride and LDL cholesterol levels in patients on a fat-restricted diet, but may act to raise LDL cholesterol in patients with elevated triglycerides or lower HDL cholesterol in other patients
- Omega-6 fatty acid (found in common vegetable oils) helps to reduce TC and LDL cholesterol, but may also reduce “good” HDL cholesterol and contribute to weight gain

Monounsaturated fats

Monounsaturated fats are slightly saturated liquid fats found in plant oils such as canola, peanut and olive oil, and in most nuts (other than walnuts). Monounsaturated fats contain oleic acid. Foods containing monounsaturated fats are equally effective as vegetable oils in lowering LDL cholesterol levels but do not appear to increase HDL cholesterol.

Hydrogenated fats

Hydrogenated fats are unsaturated liquid fats with hydrogen added for the manufacture of products such as margarine and vegetable shortening. Hydrogenation makes the fats more solid and prevents spoilage. Foods containing hydrogenated fats, like those containing saturated fats, raise LDL cholesterol levels.

Eating saturated (and hydrogenated) fats increases cholesterol, which can end up on artery walls. Those found in meat, poultry, whole-milk dairy products, lard and coconut and palm oils are the worst offenders. HDL cholesterol reduces the build up of fatty plaques so it is desirable to increase intake of foods high in omega fatty acids. Panel 2 describes the various dietary fats.

The “Mediterranean diet” has been advocated in recent years, as a healthier diet. The risk of a heart attack in people on such a diet is about 50 per cent lower than in those on a UK diet. The Mediterranean diet is low in saturated fats and high in monounsaturated fat (eg, olive oil), fruit and vegetables, and oily fish. It also includes red wine. A moderate
Panel 3: Dietary tips for improving lipid profile

Soy Using soya as an alternative to meat and cheese helps reduce saturated fat intake. The US Food and Drugs Administration allows manufacturers to recommend a daily intake of 25g. There is some evidence that the isoflavones in soya help reduce LDL cholesterol. However, the evidence for the benefit of isoflavones supplements is weaker. It may be that isoflavones only lower cholesterol in the presence of other soy components, such as phytates.

Salmon Omega-3 fatty acids found in salmon help to lower LDL cholesterol and triglycerides and raise HDL cholesterol. Mackerel and sardines are also rich in omega-3 fatty acids.

Beans Beans are rich in soluble fibre. In the gastrointestinal tract this forms a gel that binds cholesterol, preventing absorption. It has been estimated that eating a cup of beans each day can lower cholesterol by 10 per cent in six weeks. However, tinned beans can be high in sodium.

Avocados and nuts Avocados are a good source of monounsaturated fat, which can help lower LDL cholesterol. They also contain beta-sitosterol and this reduces cholesterol absorption. However, people should be aware that avocados are calorie rich. You could suggest that another high fat food (eg, mayonnaise) is substituted with it. Nuts are also high in monounsaturated fat and they are a good source of vitamin E and magnesium. Again they are high in calories, so the key is to eat them in moderation (eg, three or four handfuls a week as a snack). Make sure that people realise that plain nuts are more healthy than salted ones.

Garlic There is some evidence that garlic lowers cholesterol and prevents cholesterol particles from sticking to arteries. Garlic also has anticoagulant, antihypertensive and anti-infective properties.

Cholesterol-lowering spreads Spreads that contain plant sterols have been shown to lower LDL cholesterol. They also contain beta-sitosterol and this reduces cholesterol absorption. However, people should be aware that avocados are calorie rich. You could suggest that another high fat food (eg, mayonnaise) is substituted with it. Nuts are also high in monounsaturated fat and they are a good source of vitamin E and magnesium. Again they are high in calories, so the key is to eat them in moderation (eg, three or four handfuls a week as a snack). Make sure that people realise that plain nuts are more healthy than salted ones.

Spinach There is some evidence that the lutein contained in spinach helps prevent atherosclerosis.

Tea Tea is a good source of antioxidants (flavonoids). This means that drinking tea can help to prevent oxidation of LDL cholesterol. It is best to drink green or black teas without milk — adding milk reduces antioxidant properties.

Red wine and chocolate Lowering cholesterol does not mean not enjoying yourself. For example, red wine has antioxidant properties, as does dark chocolate.