# Atherosclerosis

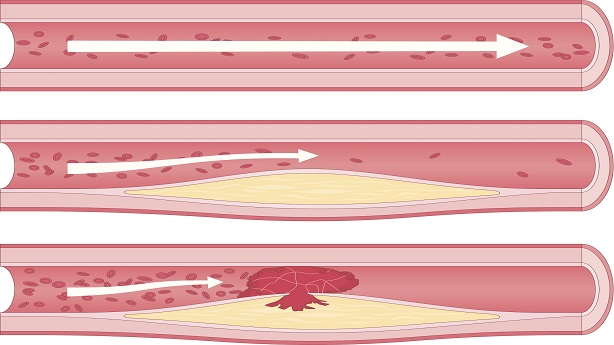
https://www.coeuretavc.ca/maladies-du-coeur/problemes-de-sante/atherosclerose?fbclid=IwAR2AjqhZn\_zz-hcomxVMUZK5OPjNZf8MAohMQDyArZZ\_FU9tR-9-NsP7-WE#:~:text=L'ath%C3%A9roscl%C3%A9rose%20peut%20causer%20un,du%20c%C5%93ur%20%E2%80%93%20peut%20%C3%AAtre%20fatale

# What is atherosclerosis?

Blood flows through the arteries like water through a garden hose to carry oxygen and nutrients to the organs. Atherosclerosis is characterized by the accumulation of fatty deposits (atheroma plaque) in the arteries, which then lose their elasticity (harden) and narrow.

Plaque is a viscous mixture of fat (lipid streaks) that builds up and makes the artery walls thick and hard. Gradually, these become narrower or blocked, which hinders blood circulation. The arteries that supply blood to the heart (coronary arteries), neck (carotid arteries) and legs are most affected.

The plaque can also rupture. In this case, a blood clot, or thrombus, forms (this is called thrombosis) at the rupture point of the plaque and blocks blood flow. The clot can also travel through blood vessels and obstruct blood flow to organs.



Atherosclerosis usually begins early in life. In fact, many people already have plaque buildup in their 40s. However, moderate accumulation does not have much effect on blood circulation. Thus, people with atherosclerosis often have no symptoms until at least half the diameter of the artery is blocked.

# **Potential complications of atherosclerosis**

Depending on which arteries are affected, atherosclerosis can cause several health problems.

## Coronary artery disease and angina

If a coronary artery is affected by atherosclerosis, there is a risk of coronary artery disease or angina (chest pain). The heart is a muscle and, like all muscles in the body, it requires a supply of oxygenated blood. If another coronary artery narrows or becomes blocked, blood flow to the heart may slow or even stop. Coronary artery disease can cause a heart attack.

When plaque grows in very small arteries in the heart, it can lead to coronary microvascular disease. Microvascular angina can present as chest pain, even when no tests detect blockage in the large arteries.

## **Carotid artery disease**

If carotid arteries – which run in the neck – become narrowed or blocked, blood flow to the brain may slow or even stop. Additionally, a piece of plaque can break off, travel to the brain through the arteries and block blood vessels there, causing a stroke or transient ischemic attack (TIA, or mini-stroke).

## **Peripheral arterial disease**

If arteries in the legs or arms become narrowed or blocked, the risk of developing peripheral artery disease (PAD) is high. The latter leads in particular to pain and muscle cramps during physical activities, even walking. Typically, leg pain is the first apparent sign of PAD, but the disease can affect other organs in the body. Indeed, PAD also sometimes affects the arteries that carry blood to the kidneys or stomach, potentially causing damage to these organs.

Learn more about MAP on the website of Laval University and the Canadian Society of Vascular Surgery. <https://canadianvascular.ca/Maladie-vasculaire-peripherique-MVP/~french>

## **Aneurysm**

Atherosclerosis can cause an aneurysm, which is a swelling in the wall of an artery that causes it to weaken. An aneurysm can rupture and cause bleeding in the brain. Rupture of an aneurysm of the aorta – the largest artery in the heart – can be fatal.

