

Aortic stenosis

Aortic stenosis is the abnormal narrowing of the aortic valve, which restricts the flow of blood from the ventricle into the aorta. Normally, blood carrying oxygen (oxygenated) enters the left upper chamber (atrium) of the heart. It is then pumped into the lower left chamber (ventricle). The aortic valve opens when the heart contracts to pump blood from the left ventricle into the aorta, the body's main artery. When the left ventricle relaxes, the aortic valve closes because there is a higher blood pressure within the aorta compared to the ventricle.

Aortic stenosis creates high blood pressure inside the left ventricle. This is because the narrowed valve restricts blood flow. In response to the extra workload, the muscle of the left ventricle thickens (concentric hypertrophy) and the chamber itself may eventually balloon out. The heart can no longer pump blood efficiently. Without treatment, death from congestive heart failure is possible. Around four in every 1,000 people are thought to have aortic stenosis.

Symptoms of aortic stenosis

Aortic stenosis may have no symptoms (asymptomatic) for many years. This is why the condition, which may have been congenital (present from before birth), is often diagnosed during teenage years. Symptoms may appear later in life after decades of gradual progressive narrowing. The onset of symptoms may be gradual or abrupt with:

- Breathlessness
- Breathing problems worsened by physical activity
- Coughing at night when lying down in bed
- Fainting
- Heart palpitations
- Pains in the chest, from the heart (angina)
- Fatigue
- Visual problems.

Causes of aortic stenosis

Some of the causes include:

- **Congenital heart disease** – the baby is born with heart abnormalities. For example, the aortic valve may be smaller than it should be.
- **Valve abnormalities** – some people are born with minor abnormalities of the aortic valve. Over time, these abnormalities may cause the valve to narrow.
- **Rheumatic heart disease** – is a condition that can scar the aortic valve and narrow its opening.
- **Calcium deposits** – a build-up of calcium can stiffen the aortic valve and interfere with its proper functioning. This is the most common cause of aortic stenosis in people aged 70 years and over.

Complications of aortic stenosis

Aortic stenosis can be a serious and potentially life-threatening condition. Some of the possible complications include:

- **Pulmonary oedema** – the back pressure of blood inside the heart changes the pressure in the blood vessels of the lungs. This causes congestion and breathing difficulties.
- **Cardiomegaly** – without treatment, the left ventricle may thicken and enlarge. This reduces the ventricle's ability to pump blood.

- **Congestive heart failure** – aortic stenosis compromises the functioning of the heart's left side. Congestive heart failure occurs when the right side of the heart also stops working properly.
- **Heart arrhythmia** – is an irregular heartbeat. Some arrhythmias in the ventricles may be associated with cardiac death, such as 'ventricular fibrillation' when the ventricles are reduced to quivering rather than beating.

Diagnosis of aortic stenosis

Aortic stenosis is diagnosed using a number of tests including:

- Physical examination including listening to the heart with a stethoscope
- Chest x-ray
- Electrocardiogram (ECG) to monitor the heart rate and pick up any unusual rhythms and to assess thickening of the left ventricle
- Echocardiograph (ultrasound scan) of the heart to assess the functioning of the aortic valve and of the left ventricle
- Cardiac catheterisation (a slender tube is inserted into a blood vessel of the groin and threaded up to the heart)
- Left ventriculography, which includes using a dye so that the heart shows up more clearly on x-ray
- Coronary arteriography to assess whether there is coronary artery disease in addition to the recognised aortic valve disease.

Treatment for aortic stenosis

Treatment may include:

- Monitoring – for asymptomatic or mild cases
- Medications to prevent heart failure
- Hospitalisation – for moderate to severe cases
- Lifestyle patterns such as maintaining physical activity while avoiding hard physical exercise, control of weight and avoidance of smoking
- Surgery.

Surgical procedures

There are two main surgical procedures for treating aortic stenosis:

- **Balloon valvuloplasty** – a catheter is inserted into a blood vessel in the groin and threaded up to the heart. The tip of the catheter is placed inside the aortic valve and then a balloon is inflated. This helps to stretch and widen the valve and improve blood flow into the aorta. This procedure doesn't cure the condition and further surgical treatment may be needed later in life. This procedure is usually limited to those with congenital aortic stenosis – usually in children or adolescents.
- **Aortic valve replacement** – if the valve is too defective, it may be surgically replaced with an artificial valve. Sometimes, the person's own pulmonary valve may be used. The latter is known as a pulmonary autograft or Ross Operation.

Where to get help

- Your doctor
- Cardiologist

Things to remember

- The aortic valve opens when the heart contracts to allow the passage of blood from the left ventricle into the aorta, the body's main artery.
- Aortic stenosis is the abnormal narrowing of the aortic valve, which impedes the flow of blood from the ventricle into the aorta.
- Aortic stenosis may be a serious and potentially life-threatening condition.

- Treatment options include medications to prevent heart failure and surgery to repair or replace the faulty valve.

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