

A REVIEW ON HYPERLIPIDEMIA AND ITS PREVENTIVE MEASURES IN INDIAN ADULT POPULATION

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Abstract: Cardiovascular disease is the leading cause of death worldwide and mortality due to cardio vascular disease is higher in low and middle income countries, like India. There has been an alarming increase in the prevalence of hyperlipidemia over the past two decades. Nearly, 24 % of deaths among adults aged 25-70 years are due to hyperlipidaemia. It is one of the medical conditions characterized by an increase in one or more of the Plasma lipids, including triglycerides, cholesterol, cholesterol esters, phospholipids and or plasma lipoproteins. This elevation of plasma lipids is among the leading risk factors associated with cardiovascular diseases. The causes of increase cardio vascular disease rates include life style change, unhealthy eating habits, obesity and physical inactivity. The emergencies, risk factors and remedies are described in the literature.

Keywords: Hyperlipidemia, Preventive measures and Dietary modifications.

1. INTRODUCTION

Industrialization and Globalization has led to economic prosperity and modern way of life in India. This in turn is related as an increased prevalence of lifestyle oriented diseases in the country. Coronary Artery Disease (CAD) is a major cause of morbidity and mortality in developing countries and it is one of the major public health problems globally.

For most primary care providers, hyperlipidemia is defined as elevations of fasting total cholesterol concentration which may or may not be associated with elevated TG concentration. However, lipids are not soluble in plasma, but are instead transported in particles known as lipoproteins. Cholesterol and lipoproteins are not the same, although they work together. Lipoproteins carry cholesterol to the cells.

Hyperlipidaemia is sometimes considered as a consequence of modernization, because the prevalence of hyperlipidaemia in developed countries is often higher than in developing countries.

In developing countries, as the pace of Urbanization increases, the population is more dependent on diets considered unhealthy, exacerbated by low physical activity. Majority population living in stressful environment is another reason for developing Coronary Artery Disease (CAD).

2. GROUPING OF HYPERLIPIDEMIA

Hyperlipidemia may be classified as either familial (also called primary) caused by specific genetic abnormalities, or acquired (also called secondary) when resulting from another underlying disorder that leads to alterations in plasma lipid and lipoprotein metabolism. Also, hyperlipidemia may be idiopathic, that is without known cause.

Familial (Primary) Familial hyperlipidemias are classified according to the Fredrickson classification, which is based on the pattern of lipoproteins on electrophoresis or ultracentrifugation. It was later adopted by the World Health Organization (WHO). It does not directly account for HDL, and it does not distinguish among the different genes that may be partially responsible for some of these conditions. It remains a popular system of classification,

According To "Fredrickson" Classification, There are Five Types of Hyperlipidemias

Type I - Raised cholesterol with high triglyceride levels

Type II - High cholesterol with normal triglyceride levels

Type III - Raised cholesterol and triglycerides

Type IV - Raised triglycerides, atheroma, and raised uric acid

Type V - Raised triglycerides

Acquired (Secondary)

Acquired hyperlipidemias (also called secondary dyslipoproteinemias) may mimic primary forms of hyperlipidemia and can have similar consequences. They may result in increased risk of premature atherosclerosis or, when associated with marked hypertriglyceridemia, may lead to pancreatitis and other complications of the chylomicronemia syndrome. **The most common causes of acquired hyperlipidemia are:**

- Diabetes Mellitus
- Use of drugs such as diuretics, beta blockers, and estrogens

Other conditions leading to acquired hyperlipidemia include:

- Hypothyroidism
- Renal Failure
- Nephrotic Syndrome
- Alcohol
- Some rare endocrine disorders and metabolic disorders

According to "**Greenspan's Basic & Clinical Endocrinology**" by **Dr. David Gardner**, acquired hyperlipidemia is high fat and cholesterol in the blood due to other conditions or medications. Diabetes, low thyroid hormone levels, kidney disease and some other metabolic disorders cause hyperlipidemia. Some drugs can also cause hyperlipidemia, including alcohol, diuretics, estrogens and beta-blockers.

