

## Aortic Stenosis

The aim of this fact sheet is to explain what Aortic Stenosis is, what effect it will have on a child and how it can be treated.

### What is Aortic Stenosis?

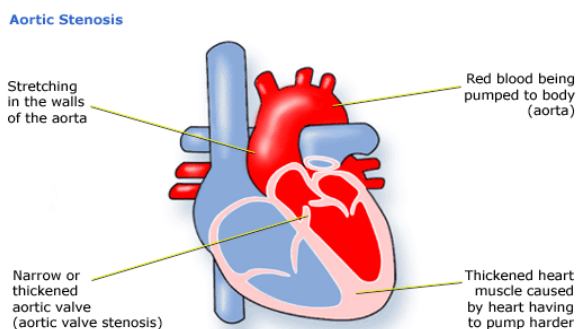
**Aortic** means 'of the aorta'. The aorta is the main artery which carries red (oxygenated) blood from the heart to the rest of the body. **Stenosis** means narrowing.

**Aortic stenosis** is a narrowing of the aortic valve. This means that the flow of blood from the left ventricle into the aorta is less efficient than in a normal heart. The result is that the body does not get as much oxygen as it should.

The aortic valve itself may be too narrow, or there may be narrowing above the valve – **supravalvular stenosis** or below the valve – **subvalvular stenosis**. The narrowing may be mild, moderate or severe.

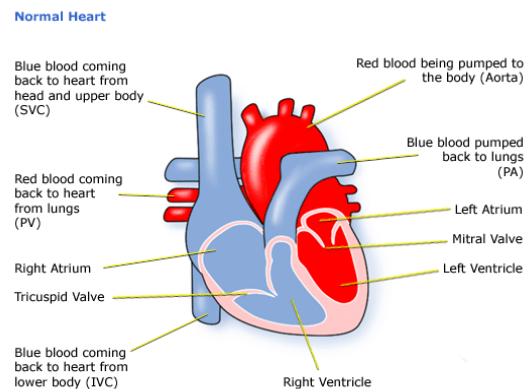
The picture below shows a heart affected by Aortic Stenosis. This cutaway view (the blue pulmonary artery has been removed) allows you to see the narrow aortic valve and the thickened heart muscle around the left ventricle. The muscle becomes thicker because it has to work harder to pump the blood through the narrow valve.

**Fig 1 – Aortic Stenosis**



**Fig 2 – Normal Heart**

The second picture shows a normal heart. You cannot see the aortic valve here as the pulmonary artery is in front of it.



### Diagnosis

Aortic stenosis can cause problems with the development of the left side of the heart whilst the baby is growing in the womb. Sometimes this can be seen during a pre-natal scan and the condition is diagnosed then.

After birth, the sound of the blood being forced through the narrow aortic valve can be heard as a heart murmur. In very severe cases, the condition will cause a baby to become very pale and too sleepy to feed properly. These symptoms are caused by not enough red (oxygenated) blood circulating around the body.

A severe narrowing in an older child may result in dizziness, fainting and pain in the chest.

If your child's heart condition is complex, aortic stenosis may be only one of a number of defects affecting them.

When a heart murmur is heard the tests might include:

- ♥ listening with a stethoscope for changes in the heart sounds;
- ♥ an ultrasound scan (echocardiogram) to see how the blood moves through the heart;
- ♥ a test using an oxygen saturation monitor to see how much oxygen is getting into the blood;
- ♥ a chest x-ray to see the size and position of the heart;
- ♥ an ECG (electrocardiogram) to check the electrical activity of the heart;
- ♥ checks for chemical balance in blood and urine;
- ♥ measuring the pulse, blood pressure, temperature, and number of breaths a baby takes a minute; and
- ♥ a catheter test to look at the narrowing of the valve, especially before surgery.

## Treatment

**Balloon catheter:** One way of increasing the flow of blood through the valve is to use a balloon catheter. This is a fine plastic tube with a balloon on the end. It is pushed through a vein or artery (usually at the top of the leg) into the heart and inserted through the valve. The balloon is then inflated across the valve, stretching it in the process. The balloon is then deflated and withdrawn.

Balloon catheterisation does not leave any scars and your child may be able to leave hospital that day. Sometimes the process causes the valve to leak but this is not usually a problem, provided the leak is small.

If the valve narrows again in the future, the procedure may have to be repeated. If the procedure does not work, your child will be offered surgery.

**Surgery:** This is open heart surgery, which means that the heart will need to be stopped and opened to repair it. A heart bypass machine will take over the job that the heart normally does. The aim of the operation is to stretch or replace the aortic valve, or to reduce the obstruction above or below it.

If your child has other heart defects, the surgery performed will depend on how the heart can best be modified to cope with all the problems there are.

For older children this surgery is normally low risk, but it will depend on how well your child is otherwise. The cardiologist or surgeon should discuss the risks with you in detail before asking you to consent to the operation.

The aortic valve can be replaced by an artificial valve which is specially designed to be strong enough to withstand the high pressure of blood pumped from the left ventricle. However, artificial valves do not grow with the child, so further valve surgery may be needed (see separate fact sheet on Artificial Valves). Children with artificial valves will also need to take anticoagulants for the rest of their lives, which can have a number of implications for their health and lifestyle (see Warfarin fact sheet).

An alternative to using an artificial valve is to do a **Ross procedure**. In this operation the child's own pulmonary valve will replace the aortic valve (an autograft). A human tissue valve (a homograft) then replaces the pulmonary valve.

Children having these sorts of operations will usually spend 7-10 days in hospital, of

which one or two will be spent in the intensive care and high dependency unit. Of course, this depends on how well your child is before and after the surgery, and whether any complications arise.

### How the child is affected

If your child has mild aortic stenosis, they will need to be followed up every year or so, to make sure it has not narrowed further. Otherwise there should be no problems and your child will probably lead a perfectly normal life.

Children who have had ballooning will need to be monitored, as it is not unusual for the valve to narrow again or to start to leak. They may need a further balloon catheter or surgery.

There is always a risk of infections or complications following surgery. However, most children are completely well and

active a few days after surgery. They will have a scar down the middle of the chest, and there may be small scars where drain tubes were used.

If the valve was stretched, surgery may be needed in the future to replace it. If the valve was replaced, monitoring will be needed to make sure the replacement is working effectively, and an artificial valve may need to be replaced as the child grows.

If your child had the Ross Procedure, both valves will be monitored. The pulmonary valve sometimes needs replacing with another homograft. Alternatively, the pulmonary valve can have an artificial valve inserted into the original homograft. The aortic valve may need to be replaced with an artificial valve.