Hypercholesterolemia Disease

Hypercholesterolemia is defined as an increase in cholesterol in the bloodstream and is determined by number and strength of risk factors of coronary heart disease events as well as serum levels of LDL, HDL, TAGS, and total cholesterol. Risk factors include cigarette smoking, diabetes mellitus, hypertension, lower HDL levels, family history of premature CHD, and age. Pathological complications from hypercholesterolemia include the accumulation of cholesterol plaques along vessel walls, leading to poor organ perfusion and ischemia. Xanthomas and lipemia retinalis are physical exam findings suggestive of hypercholesterolemia.



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Risk Factors

Diabetes
Dyed-bead-pancreas
Diabetes and hypercholesterolemia are commonly comorbid as they share a link with an obese population. Diabetes is thought to play a role in raising LDL and triacylglycerol levels and lowering HDL levels.

Smoking
Smoking a cigarette
Cigarettes smokers are at increased risk for hypercholesterolemia and vascular disease. Toxins from cigarettes contribute to endothelial damage, which may facilitate cholesterol plaque formation and vessel narrowing. Cigarette smoking is also associated with a reduction in HDL levels.

Family History
Family portrait
Patients with a first degree male relative younger than 55 years old or a female relative younger than 65 years old with coronary heart disease are at increased risk for hypercholesterolemia. These patients may be more likely to have an inborn error of metabolism in the cholesterol regulation pathway.

Hypertension
Hiker-BP
Patients with hypertension are more likely to suffer from hypercholesterolemia as well. In many cases, hypertension is caused by atherosclerosis, an inflammatory response to the accumulation of cholesterol along vessel walls, which leads to narrowed blood vessels.

HDL < 40
Hot-Dog-angel with Less-than (40) Ounce
HDL transports cholesterol from peripheral tissues back to the liver. It is known as “good cholesterol” because it removes excess cholesterol from the blood. Ideal values for HDL for men is > 40 mg/dL and for women is > 50 mg/dL.

Men Older than 45 Years of Age
Man with Greater-than (4) Fork (5) Hand
As patients age, the risk for hypercholesterolemia increases. Men older than 45 years of age are one of the patient populations at highest risk for disease.

Women Older than 55 Years of Age
Woman with Greater-than (5) Hand (5) Hand
As patients age, the risk for hypercholesterolemia increases. Women over 55 years old have increased risk for disease. The difference in age for risk of disease between men and women is thought to be related to the protective effects of the hormone estrogen.

Signs and Symptoms

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Atheromas

Artery-masses

Atheromas, also known as atherosclerotic plaques, are collections of lipid-containing macrophages that collect along blood vessel walls. As atheromas enlarge, vessel lumens narrow, decreasing the delivery of oxygen-rich blood to tissues and causing tissue ischemia. If atheromas are disrupted and endothelial damage occurs, thrombus formation begins and may eventually lead to total occlusion of a blood vessel or possible embolization.

Plaques in Blood Vessel Walls

Blood Vessels with Plaques

Atherosclerotic plaques form due to accumulations of inflammatory cells, cholesterol, and triglycerides. This leads to cascading damage and the signaling of further inflammatory mechanisms.

Tissue Ischemia

Tissues with an Ice-ischemia

Tissue ischemia is a restriction in blood supply to tissues. As atheromas enlarge, vessel lumens narrow, preventing the flow of blood and delivery of oxygen to vital organs and tissues.

Xanthomas

Zen-master

Xanthomas manifest cutaneously as yellowish papules and represent deposits of cholesterol-containing macrophages seen in patients with hypercholesterolemia. They commonly occur on tendons and extensor surfaces, and when found along the eyelids are known as xanthelasmas.

Lipemia Retinalis

Red-tin eyes with Lips

This physical exam finding seen on fundoscopic exam is described as milky white retinal blood vessels. It is very rare, as it is seen in patients with triglyceride levels >1000 mg/dL, which is usually due to inborn errors of cholesterol metabolism.

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