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## Aortic stenosis

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### Summary

- 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 restricts the flow of blood from the ventricle into the aorta.
  - Aortic stenosis can be a serious and potentially life-threatening condition.
  - Treatment options include procedures or surgery to repair or replace the faulty valve.
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Aortic stenosis is the abnormal narrowing of the aortic valve, which restricts the flow of blood from the left ventricle of the heart into the aorta.

The aortic valve opens when the heart contracts to pump oxygenated blood from the left ventricle into the aorta, the body's main artery. If this valve is narrowed, it means that the heart can no longer pump blood efficiently – it needs to work harder to pump blood around your body. It also creates high blood pressure inside the left ventricle.

In response to the extra workload, the muscle of the left ventricle thickens (concentric hypertrophy) and the chamber itself may eventually balloon out.

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 (be asymptomatic) for many years. This is why the condition, which may have been present from before birth, is often diagnosed during teenage years.

Symptoms may appear later in life after decades of gradual progressive narrowing of the aortic valve. The onset of symptoms may be gradual or abrupt and may include:

- 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 of aortic stenosis include:

- **congenital valve abnormalities** – some people are born with 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

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

- **pulmonary oedema (fluid in the lungs)** – the back pressure of blood inside the heart changes the pressure in the blood vessels of the lungs. This causes fluid build-up and breathing difficulties
- **cardiomegaly (enlarged heart)** – without treatment, the left ventricle may thicken and enlarge. This reduces the ventricle's ability to pump blood
- **heart failure** – aortic stenosis compromises the functioning of the heart's left side, but this can also impact on the right side of the heart in severe cases
- **heart arrhythmia** – 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
- echocardiogram (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 or wrist and threaded up to the heart). This can include left ventriculography, which includes using a dye so that the heart shows up more clearly on x-ray
- coronary angiogram to assess whether there is coronary artery disease in addition to the recognised aortic valve disease.

### **Treatment for aortic stenosis**

Treatment for aortic stenosis may include:

- monitoring – for asymptomatic or mild cases
- 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
- procedures or surgery to replace or repair the valve.

### **Surgical procedures for aortic stenosis**

There are three main surgical procedures for treating aortic stenosis:

- aortic valve replacement
- transcatheter aortic valve implantation (TAVI)
- balloon valvuloplasty.

#### **Aortic valve replacement**

If the aortic valve is too damaged to be repaired, it may be surgically replaced with an artificial or tissue valve. This is known as aortic valve replacement. Sometimes, the person's own pulmonary valve may be used. This is known as a pulmonary autograft or Ross operation.

#### **Transcatheter aortic valve implantation (TAVI)**

TAVI is a relatively new procedure that involves a new valve being inserted without the need for open heart surgery. It is usually only suitable for older people who are too high risk for conventional surgical replacement.

#### **Balloon valvuloplasty**

When performing 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.

The balloon is then deflated and it and the catheter are then removed.

Balloon valvuloplasty doesn't cure the condition and further surgical treatment may be needed later in life. This procedure is usually used as a temporary measure or to relieve symptoms when other options are not available.

### **Where to get help**

- Your **GP (doctor)**
- Cardiologist

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