CONDITION

Aortic regurgitation

Learn how aortic regurgitation affects blood flow, what symptoms may occur, how it is diagnosed, and when monitoring or valve treatment may be needed.

WHAT IT IS
Heart valve condition causing backward blood leakage

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Shortness of breath, tiredness, palpitations, chest discomfort

WHAT CAUSES IT
Valve damage or enlargement of the aorta

HOW IT IS DIAGNOSED
Echocardiogram, with cardiac MRI if unclear

MAIN TREATMENT
Monitoring, blood pressure treatment, or valve surgery

CAN IT BE CURED?
Sometimes - valve repair or valve replacement

IS IT AN EMERGENCY?
Sometimes - sudden severe breathlessness or chest pain

LONG-TERM OUTLOOK
Variable, with severe disease risking heart failure

Overview

Aortic regurgitation is a heart valve condition. It is also called aortic insufficiency. It affects the aortic valve, which sits between the heart's main pumping chamber, the left ventricle, and the aorta, the large artery that carries blood to the body.

A healthy aortic valve closes tightly after each heartbeat. With aortic regurgitation, the valve does not close completely. Some blood leaks backward from the aorta into the left ventricle.

The condition may develop slowly over years or begin suddenly. Chronic, or long-term, aortic regurgitation gives the left ventricle time to adjust. It may become larger and pump more blood with each beat. A person can therefore have significant valve leakage without early symptoms. Over time, however, the extra workload can weaken the heart muscle.

Acute aortic regurgitation develops suddenly. The heart has no time to adapt, so pressure can rise quickly inside the heart and lungs. This is less common but may require emergency treatment.

Aortic regurgitation ranges from mild to severe. Mild disease may only need periodic monitoring. Severe disease may require valve surgery, especially when symptoms develop or tests show that the left ventricle is becoming enlarged or weak.

Symptoms

Chronic aortic regurgitation often causes no symptoms at first. It may be discovered during a physical examination or an imaging test performed for another reason.

When symptoms occur, they may include:

Some people notice a strong pulse, particularly in the neck, or feel their heartbeat more clearly when lying down. These sensations can occur because the heart is pumping a larger volume of blood with each beat.

Symptoms do not always match the severity of the valve leak. A person with severe chronic regurgitation may feel well even as the left ventricle changes. This is why scheduled heart imaging matters even when there are no symptoms.

Acute severe aortic regurgitation may cause sudden shortness of breath, chest pain, weakness, confusion, or signs of very low blood pressure. These symptoms require emergency assessment.

- Shortness of breath during activity or when lying flat
- Reduced exercise ability or unusual tiredness
- Awareness of a forceful, pounding, or irregular heartbeat
- Chest pressure or discomfort, especially with activity
- Swelling in the feet, ankles, or legs
- Lightheadedness or fainting

Causes and risk factors

Aortic regurgitation can result from a problem with the valve itself or with the nearby aorta. If the first part of the aorta becomes enlarged, the valve leaflets may be pulled apart and unable to close properly.

Possible causes include:

Long-standing high blood pressure may worsen stress on the left ventricle and contribute to aortic enlargement. A family history of bicuspid aortic valve, thoracic aortic aneurysm, or aortic dissection may also be relevant. When one of these inherited or congenital conditions is found, a clinician may discuss heart imaging for close relatives.

Aortic regurgitation is not caused by everyday activity, emotional stress, or a single dietary choice.

- Bicuspid aortic valve: The valve forms with two leaflets instead of the usual three. This difference is present from birth and may affect both the valve and the aorta.
- Age-related valve changes: Valve tissue can thicken, weaken, or become less flexible over time.
- Aortic enlargement: High blood pressure, inherited connective tissue conditions, or other aortic diseases can widen the aortic root or ascending aorta.
- Infective endocarditis: An infection of the heart's inner lining or valves can damage a valve leaflet.
- Rheumatic heart disease: Valve scarring can occur after rheumatic fever, a complication of untreated or inadequately treated streptococcal infection. This cause is less common in countries where prompt treatment is widely available.
- Aortic dissection: A tear within the wall of the aorta can suddenly disrupt the valve. This is a medical emergency.
- Chest injury or a procedure-related injury: Trauma and, rarely, complications of heart procedures can damage the valve.
- Inflammatory or inherited disorders: Conditions that affect connective tissue or blood vessels may involve the aortic root.

Diagnosis

Diagnosis usually begins with a health history and physical examination. A clinician will ask about breathing, exercise tolerance, chest discomfort, fainting, palpitations, previous infections, blood pressure, and family history.

Listening with a stethoscope may reveal a heart murmur. The typical murmur occurs while the heart relaxes between beats. A clinician may also notice a wide difference between the upper and lower blood pressure numbers or a forceful pulse. These findings can suggest regurgitation, but they cannot confirm its severity.

An echocardiogram is the main diagnostic test. This ultrasound examination shows the valve, the direction of blood flow, and how the left ventricle is functioning. It helps assess:

A transthoracic echocardiogram is performed by moving an ultrasound probe over the chest. If more detail is needed, a transesophageal echocardiogram may be used. For that test, a probe is guided into the esophagus while the person receives sedation.

Cardiac magnetic resonance imaging, or cardiac MRI, can measure backward blood flow and heart size when echocardiogram findings are unclear or incomplete. CT imaging may be used to examine an enlarged aorta or plan a procedure.

