



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2018; 7(11): 103-106
© 2018 TPI
www.thepharmajournal.com
Received: 23-09-2018
Accepted: 25-10-2018

Chitra Prabhakar
Department of Food Nutrition
and Public Health, Ethelind
College of Home Science
SHUATS, Prayagraj, Allahabad,
Uttar Pradesh, India

V Paul
Department of Food Nutrition
and Public Health, Ethelind
College of Home Science
SHUATS, Prayagraj, Allahabad,
Uttar Pradesh, India

Lipid disorders

Chitra Prabhakar and V Paul

Abstract

Lipid disorders have a broad spectrum of metabolic conditions that affect blood lipid levels. They are generally characterized by elevated levels of cholesterol, triglycerides, and/or lipoproteins in the blood in association with an increased risk of cardiovascular disease. The majority of lipid disorders are common because of unhealthy lifestyles (obesity, inactivity, alcoholism). Congenital causes are less common; like familial hypertriglyceridemia, is associated with extremely high levels of triglycerides that significantly increase the risk of pancreatitis in human, and familial hypercholesterolemia that results early atherosclerotic complications. Lipid disorders are usually detected during the time of routine laboratory testing, such as cardiovascular risk factor screening. The blood lipid profile includes all total cholesterol, LDL, HDL, and triglycerides. A fasting lipid profile must show pathological values on two different occasions to confirm the diagnosis. Dyslipidemia is diagnosed if LDL levels > 130 mg/dL and/or HDL levels < 40 mg/dL. The management of lipid disorders involves lifestyle modifications and lipid-lowering agents (primarily statins).

Keywords: Lipid disorder, HDL, LDL, VLDL

Introduction

For fats in the blood Lipid is the scientific term, and it is used to describe fatty acids, neutral fats, waxes, and steroids. Fatty acids and cholesterol these are two main types of lipids that affect heart disease. When three fatty acid molecules combine with glycerol, they form triglycerides; when they combine with cholesterol, they makes cholesterol-esters; and combining with phosphorus makes phospholipids.

After ageing, coronary arteries can develop atherosclerosis, or hardening of the arteries, the buildup of fatty streaks and cholesterol-laden plaque in the artery walls. Coronary heart disease, or CHD, diagnosed when the accumulation of plaque in a coronary artery grows large enough to obstruct blood flow to the heart.

Lipids are insoluble in water. Cholesterol and fatty acids both are carried in the blood and used in cells, the body must use a kind of protein called apoproteins to transport the lipids through the blood and into the cells. These protein fats bound are called lipoproteins, and when physicians speak of lipid disorders, they tells about problems with the amounts of these lipoproteins in the blood. Each and every lipoprotein contains cholesterol, cholesterol-esters, triglycerides, phospholipids, vitamins, and apoproteins. Lipoproteins are grouped into different classes based on their density, and also how tightly packed together these different substances are. The lipoprotein classes include:

- **High density lipoproteins (HDL):** HDL called the good cholesterol, it picks up excess cholesterol in the blood and the body and carries it back to the liver, where it is broken down and removed from the body.
- **Low density lipoproteins (LDL):** LDL called the bad cholesterol, it carries cholesterol and deposits it in body tissues to be used for cell repair or for energy high levels of LDL.
- **Very low density lipoproteins (VLDL):** VLDL made up mostly of a core of triglycerides, with small amounts of proteins and cholesterol, its particles circulate in the blood, the triglycerides are absorbed by cells for energy, leaving the protein and cholesterol remnants.

Classification

These terms are often used interchangeably, as they share common causes and they all are associated with an increased risk of atherosclerosis (The formation of lipid, cholesterol, and/or calcium-laden plaques within the tunica intima of the arterial wall in arteries. The plaques may restrict blood flow) and cardiovascular disease.

Correspondence

Chitra Prabhakar
Department of Food Nutrition
and Public Health, Ethelind
College of Home Science
SHUATS, Prayagraj, Allahabad,
Uttar Pradesh, India

