CONDITION

Atherosclerosis

Learn how atherosclerosis develops, which symptoms may occur, how it is diagnosed, and how treatment can lower the risk of heart attack, stroke, and circulation problems.

WHAT IT IS
Long-term plaque buildup inside arteries

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Chest discomfort, shortness of breath, temporary weakness, walking leg pain

WHAT CAUSES IT
LDL cholesterol buildup and inflammation

HOW IT IS DIAGNOSED
Artery imaging with ultrasound, CT, MR, or catheter angiography

MAIN TREATMENT
Lifestyle changes, medicines, and blood-flow procedures

CAN IT BE CURED?
No, treatment slows plaque progression

IS IT AN EMERGENCY?
Sometimes, new severe chest pressure

LONG-TERM OUTLOOK
Risk can be reduced, but serious complications may occur

Overview

Atherosclerosis is a long-term disease in which plaque builds up inside arteries. Arteries are blood vessels that carry oxygen-rich blood from the heart to the rest of the body.

Plaque contains cholesterol, other fats, inflammatory cells, calcium, and fibrous tissue. Over time, it can harden and narrow an artery. This may reduce blood flow to the heart, brain, legs, kidneys, or other organs.

Atherosclerosis is different from arteriosclerosis, a broader term for thickening and stiffening of the arteries. Atherosclerosis is a specific type of arteriosclerosis caused by plaque.

The condition often develops slowly and may not cause symptoms for many years. However, a plaque can become unstable and break open. The body may respond by forming a blood clot,

which can suddenly block blood flow. Depending on where this happens, the result may be a heart attack, stroke, or another medical emergency.

Atherosclerosis matters because it can affect several parts of the body at the same time. For example, a person with plaque in the leg arteries may also have plaque in the arteries supplying the heart or brain. Managing cholesterol, blood pressure, tobacco exposure, diabetes, and other risks can slow the disease and reduce the chance of complications.

Symptoms

Early atherosclerosis usually causes no noticeable symptoms. Symptoms tend to appear when an artery becomes narrowed enough to limit blood flow or when a blood clot forms.

The symptoms depend on which arteries are affected:

Call emergency services for chest pressure or discomfort that is new, severe, lasts more than a few minutes, or occurs with sweating, shortness of breath, faintness, or nausea.

Emergency help is also needed for sudden facial drooping, arm or leg weakness, trouble speaking, loss of vision, severe dizziness, or loss of balance. A suddenly cold, pale, numb, very painful, or weak arm or leg can indicate an abrupt loss of blood flow and also requires emergency care.

- Heart arteries: Chest pressure, tightness, heaviness, or discomfort may occur during activity or stress. Some people have shortness of breath, unusual fatigue, nausea, or discomfort in the arm, shoulder, jaw, back, or upper abdomen.
- Brain and neck arteries: Temporary weakness, numbness, speech difficulty, vision changes, dizziness, or loss of coordination can occur if blood flow to the brain is interrupted.
- Leg arteries: Pain, aching, cramping, or tiredness in the calf, thigh, hip, or buttock may begin during walking and improve with rest. More advanced disease may cause foot pain at rest, slow-healing wounds, or skin color changes.
- Kidney arteries: Narrowing may contribute to high blood pressure that is difficult to control or to reduced kidney function.
- Abdominal arteries: Reduced blood flow to the intestines may cause abdominal pain after meals, sometimes with reduced food intake or unintended weight loss.

Causes and risk factors

Atherosclerosis begins with changes in the inner lining of an artery. Low-density lipoprotein cholesterol, often called LDL or "bad" cholesterol, can enter the artery wall. Inflammation develops around the trapped cholesterol, and plaque gradually forms.

Plaques do not all behave the same way. Some mainly narrow the artery over time. Others may not cause severe narrowing but can rupture and trigger a blood clot. A person's risk therefore cannot be judged from symptoms alone.

Factors associated with atherosclerosis include:

Some risks, such as age and family history, cannot be changed. Others can be treated or reduced. Risk factors also interact. For example, smoking combined with high blood pressure may create more risk than either factor alone.

A family history can be especially important when close relatives developed heart or blood vessel disease at an unusually young age. In some families, very high LDL cholesterol is caused by an inherited condition called familial hypercholesterolemia.

- High LDL cholesterol or certain inherited cholesterol disorders
- High blood pressure
- Cigarette smoking or other tobacco exposure
- Diabetes
- Chronic kidney disease
- Older age
- A family history of early cardiovascular disease
- Limited physical activity
- Eating patterns high in saturated fat, trans fat, sodium, or heavily processed foods
- Excess body weight, especially when linked with diabetes, high blood pressure, or abnormal cholesterol
- Chronic inflammatory conditions, such as rheumatoid arthritis or psoriasis
- Sleep disorders that affect breathing, including obstructive sleep apnea

Diagnosis

A clinician usually begins by reviewing symptoms, medical history, family history, medicines, tobacco exposure, eating habits, and physical activity. The examination may include blood pressure measurements, listening for unusual blood-flow sounds, checking pulses, and looking

for skin or wound changes.