3. CAUSES OF HYPERLIPIDEMIA

Hyperlipidemia is most commonly associated with high fat diets, a sedentary lifestyle, obesity and diabetes. There are also genetic causes. Familial hypercholesterolemia, one form of hyperlipidemia, is the most common dominantly inherited genetic disorder in humans worldwide. It results from mutations in genes involving proteins in a form of cholesterol called low-density lipoprotein cholesterol that can lead to early-onset atherosclerosis.

List of causes associated for developing hyperlipidemia are:

1. Lifestyle habits or treatable medical conditions. Lifestyle contributors include obesity, not exercising, and smoking
2. Diabetes (type 2)
3. Kidney disease
4. An under active thyroid gland
5. Environmental and genetic factors
6. Alcohol
7. Nephrotic Syndrome
8. Obstructive Jaundice
9. Hypothyroidism

10. Cushing's Syndrome
11. Anorexia Nervosa
12. Medications-
 - Thiazide Diuretics
 - Cyclosporine
 - Glucocorticoids
 - Beta Blockers
 - Retinoic Acid
13. High dietary simple carbohydrates
14. Estrogen therapy
15. Lipoprotein lipase mutations

4. SIGNS AND SYMPTOMS OF HYPERLIPIDEMIA

Hyperlipidaemia usually has no noticeable symptoms and tends to be discovered during routine examination or evaluation for atherosclerotic cardiovascular disease.

1. Xanthoma
2. Xanthelasma of eyelid
3. Chest Pain
4. Abdominal Pain
5. Enlarged Spleen and liver
6. High cholesterol or triglyceride levels
7. Heart attacks
8. Higher rate of obesity and glucose intolerance
9. Pimple like lesions across body
10. Atheromatous plaques in the arteries

5. PREVENTIVE MEASURES OF HYPERLIPIDEMIA

1. Drug therapy:

These treatments will be indicated for those patients who suffer from hyperlipidemia since the medical community has yet fully embrace this connection as an area of prevention. When a drug is used with any patient, its potential benefits and hazards must be carefully weighed. Almost 10 million adults require drug therapy to meet the low density lipo protein goals set by the National Cholesterol Education Program.

Disorders	Drug therapy
Familial hypercholesterolemia	Lovastatin
Familial defective apolipoprotein B	None
Polygenic hypercholesterolemia	Lovastatin
Familial lipoprotein lipase deficiency	Nicotinic acid
Familial hypertriglyceridemia	Gemfibrozil. Nicotinic acid
Familial combined hyperlipidemia	Clofibarte
Familial dysbetalipoproteinemia	Gemfibrozil

2. Dietary control: Food choices made by individuals play a major role in preventing hyperlipidaemia. They can reduce foods high in saturated fatty acids and cholesterol eg. Foods of animal origin. Consumption of fish oil or olive oil or their supplements which include a low concentration of saturated fats aid in prevention. Cholesterol free vegetarian foods and fruits like avocado when included in daily diet will significantly reduce elevated triglyceride levels

3. Physical activity: Focusing on daily exercises, since regular exercises will lead to an improvement in lipid concentrations i.e., daily walking will reduce triglyceride level by an average of 10 mg/dL and elevation in HDL level by 5 mg/dl. Evidence proved that increased levels of physical activity decrease the population burden of cardiovascular disease (CVD).

4. Yoga: The best method to control hyperlipidemia in a natural way without any dangerous side effects on the body as suggested by numerous studies in yoga.

6. DIETARY NEEDS FOR HYPERLIPIDEMIC PATIENTS

1. Dietary Cholesterol: Like other sterols, cholesterol is a sterol i.e. a combination of steroid and alcohol) and lipid (a type of fat). It is found in foods such as eggs and dairy products and is also manufactured in the body, especially the liver. The dietary cholesterol is responsible for both the development of hypercholesterolemia, and atherosclerosis has been the focus of many investigators. Many studies in rabbits, rats (and other animal models) and in human diet and epidemiologic investigations indicated the importance of dietary cholesterol on serum cholesterol levels and its associated effects.

2. Carbohydrates: Only complex carbohydrates should be included the diet, since the total calories are restricted. High carbohydrates intakes can increase in fasting triglycerides level. By restriction of carbohydrate intake serum triglycerides levels can be controlled.

3. Protein: Soy protein also lowers serum cholesterol levels in animals and in hypercholesterolemic individuals when compared with casein (a dairy protein) and beef proteins. The mechanism underlying these changes is unknown but it has been stated that soy protein affects cholesterol absorption, bile acid absorption, the insulin-glucagon ratio, serum thyroxine levels and hepatic LDL-receptor activity.

