

Arteriosclerosis

An Overview

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IMPORTANT

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Introduction

Arteriosclerosis is a common disorder of the arteries. It is marked by thickening, loss of elasticity, and hardening of the walls through calcium. This results in less blood supply, especially to the brain and legs. The condition often develops with aging. It also often occurs with high blood pressure, kidney disease, hardening of the connective tissues (scleroderma), diabetes, and excess of lipids in the blood (hyperlipidemia).

Symptoms include leg cramps when walking (intermittent claudication), changes in skin temperature and colour, altered pulses, headache, dizziness, and memory defects. Drugs to widen the blood vessels and exercise to stimulate circulation may relieve symptoms of arteriosclerosis. However, there is no specific treatment for the disorder. Kinds of arteriosclerosis are atherosclerosis, Monckeberg's arteriosclerosis.

Arteriosclerosis - (Picture right) this is the inside of an artery partly blocked by cholesterol, a fatty material.

Smoking worsens this problem leading to serious circulatory problems.



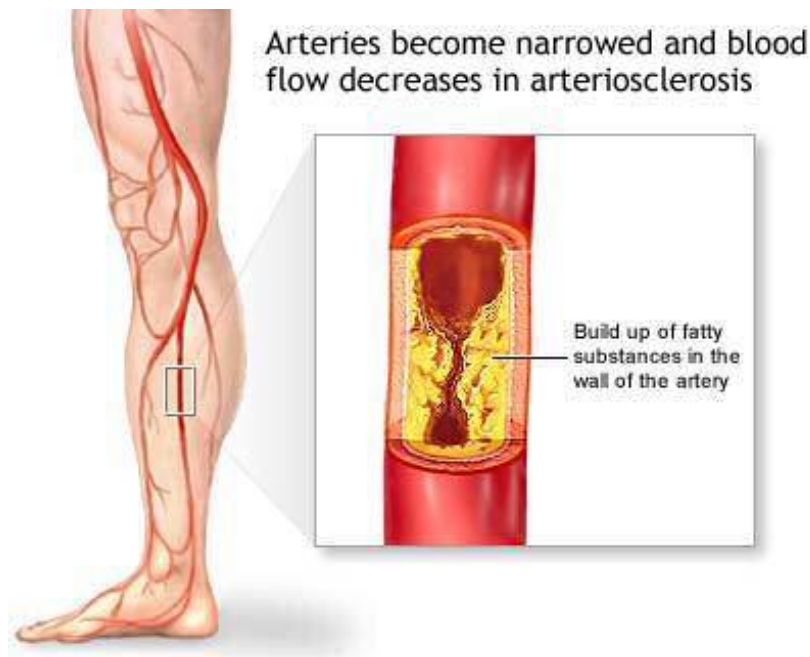
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Arteriosclerosis of the Extremities

Arteriosclerosis of the extremities is a disease of the peripheral blood vessels that is characterized by narrowing and hardening of the arteries that supply the legs and feet. The narrowing of the arteries

causes a decrease in blood flow. Symptoms include leg pain, numbness, cold legs or feet and muscle pain in the thighs, calves or feet.

(Picture below - Arteriosclerosis of the extremities)



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Atherosclerosis

Atherosclerosis is a common disorder of the arteries. Yellowish plaques of cholesterol, fats, and other remains are deposited in the walls of large and medium-sized arteries. The vessel walls become thick and hardened. The vessel narrows and lessens circulation to organs and other areas normally supplied by the artery. These plaques (atheromas) are major causes of heart disease, chest pain (angina pectoris), heart attacks, and other disorders of the circulation.

How atherosclerosis develops is not clear. It may begin with injury to the artery or with an increase of muscle in vessel walls. Excess saturated fats in the diet, faulty carbohydrate processing, or a genetic defect may also be causes. Atherosclerosis usually occurs with aging. It is often linked to being overweight and having high blood pressure and diabetes. Portions of arteries that are blocked or damaged may be replaced by patches, or bypassed, as in coronary bypass surgery. Laser surgery may also be used. Eating a diet low in cholesterol, calories, and saturated fats, getting adequate exercise, and avoiding smoking and stress may help prevent the disorder. See also arteriosclerosis.

Peripheral Atherosclerotic Disease

Peripheral Atherosclerotic Disease is acute or chronic occlusion of the blood supply to the extremities by atherosclerotic plaques.