# **Risk factors**

The risk factors for atherosclerosis are:

* high blood pressure;
* hypercholesterolemia (high cholesterol);
* diabetes;
* unhealthy weight;
* an unhealthy diet;
* a family history of heart disease;
* a lack of physical activity;
* smoking;
* dyslipidemia (high blood fat levels);
* chronic renal failure (or nephropathy);
* the Depression.
* Find out how to reduce your risk of atherosclerosis.

## **Causes**

Atherosclerosis is a health problem that develops slowly and gradually, and can begin in childhood. The causes are complex and not completely understood. However, it is believed that atherosclerosis begins when the inner lining of the artery is damaged, notably by:

* high blood pressure;
* high cholesterol (hypercholesterolemia) and triglycerides (a type of lipid found in the blood – hypertriglyceridemia);
* high levels of insulin in the blood resulting from diabetes (hyperinsulinism);
* smoking (more precisely by chemicals).

Damaged blood vessels respond by depositing plaque composed of lipids, cholesterol, calcium and other fatty substances against their inner lining. Gradually, the diameter of these blood vessels narrows, which impairs blood flow.

## **Symptoms**

In some cases, atherosclerosis does not cause any symptoms until it has advanced enough to block a major blood vessel. If the blockage occurs in one of the arteries of the heart, it will cause angina. Additionally, by developing in the coronary arteries, atherosclerosis can cause a heart attack. If the blockage forms in the arteries of the brain, it can lead to a stroke. If it occurs in the legs, it can cause cramps there during physical activities like walking.

## **Diagnostic**

A health care provider bases the diagnosis of atherosclerosis on a medical history check, a complete physical exam, and blood tests. Tests include:

* the medical examination;
* taking the tibio-brachial index (test comparing blood pressure at the ankle and that in the arm to determine the state of blood circulation in the limbs and, thus, making it possible to diagnose PAD);
* blood tests;
* urine tests;
* Doppler ultrasound;
* electrocardiogram (ECG);
* the stress test;
* coronary angiography;
* cardiac MRI;
* nuclear imaging Single photon emission tomography (SPECT) and position emission tomography (PET) allow the doctor to assess the quality of blood circulation. Using radioactive substances, their camera produces 3D images of internal organs. PET emits less radioactive radiation and provides higher quality images, which can detect smaller blood interruptions, than SPECT.

Blood tests used to measure cholesterol and triglyceride levels help determine whether healthy people are at risk of atherosclerosis. Blood lipid testing is recommended for people aged 40 or over and people with risk factors. If this is your case, ask your family doctor to measure your lipid levels if they are not already monitored.

## **Treatment**

A person with atherosclerosis can treat the condition by changing certain lifestyle habits, taking medications, or having surgery or other procedures.

## **Way of life**

You can reduce your risk of developing heart disease or having a stroke by controlling your blood pressure, diabetes and blood cholesterol levels. It is also important to have a healthy lifestyle.

* Do not smoke.
* Be active.
* Maintain a healthy weight.
* Eat a healthy, balanced diet (such as following a special diet that reduces the risk of heart disease and stroke).
* Reduce your alcohol consumption.
* Reduce your stress.
* Talk to your doctor about lifestyle changes you can make to stay healthy.

## **Drugs**

The drug treatments that can be prescribed are diverse.

* To reduce lipid and cholesterol levels in the blood
  + statins
* To control blood pressure
  + ACE (angiotensin converting enzyme) inhibitors
  + beta-blockers
  + calcium channel blockers.
  + diuretics
* To reduce the risk of blood clots
  + antiplatelets
  + anti coagulant

## **Surgery**

If you have severe atherosclerosis, a doctor may recommend surgery to manage your condition. Interventions associated with atherosclerosis are:

* percutaneous coronary intervention (PCI, or stent angioplasty – inserting and inflating a balloon into the narrowed or blocked artery to implant a stent and thus widen the artery);
* carotid endarterectomy (surgery to remove plaque in the carotid artery);
* coronary bypass surgery (intervention aimed at allowing blood to bypass the narrowed or blocked artery).

## **Recovery**

A personalized cardiac rehabilitation program includes physical exercises, as well as information sessions and psychological consultation to support your recovery from heart disease and to reduce your risk of suffering from other heart problems in the future. Consult your doctor, a public health service or a hospital center to find out about cardiac rehabilitation programs offered in your area.