- **Dyslipidemia:** Abnormal lipoprotein levels like LDL and HDL in association with an increased risk of cardiovascular disease or you can say current cardiovascular disease (lipoprotein is A group of proteins synthesized in the small intestine and liver that transport hydrophobic lipids such as cholesterol, triglycerides, and phospholipids throughout our body. All Types are named based on the density of their contents and include very-low- (VLDL), low- (LDL), intermediate- (IDL), and high-density lipoproteins (HDL). Dyslipidemia, it is a major risk factor for atherosclerotic cardiovascular disease.
- **Hyperlipidemia:** It is a condition of elevated serum concentrations of both triglycerides (> 200 mg/dL) and cholesterol (> 190 mg/dL). Causes include genetic predisposition, a diet high in saturated fat and cholesterol, and other conditions (e.g., diabetes mellitus, hypothyroidism). It contributes towards the development of atherosclerosis. Elevated blood lipid levels (total cholesterol, LDL, triglycerides- These are a single lipid composed of one glycerol linked to three fatty acids. Stored mainly in adipocytes and serves as an energy reserve)
- **Hypercholesterolemia:** It is an autosomal dominant condition associated with mutations in the LDL receptor that lead to elevated LDL levels with early atherosclerotic complications (cardiovascular disease). elevated total cholesterol > 200 mg/dL
- **Hypertriglyceridemia:** It is an autosomal dominant condition characterized by markedly increased triglyceride levels in the serum. This problem Associated with an increased risk of acute pancreatitis and elevated triglyceride levels.
- **Hypolipoproteinemia:** This elevated levels of a certain lipoprotein.
- **Pathophysiology:** It is an extremely high levels of triglycerides and/or LDL result in extravasation of plasma lipoproteins and their deposition in tissue.
- **Eruptive xanthomas:** Results yellow papules with an erythematous border; located on the buttocks, back, and the extensor surfaces of the extremities.
- **Occurrence:** hypertriglyceridemia (chylomicron or VLDL); also called lipoprotein lipase deficiency.
- **Tendinous xanthomas:** Results firm nodules, located in tendons (typically extensor tendons of hands and the Achilles tendon).
- **Occurrence:** severe hypercholesterolemia, ↑ LDL levels (increase).
- **Palmar xanthomas:** Accumulation of yellow plaques on the palms of the hands.
- **Occurrence:** type III hyperlipoproteinemia, ↑ VLDL (increase).
- **Xanthelasma:** Results nodular lipid deposits around the eyelids.
- Typically bilateral, yellow, flat plaques accumulation on the upper eyelids (nasal side).
- **Occurrence:** Is primary or hypercholesterolemia (e.g., primary biliary cholangitis), hyperapobetalipoproteinemia, ↑ LDL levels.
- To those who are suffering from diabetes mellitus.
- Patients with increased lipoproteins in blood plasma.
- affects postmenopausal women.
- Eye manifestations are visible.
- **Lipemia retinalis:** In this opaque, white appearance of the retinal vessels, visible on fundoscopic exam.
- **Arcus lipoides cornea.**
- **Fatty liver (hepatic steatosis)** is also occur.
- **Severe hypertriglyceridemia** (typically > 1000 mg/dL) → tends to pancreatitis.
- **Atherosclerosis with secondary diseases.**
- **Coronary heart disease.**
- **Myocardial infarction.**
- **Stroke.**
- **Peripheral arterial disease.**
- **Carotid artery stenosis.**
- **Cholesterol embolization syndrome**

Etiology

- Congenital (less common)
- Hyperchylomicronemia
- Familial hypercholesterolemia
- Familial hyperlipidemia
- Familial hypertriglyceridemia
- Acquired (more common)
- Obesity
- Diabetes mellitus
- Physical inactivity
- Alcoholism
- Hypothyroidism
- Nephrotic syndrome
- Cholestatic liver disease
- Cushing's disease
- **Drugs:** Oral contraceptive pill of women's, high-dose diuretic use, metoprolol

Clinical feature

- Typically there are no specific signs or symptoms.
- Skin manifestation.
- **Xanthoma:** nodular lipid deposits in the skin and tendons of person.

Diagnostic

- Laboratory analysis can be done.
- **Fasting lipid profile:** total cholesterol, HDL, and triglycerides are also measured.
- LDL level can be measured directly using assays or it can be estimated using the Fried Ewald formula.
- Pathological values from two different occasions are required to confirm the diagnosis and it is very important.
- **Dyslipidemia is diagnosed if LDL > 130 mg/dL or if HDL levels < 40 mg/dL**
- Identify underlying cause is very important.
- Fasting blood glucose level or Hb1Ac must be check.
- TSH level required.
- Liver function tests must be done.
- Urine analysis required.

Parameters of fat metabolism		
Laboratory parameter	Optimal level (mg/dL)	Pathological (mg/dL)
Total cholesterol	< 200	Borderline: 200–239 High: > 240
Triglycerides	< 150	Borderline: 150–199 High: > 200 Very high: \geq 500
LDL	< 100	Near optimal: 100–129 Borderline high: > 130 High: > 160 Very high: \geq 190
HDL	\geq 60	Low: < 40
LDL/HDL ratio: the ratio of LDL and HDL levels serves as a control measure of cholesterol metabolism		

- Assessment of cardiovascular disease (CVD)
- Myocardial infarction checkup.
- Stroke.
- Symptomatic carotid artery stenosis.
- Peripheral artery disease could be visible.
- Abdominal aortic aneurysm.
- CVD risk equivalents to: diabetes mellitus, chronic kidney disease.
- Assess for other major risk factors of CVD in person.
- Smoking.
- Hypertension.