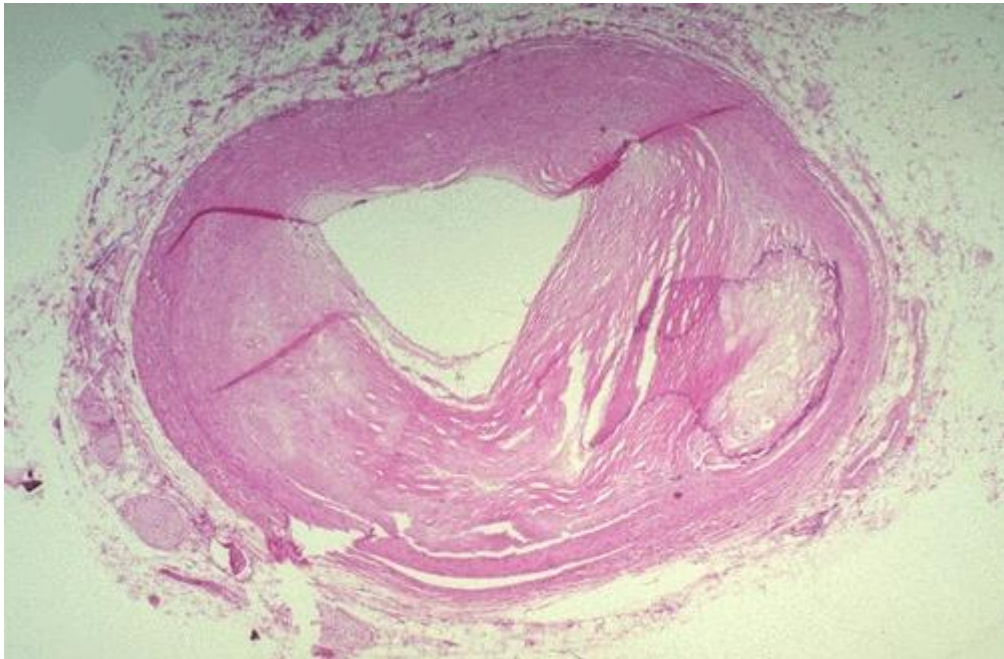
Causes and Incidence

The most common cause is underlying atherosclerosis, and individuals with atherosclerosis are vulnerable.

Disease Process

The pathologic processes involved in atherosclerosis are detailed under coronary artery disease. In peripheral disease, an artery in an extremity is either suddenly occluded (acute), resulting in rapid

tissue ischemia, or occluded after a long-term build up of plaque in the vessel (chronic), leading to insidious development of tissue ischemia.



(Picture above - Atherosclerotic plaque in an artery)

Symptoms

Acute - Sudden onset of severe pain, coldness, numbness, and pallor of affected extremity; absent pulses distal to occlusion

Chronic - Intermittent claudication progressing to pain at rest; decreased pulses; pallor after elevation; dry, scaly skin with sparse hair and nail growth on affected extremity; numbness and tingling; slow healing of wounds

Complications:

Necrosis and gangrene, with resultant limb loss, is the most common complication.

Diagnostic Tests

Clinical evaluation and Doppler ultrasound to locate the obstruction are used for diagnosis.

Treatments

Surgery - Thromboendarterectomy or resection with or without graft to remove obstruction and make vessel patent; amputation for uncontrolled infection, necrosis, or gangrene

Drugs - Antiinfective drugs for infection; vasodilators, calcium antagonists, and thromboxane inhibitors for chronic disease

General - Acute: percutaneous transluminal angioplasty instead of surgery to remove obstruction; lasers, mechanical cutters, stents, and rotational sanders are also being tried to clear the blockage

Chronic: progressive exercise to develop collateral circulation; prophylactic nail and foot care to prevent secondary infection; careful monitoring of wounds, cuts, and ulcers; avoidance of all tobacco products and any other known vasoconstrictors.

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Coronary Artery Disease

Coronary Artery Disease is a disorder that impedes the blood flow in the arteries serving the myocardium of the heart.

Causes and Incidence

The primary causes of coronary artery disease (CAD) are arteriosclerotic and atherosclerotic processes, which narrow and occlude the vessel lumen and thicken the arterial walls. Risk factors associated with the development of CAD include underlying disease (e.g. hypertension or diabetes); use of tobacco products; familial hyperlipidemia, high-fat diet; sedentary life-style; stress; estrogen use in women less than 50 years of age; and obesity.

Vascular disease (CAD and CVA) is the leading cause of death in Europe. The incidence of CAD increases with age, and men seem more susceptible than women, particularly premenopausal women. The death rate among white men 55 to 64 years of age is about 1 in 100. CAD is much more prevalent in Western societies than in other areas of the world.

Disease Process

The exact pathologic mechanisms that induce atherosclerosis are not well understood. Current hypotheses are (1) the lipid hypothesis, in which an elevation of plasma low-density lipoprotein penetrates the arterial wall and causes a lipid buildup in the smooth muscle cells, and (2) the endothelial injury hypothesis, which suggests that a mechanical or chemical injury to the endothelial barrier sets up a tissue response, with platelet adhesion and aggregation. In either case, atherosclerosis is marked by changes in and thickening of the intimal lining of the arterial vessel. Lipids, smooth muscle cells, and connective tissue form a plaque-like substance on the lining. This process is slow and may occur over a lifetime. Arteriosclerosis causes hypertrophy and subintimal fibrosis, resulting in intimal thickening and loss of elasticity of the vessel wall, which widens the pulse pressure and increases the systolic pressure. This loss of elasticity is reinforced by atherosclerotic processes. Arterial lumens become increasingly narrow and may become obstructed, causing ischemia of the myocardium. The plaque may harden, calcify, and undergo fissure or rupture, simulating a thrombosis or embolus rapidly occluding a lumen.

Symptoms

CAD is asymptomatic until myocardial ischemia occurs. The two major manifestations of ischemia are chest pain (angina) and myocardial infarction.

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