4. Fiber: Studies have shown that only water-soluble fiber plays a role in lipoprotein metabolism in humans. The mechanism by which dietary fiber affects plasma lipid levels is unknown. Insoluble fibers in wheat and vegetables do not reduce cholesterol, but they do have other beneficial effects. Dietary fiber is a collective term for a variety of plant substances that are resistant to digestion by human gastrointestinal enzymes. Dietary fibers can be classified in 2 major groups depending on their solubility in water. In humans, the structural or matrix fibers (lignins, cellulose, and some hemicelluloses) are insoluble, whereas the natural gel-forming fibers (pectins, gums, mucilages, and the remainder of the hemicelluloses) are soluble. Studies have focused that the soluble fibers present in oats, psyllium, pectin, and guar gum possess the properties that lower total and LDL cholesterol. Water-insoluble wheat fiber and cellulose have no effect unless they displace foods supplying saturated fats and cholesterol.

5. Antioxidants: Flavonoids are ubiquitously present in fruits and vegetables. They have attracted much attention in relation to prevention of degenerative diseases such as atherosclerosis. Their antioxidant activity should be at least partly responsible for such prevention. The mechanism of antioxidant activity of flavonoids can be characterized by direct scavenging or quenching of oxygen free radicals or excited oxygen species as well as inhibition of oxidative enzymes that generate these reactive oxygen species. The essential part of the free radical-scavenging activity of flavonoids is attributed to the *o*-di hydroxyl group in the B ring (catechol group) in their diphenylpropane structure. Catechol type flavonoids therefore possess powerful antioxidant activity.

Supporting foods for hyperlipidemia:

Ingredients	Role
Nuts	Almonds lower LDL by 4.4% walnuts lower LDL by 16%.
Oatmeal	Drops LDL by 12-24 %.
Orange juice	Reduce blood cholesterol level.
Coriander seeds	Lower cholesterol and triglycerides levels.
Fish oil	Lower triglycerides levels.

Honey	Lower cholesterol level.
Soybeans	Reduce the production of new cholesterol.
Indian gooseberry	Reduce excess cholesterol build-up.
Brown rice	Lower cholesterol level.
Turmeric	Lowers LDL cholesterol levels.
Brinjal	Lowers LDL cholesterol levels.
Coconut oil	Increases HDL and improves the LDL/HDL ratio.
Fenugreek seeds	Lowers cholesterol level by 14%.
Beans	Lowers LDL level.
Avocados	Lowers cholesterol levels and boost up HDL level.
Olive oil	Lowers LDL-C levels.
Apples	Lowers cholesterol level.
Broccoli	Lowers blood cholesterol level.
Chocolate	Maintain HDL-C and reduces LDL-C levels.
Barley	Lower blood cholesterol and triglycerides levels.
Tomatoes	Lycopene lowers LDL-C level.
Yogurt	Reduce LDL level by 4%.
Green tea	Lowers the cholesterol level.
Margarine	Lower LDL cholesterol.
Ginger	Lower cholesterol level.
Garlic	Reduces the formation of plaque in the blood vessels.
Vinegar	Lower triglycerides level.

SOURCES: Niharika Verma

7. CONCLUSION

The prevalence of dyslipidemia is very high in India, which calls for urgent lifestyle intervention strategies to prevent and manage the important cardiovascular risk factors. Although food rich in saturated fats and cholesterol are most common cause of hyperlipidemia seen in our society, alcohol excess, diabetes mellitus, weight gain, less physical exercise and genetic factors can explain this metabolic syndrome. Several classes of drugs (including contraceptives) to be considered as common causes of altered lipid profiles. A relationship of cause and effect appears to exist among the known chronic metabolic illnesses (diabetes, obesity, hypertension and hyperlipidemia) which throw a growing burden on our society. The various ways to reduce the risk due to hyperlipidemia are, to follow a healthy lifestyle and drugs and dietary restrictions that can reduce the cholesterol and triglyceride levels in blood. The disease effect may occur around the eye and in other parts of the body as well. So people should try to avoid fried food items in the daily diet and include more fruits and vegetables in their everyday meal.

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