Treatment

- Goal: To improve serum lipid levels to reduce the risk of cardiovascular disease.
- General measures: lifestyle modifications must be done.
- Dietary changes: Reduce saturated fat and cholesterol intake in daily bases.
- Weight management must be done.
- Physical activity is compulsory.
- Medical therapy needed.
- Statins.
- Second-line lipid-lowering agents also required.
- Treatment of xanthomas and xanthelasmas: It is not required in most cases; surgical removal for cosmetic reasons is possible but is associated with a high rate of recurrence.
- Management of congenital disorders: lifestyle modifications and lipid-lowering agents, LDL apheresis may be required in severe cases.

Prevention

- The decision to screen for hyperlipidemia depends on the patient's overall risk for cardiovascular disease and problem.
- Screening the high-risk individuals (i.e., with other risk factors for cardiovascular disease): $\text{♂} > 20\text{--}25$ years; $\text{♀} > 30\text{--}35$ years
- Screening low-risk individuals range: $\text{♂} > 35$ years; $\text{♀} > 45$ years.

Reference

1. Le T, Bhushan V, Bagga HS. First Aid for the USMLE Step 2 CK. McGraw-Hill Medical, 2009.
2. Vijan S. Screening for Lipid Disorders in Adults. In: Post TW, MA Up To Date, 2017. <https://www.uptodate.com/contents/screening-for-lipid-disorders-in-adults>.
3. Le T, Bhushan V. First Aid for the USMLE Step 1 2015. McGraw-Hill Education, 2014, 2015.
4. Jenkins B, McInnis M, Lewis C. Step-Up to USMLE Step 2 CK. Lippincott Williams & Wilkins, 2015.
5. Rosenson RS. Secondary Causes of Dyslipidemia. In: Post TW, ed. Up To Date. Waltham, MA: Up To Date, 2015. <https://www.uptodate.com/contents/secondary-causes-of-dyslipidemia>.
6. Rosenson RS, Kastelein JJP. Hypertriglyceridemia. In: Post TW, ed. Up To Date. Waltham, MA: Up To Date, 2018. <https://www.uptodate.com/contents/hypertriglyceridemia>.
7. Rosenson RS. Lipoprotein Classification, Metabolism, and Role in Atherosclerosis. In: Post TW, ed. Up To Date. Waltham, MA: Up To Date, 2017. <https://www.uptodate.com/contents/lipoprotein-classification-metabolism-and-role-in-atherosclerosis>.
8. Torres KMT. Xanthomas. In: Elston DM. Xanthomas. New York, NY: Web MD. 2018. <https://emedicine.medscape.com/article/1103971>
9. Zak A, Zeman M, Slaby A, Vecka M. Xanthomas: clinical and pathophysiological relations. Biomed Pap, 2014. doi: 10.5507/bp.2014.016.
10. U.S. Department of Health and Human Services. 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, 2017. <https://www.nhlbi.nih.gov/files/docs/resources/heart/atp-3-cholesterol-full-report.pdf>.
11. Hennekens CH, Lopez-Sendon J. Prevention of Cardiovascular Disease Events in Those with Established Disease or at High Risk. In: Post TW, ed. Up To Date. Waltham, MA Up To Date, 2017. <https://www.uptodate.com/contents/prevention-of-cardiovascular-disease-events-in-those-with-established-disease-or-at-high-risk>.
12. Rosenson RS. Measurement of Blood Lipids and Lipoproteins. In: Post TW, ed. Up To Date. Waltham, MA: Up To Date, 2016. <https://www.uptodate.com/contents/measurement-of-blood-lipids-and-lipoproteins>.
13. De Ferranti SD, Newburger JW. Dyslipidemia in Children: Management. In: Post TW, ed. Up To Date. Waltham, MA: Up To Date, 2016. <https://www.uptodate.com/contents/dyslipidemia-in-children-management>.
14. Lambert M. ACC/AHA release updated guideline on the treatment of blood cholesterol to reduce ASCVD risk. Am Fam Physician. 2014; 90(4):260-265. url: <http://www.aafp.org/afp/2014/0815/p260.html>.
15. Stone NJ, Robinson JG, Lichtenstein AH, et al. ACC/AHA guideline on the treatment of blood

cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol.* 2014; 63(25 Pt B): pp. 2889–2934. doi: 10.1016/j.jacc.2013.11.002.

16. Yang EH. Lipid Management Guidelines. In: Yang EH. Lipid Management Guidelines. New York, NY: Web MD, 2015. <http://emedicine.medscape.com/article/2500032>.