

Congenital Heart Defects

Transposition of the Great Arteries

What is Transposition of the Great Arteries (TGA)?

Transposition of the Great Arteries means that the pulmonary artery is where the aorta should be, carrying red blood from the left ventricle to the lungs, and the aorta is where the pulmonary artery should be, carrying blue blood around the body.

Transposition of the Great Arteries

Transposition means 'in each other's place'. The Great Arteries are:

- The pulmonary artery, which normally carries blue (deoxygenated) blood from the right ventricle to the lungs.
- The aorta, which normally carries red (oxygenated) blood from the left ventricle to the body.

There may also be a ventricular septal defect (VSD) - a hole in the wall between the ventricles. This means that blood can leak from one side to the other. There may be other associated conditions, such as coarctation of the aorta or pulmonary stenosis.

Fig 1: TGA

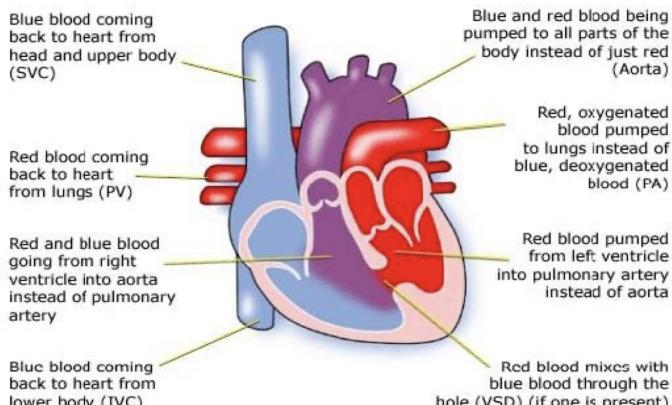
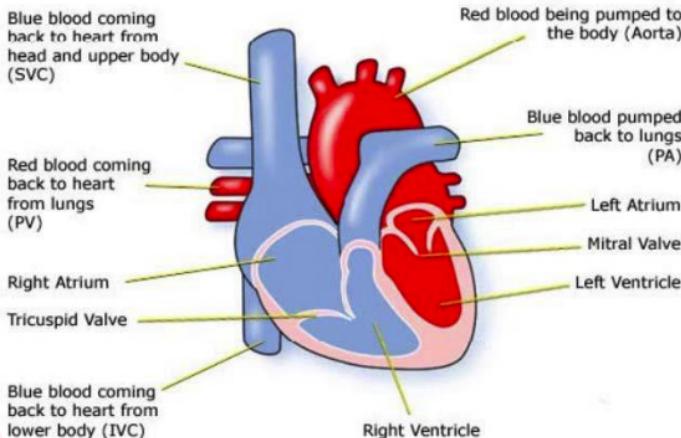


Fig 2: Normal Heart



Diagnosis

Your child's TGA may have been diagnosed on a scan during pregnancy. If so, he or she would have been taken into hospital shortly before birth to see if the prenatal assessment of the defect was accurate, and if the heart needs treatment shortly after birth.

Your child may have been diagnosed after birth. Your baby might have been quite well before the foetal circulation system (ductus arteriosus) started to close down after birth. This is because red blood was passing between the left and right atrium, from where it was pumped into aorta and around the body. Some of the blue blood in the aorta passed through the ductus arteriosus into the pulmonary artery and was carried to the lungs.

As the foetal circulation started to close down, your baby may have become increasingly blue (cyanosed), and so breathless that he or she was very difficult to feed. If your child has a VSD this will allow red blood to flow from the left ventricle into the aorta, and the symptoms will not be so severe.

When a heart condition is suspected the tests used can be:

- Pulse, blood pressure, temperature, and number of breaths a baby takes a minute
- Listening with a stethoscope for changes in the heart sounds
- 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
- An ultrasound scan (echocardiogram) to see how the blood moves through the heart
- Checks for chemical balance in blood and urine
- A catheter or MRI (magnetic resonance imaging) scan may be needed

Medication:

A series of operations may be necessary to bypass the blocked pulmonary artery. These are open heart surgeries - the heart will need to be stopped and opened to repair it. This means that a machine will have to take over the job that the heart normally does - the heart bypass machine.

Balloon septostomy:

Another way of increasing red blood to the aorta is to make the hole between the atria bigger. This involves threading a fine tube - a catheter - through the umbilicus (belly button) or groin, into the heart and through the hole between the atria. A balloon on the end is inflated and pulled back, so that the hole is made bigger.

Corrective surgery:

This is open heart surgery - the heart will need to be stopped and opened to repair it. This means that a machine will have to take over the job that the heart normally does - the heart bypass machine. The aim of the operation is to make the circulation of blood through the heart and lungs normal.

Usually an operation called the Arterial switch will be carried out in the first few days of life. The pulmonary artery and aorta are cut and reattached to the correct side of the heart. The arteries which supply the heart with red blood (coronary arteries) also need to be reattached.

The holes between the two sides of the heart are closed. If your child has other heart defects, the kind of surgery needed will depend on how the heart can best be modified to cope with all the problems he or she has. For most children this surgery is low risk, but it can depend on how well your child is otherwise. The doctors will discuss risks with you in detail before asking you to consent to the operation.

The length of time in hospital will usually be only 10 to 12 days, 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 Your Child is Affected

Cases of TGA can be more complicated than this description. In some cases the arterial switch operation cannot be performed, and other kinds of surgery can be offered (Rastelli, Senning, Fontan). After surgery it is not uncommon for a baby to pick up an infection, such as a chest infection or infected wound, while undergoing treatment. Some children react badly to some kinds of medicines. The kind of surgery needed can sometimes cause a very fast pulse rate (called tachycardia), which may need

medication to keep it stable.

But most babies are completely well, pink, active, and gaining weight a few days after surgery. He or she will have a scar down the middle of the chest, and there may be small scars where drain tubes were used. These fade very rapidly, but they will not go altogether. Smaller scars on the hands and neck usually fade away to nothing. A child who has had an arterial switch operation will be monitored as there can be problems in the development of the arteries to the lungs (pulmonary) and to the heart itself (coronary). Children with complicated forms of TGA who have had other procedures will often need surgery later in life.

After the first year, the child will be monitored infrequently by a cardiologist. Some children with TGA have other health problems as they get older, which may not be related to their heart condition. You will need to make sure that these are properly diagnosed and not put down to the trauma of surgery.

- **It is common for the valves to leak a little, but if this becomes severe, they may need further repair or even replacement with an artificial valve. If this happens the child will need to take an anticoagulant medicine to stop blood clots forming. The anticoagulant effect has to be monitored frequently using a blood test;**
- **The electrical system of the heart is sometimes damaged, causing a fast or slow heartbeat - these may need to be corrected by using medicines, a pacemaker or an ablation**
- **Children with heart conditions are more likely to have an infection called infective endocarditis. Although this is a difficult disease to treat it is rare.**

If you need any further information please contact your cardiologist or clinical nurse specialist.

Evidence and sources of information:

(1) Great Ormond Street Hospital.

Transposition of the Great Arteries Information. London: GOSH; 2017. Available at: www.gosh.nhs.uk/medical-information-0/search-medical-conditions/transposition-great-arteries

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