CONDITION

Aortic dissection

Learn how an aortic dissection develops, which symptoms need emergency care, and how doctors diagnose, treat, and monitor this serious aortic condition.

WHAT IT IS
Tear separating layers of the aorta

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Sudden severe chest or back pain, fainting, breathlessness, stroke-like symptoms

WHAT CAUSES IT
Weakened aortic wall, sometimes inherited

HOW IT IS DIAGNOSED
CT angiography, TEE, or MRA

MAIN TREATMENT
Blood pressure medicines, surgery, or endovascular repair

CAN IT BE CURED?
Sometimes, but lifelong monitoring remains necessary

IS IT AN EMERGENCY?
Yes, suspected dissection needs emergency assessment

LONG-TERM OUTLOOK
Lifelong follow-up due to ongoing complications

Overview

An aortic dissection is a tear in the inner layer of the aorta, the body's largest artery. The aorta carries oxygen-rich blood from the heart to the rest of the body.

When the inner layer tears, blood can enter the wall of the aorta and separate its layers. This creates a second channel, sometimes called a false lumen. The dissection may extend along the aorta and reduce blood flow to the brain, heart, kidneys, intestines, spinal cord, or limbs. It can also weaken the aortic wall and lead to life-threatening internal bleeding.

Doctors commonly classify aortic dissections by the part of the aorta involved:

An aortic dissection is part of a group of emergencies called acute aortic syndromes. Related conditions include bleeding within the aortic wall without a visible inner tear, called an

intramural hematoma, and a penetrating aortic ulcer.

Prompt medical care matters because symptoms can resemble a heart attack, stroke, or other condition. Testing is needed to identify the cause and choose the safest treatment.

- Stanford type A involves the ascending aorta, the section closest to the heart. It usually requires emergency surgery.
- Stanford type B does not involve the ascending aorta. Some cases can initially be managed with medicine and close monitoring, while others need an urgent procedure.

Symptoms

The most recognized symptom is sudden, severe pain in the chest, upper back, abdomen, or neck. People may describe the pain as sharp, tearing, ripping, or unlike pain they have felt before. The pain may move as the dissection extends, but it does not always have a classic description.

Other possible symptoms include:

Some people have less dramatic pain, and a small number have no clear pain. Symptoms depend on which parts of the aorta and which branch arteries are affected.

Call emergency services immediately for sudden severe chest, back, or abdominal pain, especially when it occurs with fainting, breathlessness, sweating, weakness, or stroke-like symptoms. Do not drive yourself. A suspected aortic dissection requires emergency assessment even if the pain improves.

- Fainting, severe weakness, sweating, or shortness of breath
- New weakness or numbness on one side, trouble speaking, confusion, or other stroke-like symptoms
- Pain, numbness, coolness, or weakness in an arm or leg
- A weak pulse or a major blood pressure difference between the arms
- Severe abdominal or back pain
- Trouble walking or sudden paralysis
- Symptoms of heart failure, such as severe breathlessness
- Loss of consciousness

Causes and risk factors

A dissection usually develops where the aortic wall has been weakened or placed under long-term stress. High blood pressure is a major risk factor because it repeatedly increases force against the artery wall.

An enlarged aorta, called an aortic aneurysm, also raises the risk. However, a dissection can occur when the aorta is only mildly enlarged or has not previously been known to be abnormal.

Other factors that can increase risk include:

Inherited conditions can weaken the connective tissue that supports the aorta. These include Marfan syndrome, Loeys-Dietz syndrome, vascular Ehlers-Danlos syndrome, and certain gene variants that cause familial thoracic aortic disease. A person may have an inherited risk even without obvious physical features.

Pregnancy and the weeks after delivery place additional stress on the heart and aorta. Dissection remains uncommon, but the risk may be higher in people with an enlarged aorta, a genetic aortic condition, a bicuspid aortic valve, or poorly controlled high blood pressure.

Having one or more risk factors does not mean that a person will develop a dissection. Some people have no previously recognized aortic disease.

- Older age
- Smoking
- Atherosclerosis, which is plaque buildup in the arteries
- A bicuspid aortic valve, meaning the valve has two flaps instead of the usual three
- Coarctation of the aorta, a narrowing present from birth
- A previous aortic dissection, aneurysm, or aortic procedure
- A family history of thoracic aortic aneurysm or dissection
- Inflammatory diseases that affect blood vessels
- Significant blunt chest injury
- Use of cocaine or other stimulants like methylphenidate or lisdexamfetamine that can sharply raise blood pressure

Diagnosis

Doctors first assess symptoms, medical history, blood pressure, pulses, heart sounds, and signs of reduced blood flow to an organ or limb. They may ask about known aortic enlargement, inherited conditions, pregnancy, stimulant use, and family history.

Imaging is needed to confirm or exclude a dissection. The test is chosen according to the person's condition, kidney function, local resources, and how quickly results are needed.