Blood tests can measure total cholesterol, LDL cholesterol, high-density lipoprotein cholesterol, and triglycerides. Blood glucose or an A1C test may be used to look for diabetes. Kidney and liver tests may help assess related conditions and guide treatment.

Testing is selected according to symptoms and the part of the body that may be affected. Possible tests include:

Not everyone needs imaging. Broad screening with artery scans can lead to unclear findings or unnecessary procedures. A clinician can decide whether testing is likely to change care.

- Ankle-brachial index: Compares blood pressure at the ankle with blood pressure in the arm to check circulation in the legs.
- Electrocardiogram: Records the heart's electrical activity.
- Exercise or imaging stress test: Evaluates how the heart responds when it works harder.
- Ultrasound: Uses sound waves to assess blood flow or look for narrowing in certain arteries.
- CT coronary calcium scan: Detects calcium in heart-artery plaque and may help refine cardiovascular risk for selected people when a treatment decision is uncertain.
- CT or MR angiography: Produces detailed pictures of arteries, often with contrast material.
- Catheter angiography: Uses a thin tube placed in an artery and contrast dye to show blockages. It is usually reserved for situations in which detailed anatomy or a procedure may be needed.

Treatment and management

Treatment aims to prevent plaque from progressing, lower the chance of a blood clot, relieve symptoms, and protect affected organs. The plan depends on whether a person already has cardiovascular disease and on their overall risk.

Stopping tobacco use is one of the most important steps for people who smoke. Counseling, support programs, and approved medicines can improve the chance of quitting. Avoiding secondhand smoke is also helpful.

Regular physical activity supports blood pressure, cholesterol, blood sugar, circulation, and overall fitness. People with leg-artery disease may benefit from a structured walking program. Anyone with chest discomfort, severe leg symptoms, or major health limitations should ask a clinician how to begin safely.

A heart-supportive eating pattern generally emphasizes vegetables, fruits, whole grains, legumes, nuts, fish, and unsaturated oils. It limits saturated fat, trans fat, excess sodium, added sugars, and heavily processed foods. Changes should be practical and sustainable rather than based on short-term restrictive diets.

Medicines may be used to address specific risks:

Medicines work best when taken consistently. A person should not stop a statin, antiplatelet medicine, or blood pressure medicine because of a suspected side effect without contacting the prescriber. A different dose or medicine may be possible.

Some people need a procedure to restore blood flow. Angioplasty uses a small balloon to open an artery, often followed by placement of a mesh tube called a stent. Bypass surgery creates a new route around a severe blockage. Procedures may improve symptoms or treat dangerous reductions in blood flow, but they do not remove the tendency to develop plaque. Risk-factor treatment remains important afterward.

- Cholesterol-lowering treatment: Statins like atorvastatin or simvastatin lower LDL cholesterol and reduce the risk of cardiovascular events for many people with established atherosclerotic cardiovascular disease or elevated risk. Other medicines, such as ezetimibe, PCSK9-targeting therapies, or bempedoic acid, may be considered in selected situations.
- Blood pressure treatment: Several types of medicine can lower blood pressure. The choice depends on other medical conditions, kidney function, side effects, and treatment goals.
- Diabetes treatment: Blood sugar management helps protect blood vessels. Some diabetes medicines also provide heart or kidney benefits for appropriate patients.
- Antiplatelet treatment: Medicines such as aspirin or clopidogrel make platelets less likely to form a clot. They are commonly used for certain people with established artery disease, but they can cause bleeding. Aspirin should not be started for prevention without discussing personal benefits and risks with a clinician.

Complications

Atherosclerosis can lead to:

Complications may develop gradually or appear suddenly after a plaque ruptures. Prompt attention to changing symptoms can reduce delays in treatment.

- Coronary artery disease, heart attack, or heart failure when heart arteries are affected

- Transient ischemic attack or stroke when blood flow to the brain is interrupted
- Peripheral artery disease with walking pain, wounds, infection, or threatened loss of a limb
- Kidney damage when kidney blood flow is reduced
- Mesenteric ischemia , meaning inadequate blood flow to the intestines
- Aneurysm , an abnormal bulge in a weakened artery wall

Follow up

Routine follow-up is used to review blood pressure, cholesterol, blood sugar, symptoms, physical activity, tobacco use, and how medicines are working. Blood tests may be repeated after treatment changes or at intervals chosen by the clinician. People who have had a stent, bypass operation, stroke, heart attack, or limb procedure may need follow-up with one or more specialists.

Contact a clinician promptly for new or worsening chest discomfort with activity, a clear reduction in walking distance, foot pain at rest, a wound that is not healing, or medicine side effects. These symptoms need assessment but are not always emergencies.

Use emergency services for possible heart attack or stroke symptoms, fainting with chest discomfort, sudden severe shortness of breath, or a limb that suddenly becomes painful, pale, cold, numb, or weak. Do not drive yourself when emergency symptoms are present.

Sources

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