



CONCEPT OF HYPERLIPIDEMIA: A SCIENTIFIC REVIEW

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ABSTRACT In this modern era, due to varying factors of faulty dietary habits, work pressure, sedentary lifestyle all contribute to disease hyperlipidemia. The term 'Hyperlipidemia' is used to denote raised serum levels of total cholesterol, low-density lipoprotein cholesterol, triglycerides or both total cholesterol and triglyceride. Liver plays an important role in metabolism of low density lipids (cholesterols) and also protein and fat metabolism. Cholesterol and triglycerides increases fatty deposits in arteries and the risk of blockages. It can be prevented and treated through the appropriate maintenance of healthy lifestyle. The present paper highlights the causes, diagnosis and management of the Hyperlipidemia through diet and lifestyle.

KEYWORDS : Hyperlipidemia, Liver, Diet, Lifestyle

INTRODUCTION

Hyperlipidemia is a metabolic disorder in which the levels of Lipoproteins, Cholesterol, Triglycerides or both are raised in plasma, wherein there is a deposition of lipids mainly in form of esterified cholesterol in the wall of arteries. Lipids have been considered as "fats" in the bloodstream, which is commonly divided into cholesterol and triglycerides. However, the cholesterol circulates in the bloodstream which is involved in the structure and functions of cells, whereas, the triglycerides are either used immediately or stored in the fat cells. It causes narrowing and blockage of the arteries and produces mainly heart disease while other diseases include CVD (Cerebrovascular Disease), Renal disease, Liver disease, Peripheral Vascular disease. Hyperlipidemia is not a single disease but a range of disorder with a variety of metabolic disorder, life style disorders and even environmental as well as genetic factors. It can be caused or influenced by a wide range of other disorders also. Its presence can affect many different organs and systems at the time.

CAUSE OF HYPERLIPIDEMIA:^[1]

The causes of hyperlipidemia are:

- Primary causes
- Secondary causes

Primary causes:

It is usually due to genetic causes (such as a mutation in a receptor protein)

Secondary hyperlipidemia:

Because of sedentary lifestyle with excessive dietary intake of saturated fat, cholesterol and trans fats (Trans fats are polyunsaturated or monounsaturated fatty acids; they are used in many processed foods and are as atherogenic as saturated fat.)

Other common secondary causes include:

- Diabetes mellitus
- Hypothyroidism
- Renal disorders,
- Liver disorders,
- Cushing's syndrome,
- Obesity,
- Alcohol consumption,
- Drugs, such as thiazides, β -blockers, retinoids, highly active antiretroviral agents, cyclosporine, tacrolimus, estrogen and progestins and glucocorticoids.
- Secondary causes of low levels of HDL cholesterol include cigarette smoking, anabolic steroids, HIV infection and nephrotic syndrome.

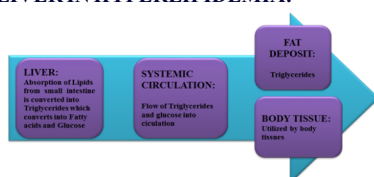
ROLE OF LIVER IN HYPERLIPIDEMIA:^[2]

Figure 1: Schematic diagram showing the lipid metabolism

Few aspects of Lipid metabolism are unique to the liver.

- Liver is the major site for converting excess carbohydrates and proteins into fatty acids and triglyceride which are then exported and stored in adipose tissue.
- The liver is extremely active in oxidizing triglycerides to produce energy. The liver breaks down many more fatty acids that the hepatocytes need and exports into blood.
- The liver synthesizes large quantities of lipoproteins, phospholipids, amino-acids and cholesterol.
- Hepatocytes are responsible for synthesis of most of the plasma protein (albumin) and also clotting factors.

Hyperlipidemia is a known risk factor for fatty infiltration of the liver, a condition that can progress to cirrhosis and liver failure. Low LPL (lipoprotein lipase) activity further causes high synthesis of LDL cholesterol by the liver, ultimately leads to hyperlipidemia. The pathophysiology of hyperlipidemia involves the defect in lipid metabolism. Cholesterol, triglycerides and phospholipids are transported in the bloodstream as a complex of lipids and proteins known as lipoproteins. Due to the impaired lipid metabolism, lipoproteins circulating in the blood stream start adhering to the walls of blood vessels and thereby causing the deposition over the blood vessels. Gradually, the Elevated total and low-density lipoprotein (LDL) cholesterol and reduced high density lipoprotein (HDL) cholesterol are associated with the development of Coronary Heart Disease (CHD).

SIGNS AND SYMPTOMS:^[3]

Person with hyperlipidemia usually has no signs or symptoms. In familial hyperlipidemia, there may be yellowish fatty growths around the eyes or the joints. Hyperlipidemia is usually detected during a routine blood or following a cardiovascular event, such as a heart attack or stroke. Excessive fat in the blood accumulates over time, forming plaques on the walls of the arteries and blood vessels. This will narrow the openings, producing turbulent blood flow through the vessels.

DIAGNOSIS:^[4]

Diagnosis for Hyperlipidemia is done with a blood test called a lipid profile.

LIPID PROFILE:

- Total serum Cholesterol
- Triglyceride
- Low density lipid (LDL)
- High density lipid (HDL)
- Very low density lipid (VLDL).

MANAGEMENT:^[5]

Hyperlipidemia is a common health problem that can lead to serious cardiovascular or heart disease, but it can be prevented through the appropriate maintenance of a heart healthy lifestyle, which involves a "heart healthy" diet, regular exercise habits and maintaining a healthy weight.

DIET:

Reduce the total fat intake:

- Dairy products and meat are the principal sources of saturated fat in the diet. Hence reduce their intake and substitute fish and poultry.
- Visible fat and skin should be removed before cooking and preparing meat dishes.
- Meat products including sausages and reconstituted meats (like luncheon meat) should be avoided since the concentration of fat is unknown and often high.
- Baking and grilling of meats reduces the fat content.
- Low fat or cottage cheese and skimmed or semi skimmed milk should be substituted for the full fat varieties.
- Pastries and cakes to be avoided (due to high fat)
- Overall aim should be decrease fat intake such that it is providing approximately further reduction in fat intake is unacceptable to many patients substitute with unsaturated monounsaturated oils (olive oil) and polyunsaturated oils (sunflower, safflower, corn and soya) should be used in the cooking instead of saturated fat rich alternatives.
- Reduce the dietary cholesterol intake.
- Avoid liver, offal and fish.
- Although eggs and prawns are rich in cholesterol their contribution to body cholesterol pool is small and they can still be part of a balanced lipid lowering diet.
- Increase intake of fibre (Nsp- Non starch polysaccharides).
- Foods high insoluble fibre like pulses, legumes, root vegetables, leafy vegetables and unprocessed cereals helps reduce circulating lipids concentrations substitute these for higher fat alternatives.

REDUCE THE ALCOHOL INTAKE:

Excess alcohol is a cause of hyperlipidemia and may worsen primary lipid disorders.

ACHIEVE AN IDEAL BODY WEIGHT:

Obesity as it will help the lipid disorder and also due to the reason that itself is a risk factor for CVD.

SMOKING:

Smoking triggers many problems that contribute to heart disease. It promotes plaque build up on the walls of the arteries, increases LDL levels, and it encourages blood clot formation and inflammation. Quitting will result in higher HDL. This may be one reason why cardiovascular disease risk falls after quitting.

CONCLUSION:

Hyperlipidemia is a common health problem that can lead to serious cardiovascular or heart disease, but it can be prevented and treated through the appropriate maintenance of a healthy lifestyle.

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