CT angiography is commonly used because it is fast and can show the entire aorta, the tear, and affected branch arteries. It usually requires an intravenous contrast material that makes blood vessels visible.

Transesophageal echocardiography , or TEE, uses an ultrasound probe placed in the esophagus. Because the esophagus lies close to the heart and aorta, TEE can provide useful images at the bedside or during surgery. Sedation is usually needed.

Magnetic resonance angiography , or MRA, can provide detailed images without radiation. It takes longer and may not be suitable for someone who is medically unstable, so it is used more often in selected situations or for follow-up.

An electrocardiogram, chest X-ray, and blood tests may help evaluate other causes or complications. However, normal results from these tests do not by themselves rule out an aortic dissection. A blood test called D-dimer may contribute to a structured evaluation in carefully selected people, but it should not be used alone to dismiss concerning symptoms.

Treatment and management

Initial treatment takes place in a hospital, often in an intensive care unit. The medical team closely monitors blood pressure, heart rhythm, urine output, circulation, and neurologic function.

Medicines are usually given through a vein to reduce the force of each heartbeat and lower blood pressure in a controlled way. A beta blocker like metoprolol or propranolol is commonly used first when appropriate. Other medicines may be added if blood pressure remains high. Strong pain control is also important because pain and anxiety can increase heart rate and blood pressure.

Treatment then depends mainly on the dissection's location and complications.

A type A dissection usually requires emergency open surgery. The surgeon removes or reinforces the damaged section of the ascending aorta and replaces it with a synthetic graft. Repair or replacement of the aortic valve may also be needed. If branch arteries or the aortic arch are involved, the operation may be more extensive.

An uncomplicated type B dissection may initially be treated with medicine and close observation. "Uncomplicated" means there is no rupture, threatened organ blood flow, rapid expansion, persistent uncontrolled pain, or blood pressure that remains uncontrolled despite treatment.

A complicated type B dissection often requires an urgent procedure. Many people are treated with thoracic endovascular aortic repair, or TEVAR. During TEVAR, a stent graft is guided through an artery, usually from the groin, and placed inside the aorta to cover the entry tear. Open surgery or a combination of techniques may be needed in some cases.

After the immediate crisis, long-term management usually includes blood pressure control and regular imaging. Medicines are selected according to the person's blood pressure, heart rate, kidney function, and other medical conditions. Patients should take them as directed and discuss side effects before making changes.

Helpful long-term measures may include stopping smoking, avoiding cocaine and other non-prescribed stimulants, and treating cholesterol or other cardiovascular risks when appropriate. A clinician can explain safe activity levels. Moderate aerobic activity may be encouraged after recovery, while heavy lifting or straining may need to be limited because it can cause sudden blood pressure spikes.

People considering pregnancy after a dissection, or those with a genetic aortic condition, should seek pre-pregnancy advice from an experienced cardiovascular and maternal medicine team.

Complications

A dissection can block arteries branching from the aorta. This can reduce blood supply to organs, a problem called malperfusion.

Possible complications include:

Long-term complications can occur even after successful treatment. The remaining aorta may enlarge, form an aneurysm, or develop new areas of dissection. A surgical graft or endovascular stent graft can also require monitoring for leaks, movement, or other problems.

- Stroke or other brain injury
- Heart attack
- Leakage of the aortic valve
- Heart failure
- Blood collecting around the heart and compressing it, called cardiac tamponade
- Kidney injury
- Intestinal injury from reduced blood flow
- Spinal cord injury or paralysis

- Loss of circulation to an arm or leg
- Rupture of the aorta and severe internal bleeding

Follow up

Aortic dissection requires lifelong follow-up with a cardiovascular clinician. Care may involve a cardiologist, vascular surgeon, cardiac surgeon, genetics specialist, or a dedicated aortic disease center.

CT or MRI scans are used to monitor the repaired and unrepaired parts of the aorta. For people with residual aortic disease after an acute dissection, major US guidance recommends imaging after 1 month, 6 months, and 12 months, then annually if findings remain stable. The schedule may differ based on the repair, imaging results, kidney function, and individual risk.

Routine follow-up should review blood pressure, medicines, activity, symptoms, and imaging results. Patients can ask whether they should measure blood pressure at home and what range their care team recommends.

Genetic counseling or testing may be appropriate when dissection occurs at a younger age, runs in the family, or appears with features of an inherited condition. First-degree relatives-parents, siblings, and children-may be advised to have aortic imaging even if genetic testing does not identify a cause.

Contact the treating team promptly for new or increasing chest, back, or abdominal discomfort, reduced exercise tolerance, medication problems, or consistently higher blood pressure readings. These concerns need timely advice but are not always emergencies.

Call emergency services for sudden severe pain, fainting, severe breathlessness, stroke-like symptoms, or a suddenly cold, painful, weak limb. These symptoms should not wait for a routine appointment.

Sources

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