An electrocardiogram records the heart's electrical activity. A chest X-ray may show heart enlargement or fluid in the lungs. Exercise testing can help determine whether someone who reports no symptoms develops symptoms or has reduced exercise ability under supervision.

Clinicians classify aortic regurgitation by its severity and by its effects on the heart. Decisions are based on the full picture rather than on a single measurement.

- The amount of blood leaking through the valve
- The valve's structure and likely cause of leakage
- The size and pumping strength of the left ventricle
- The size of the aortic root and nearby aorta
- Other valve or heart conditions

Treatment and management

Treatment depends on whether the condition is acute or chronic, how much leakage is present, whether symptoms are present, and how the left ventricle and aorta are changing.

Mild or moderate chronic aortic regurgitation often does not need an immediate procedure. Regular examinations and echocardiograms are used to watch for progression. The timing of these visits is individualized according to severity, test findings, symptoms, and the condition of the aorta.

No medicine can make a damaged aortic valve close normally. Blood pressure treatment may reduce strain on the heart and aorta, especially when high blood pressure is present. The choice of medicine depends on the person's overall health and should be made by a clinician. Medication does not replace valve treatment when severe regurgitation meets criteria for an operation.

Aortic valve surgery may be recommended for severe regurgitation when symptoms develop

or when imaging shows that the left ventricle is weakening or becoming too enlarged. Surgery may also be appropriate when another heart or aortic operation is already planned.

The main surgical options are valve repair and valve replacement. Repair preserves the person's own valve but is practical only for selected valve problems and requires suitable surgical expertise. Replacement uses either a mechanical valve or a valve made from animal tissue.

Mechanical valves are durable but generally require lifelong medicine to reduce blood clot formation. Tissue valves usually do not require lifelong anticoagulation solely because of the valve, but they may wear out over time. Age, pregnancy plans, bleeding risk, other health conditions, and personal preferences all affect this decision.

A transcatheter valve procedure places a new valve through a blood vessel rather than through open surgery. Its role in isolated native aortic regurgitation is more limited than its role in aortic stenosis. It may be considered for selected people who cannot undergo surgery, depending on anatomy, local expertise, and available devices.

Acute severe aortic regurgitation usually requires urgent hospital care and often prompt surgery. Medicines may temporarily support circulation, but they generally do not correct the underlying valve damage.

Regular physical activity may be appropriate for many people with stable disease. Exercise advice should reflect the severity of leakage, heart size and function, aortic size, blood pressure, and symptoms. People with significant aortic enlargement may need to avoid heavy straining or very intense lifting.

Good dental care helps reduce infections that could enter the bloodstream. Antibiotics like amoxicillin or doxycycline before dental procedures are recommended only for certain people at highest risk of infective endocarditis, such as some patients with prosthetic valves or a previous history of endocarditis. Aortic regurgitation alone does not automatically mean preventive antibiotics are needed.

Complications

Long-term severe regurgitation can cause the left ventricle to enlarge and eventually weaken. This may lead to heart failure, in which the heart cannot pump enough blood to meet the body's needs or pressures rise enough to cause lung congestion.

Other possible complications include abnormal heart rhythms and infective endocarditis. When aortic regurgitation is related to an enlarged aorta, the aorta may continue to widen and require separate monitoring or treatment.

Complications are less likely to go unnoticed when recommended follow-up is maintained. Treatment before permanent heart muscle damage develops can improve outcomes.

Follow up

Follow-up usually includes symptom review, blood pressure checks, physical examinations, and repeat echocardiograms. More frequent monitoring may be needed when regurgitation is severe, the left ventricle is changing, the aorta is enlarged, or new symptoms appear.

Keep track of changes in exercise capacity. Becoming short of breath on a familiar walk, needing more pillows to breathe comfortably, or developing new swelling may be more useful than judging a single difficult day.

Contact the treating clinician promptly for new or steadily worsening shortness of breath, reduced activity tolerance, palpitations, swelling, chest discomfort, or fainting. Fever, chills, night sweats, or persistent unexplained fatigue also deserve timely medical review, especially after a recent infection or procedure, because they can occur with endocarditis.

Seek emergency care for:

Pregnancy increases the amount of blood the heart must pump. Anyone with moderate or severe aortic regurgitation, an enlarged aorta, or a previous valve procedure should discuss pregnancy planning with a cardiology and obstetric team.

- Sudden severe shortness of breath or difficulty breathing at rest
- New severe chest pain, especially pain that spreads to the back
- Fainting with ongoing weakness, breathing trouble, or chest pain
- Signs of stroke, such as facial drooping, arm weakness, or trouble speaking
- Confusion, cold or clammy skin, or other signs of severely reduced circulation

Sources

- Otto CM, Nishimura RA, Bonow RO, et al. 2020 ACC/AHA guideline for the management of patients with valvular heart disease. Circulation . 2021;143(5):e72-e227.
- Vahanian A, Beyersdorf F, Praz F, et al. 2021 ESC/EACTS guidelines for the management of valvular heart disease. European Heart Journal . 2022;43(7):561-632.
- Isselbacher EM, Preventza O, Hamilton Black J III, et al. 2022 ACC/AHA guideline for the diagnosis and management of aortic disease. Circulation . 2022;146(24):e334-e482.

- Wilson WR, Gewitz M, Lockhart PB, et al. Prevention of viridans group streptococcal infective endocarditis: A scientific statement from the American Heart Association. Circulation . 2021;143(20):e963-e978.