

High cholesterol

Cholesterol

Cholesterol is a type of fat produced by the liver. It is present in all human cells and forms part of the cell membrane. Cholesterol is also a constituent of various hormones in the body.¹

Cholesterol is carried through the blood by lipoproteins:

- Low-density lipoprotein cholesterol (LDL-C)
 - Also known as ‘bad’ cholesterol
 - Has a higher ratio of fat to protein
 - LDL-C can cause fatty deposits on the inside of artery walls, known as plaques, which narrow arteries making them less flexible (atherosclerosis)²
- High-density lipoprotein cholesterol (HDL-C)
 - Also known as ‘good’ cholesterol
 - Higher ratio of protein to fat
 - HDL-C helps carry excess cholesterol away from the blood²

Triglycerides (TGs) are the most common type of fat in the blood.² Excess TGs are transported to fat cells for storage.³

Dyslipidaemia and hypercholesterolaemia

Dyslipidaemia refers to an imbalance of fats in the blood, specifically elevated LDL-C and TGs, and reduced levels of HDL-C.⁴ Hypercholesterolaemia refers to high levels of cholesterol.⁵

Symptoms and diagnosis

Dyslipidaemia and hypercholesterolaemia have few clinical symptoms but are major risk factors in the development of cardiovascular disease (CVD).⁴ CVD is the world’s biggest killer, being the cause of 30% of all deaths.⁶

Dyslipidaemia is diagnosed by a blood test that measures the levels of total cholesterol, LDL-C, HDL-C and TGs in the blood.⁴

Treatment

The goal of treatment of dyslipidaemia and hypercholesterolaemia is to normalise blood lipids.

Lifestyle

Lifestyle changes, such as dietary changes to minimise intake of fat, saturated fat and cholesterol, and increasing physical activity, play an important part in treatment.⁷

But for some people lifestyle changes are not enough to reduce cholesterol. In such cases, the most commonly used drugs are statins.⁷ Other drugs that may be used include bile acid sequestering resins, cholesterol absorption inhibitors, fibrates and nicotinic acid.⁷

Quick facts

- Treatments that lower LDL-C and TGs and raise HDL-C are important
- Lifestyle changes and physical activity can play an important part in treatment⁷
- Statins may be used to help reduce cholesterol if lifestyle changes are not enough⁷
- Many patients do not achieve their lipid targets¹⁰ and persistence with statins can be poor¹²

Statins

Statins (or HMG-CoA reductase inhibitors) regulate the level of cholesterol in the body by:

- Blocking the enzyme that produces cholesterol in the liver
- Helping lower LDL-C and TGs
- Mildly assisting in raising HDL-C

Treatment targets

These depend on the patient but most doctors recommend an LDL-C less than 2.5mmol/L or a TC less than 4.0mmol/L.⁸

Side effects

Side effects associated with currently available statins may impact compliance, which may also affect patients reaching their treatment targets. Common side effects of statins include:⁹

- Headaches
- Muscle aches and pains
- Altered liver function
- Parasthesia
- Nausea and vomiting
- Flatulence and diarrhoea
- Abdominal pain

Combination therapy

For patients who do not achieve a lower LDL-C on statins alone, combination therapy may be considered as a secondary form of treatment. This includes the use of a statin in combination with either bile acid sequestrant (an absorption blocker), nicotinic acid or a fibrate.¹⁰

Lifestyle advice and statin therapy have delivered healthcare benefits, however, many patients do not reach their treatment targets¹¹ and persistence can be poor with statins.¹²

1. Mackay, J *et al.* Atlas of Heart Disease and Stroke. World Health Organization 2004. Geneva. 2. American Heart Association. What are high blood cholesterol and triglycerides? Available: <http://www.americanheart.org/downloadable/heart/119696589412413%20WhatareHBCholandTrig%209%2007.pdf>. Last accessed April 2011. 3. American Heart Association. Triglycerides. Available: <http://www.americanheart.org/presenter.jhtml?identifier=4778>. Last accessed April 2011. 4. Manrique CM, Rosenzweig JL, Umpierrez GE. Diabetes, Dyslipidemia, and Heart Protection. *J Clin Endocrinol Metab* 2009; 94: 0. 5. American Heart Association. Hyperlipidemia. Available: <http://www.americanheart.org/presenter.jhtml?identifier=4600>. Last accessed April 2011. 6. World Health Organization. Cardiovascular Diseases Fact Sheet 317, March 2013. Available at <http://www.who.int/mediacentre/factsheets/fs317/en/>. Accessed May 2013. 7. Medline Plus. High blood cholesterol and triglycerides. Available: <http://www.nlm.nih.gov/medlineplus/ency/article/000403.htm>. Last accessed April 2011. 8. Catapano AL, *et al.* EAS/EAS Guidelines for the management of dyslipidaemias. *Atherosclerosis* 2011; 217S: S1-44 9. National Institute for Health and Clinical Excellence. Statins for the prevention of cardiovascular events. Technology Appraisal 94. Available: <http://www.nice.org.uk/nicemedia/live/11564/33151/33151.pdf>. Last accessed April 2011. 10. National Cholesterol Education Program. Third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation and treatment of high blood cholesterol in adults (Adult treatment panel III) final report. *Circulation* 2002; 106: 3143-3421. 11. Kotseva K, *et al.* Cardiovascular prevention guidelines in daily practice: a comparison of EUROASPIRE I, II, and III surveys in eight European countries. *Lancet* 2009; 373: 929-940. 12. Perreault S, *et al.* Persistence and determinants of statin therapy among middle-aged patients free of cardiovascular disease. *Eur J Clin Pharmacol* 2005; 61: 667-674.