

Transposition of the Great Arteries

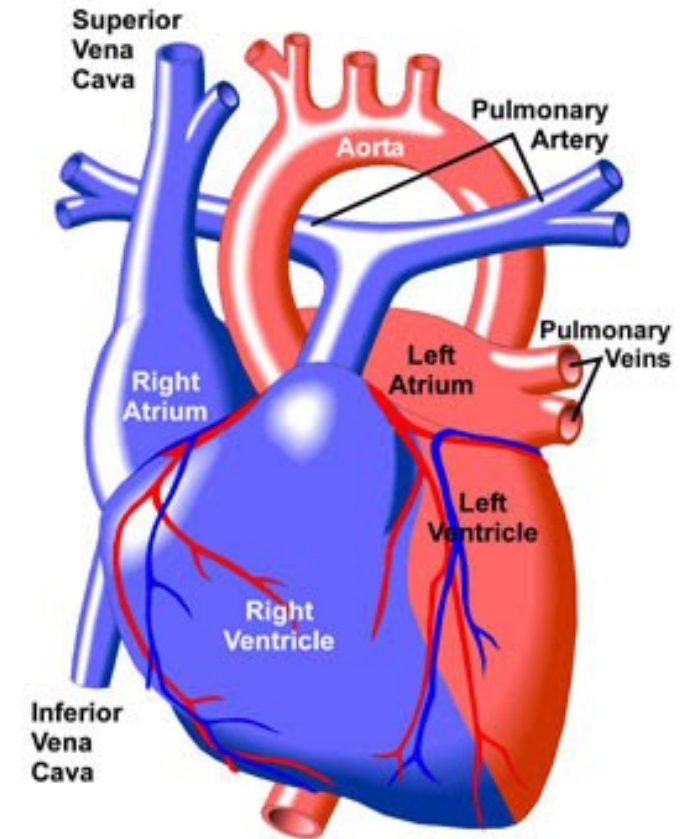
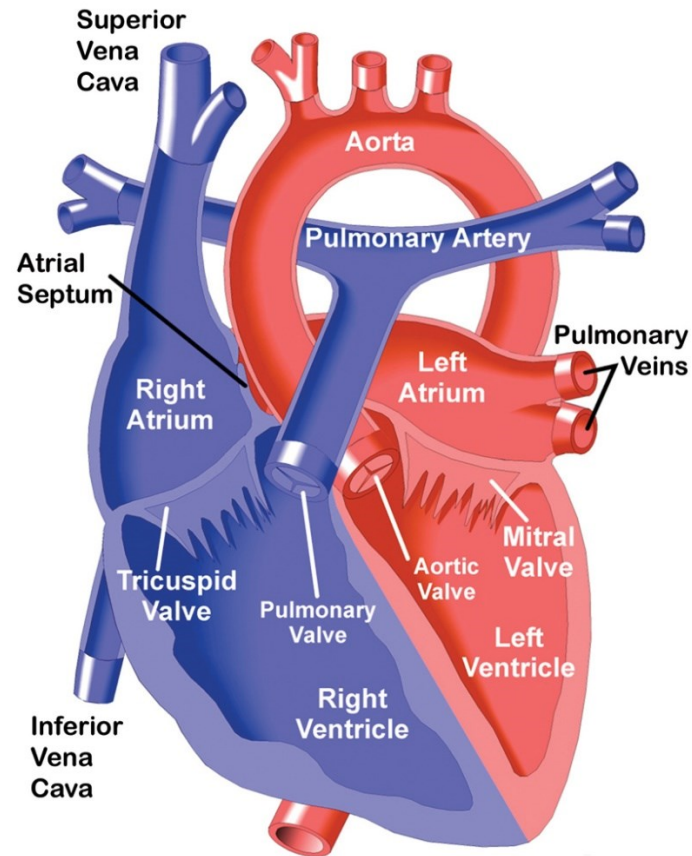
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Lead Adult Congenital Heart Disease

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Normal Anatomy & Physiology



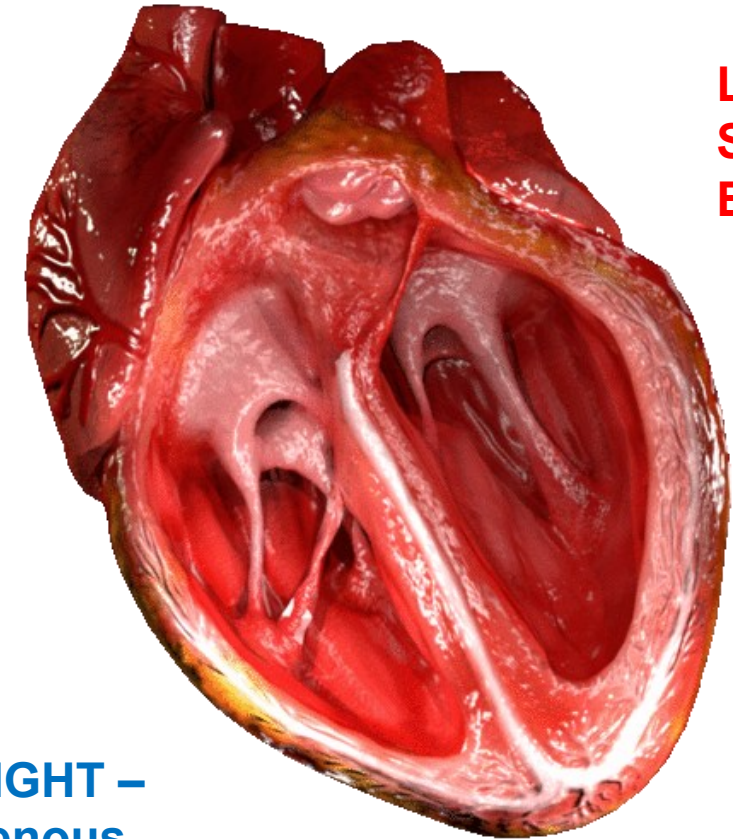
Differences in the Ventricles

Right Ventricle:

- **triangular shaped**
- **pumps blood at lower pressure to the lungs**

Left Ventricle:

- **thicker walls – more muscular**
- **pumps blood at higher pressure to the body**



**LEFT –
Systemic
Blood**

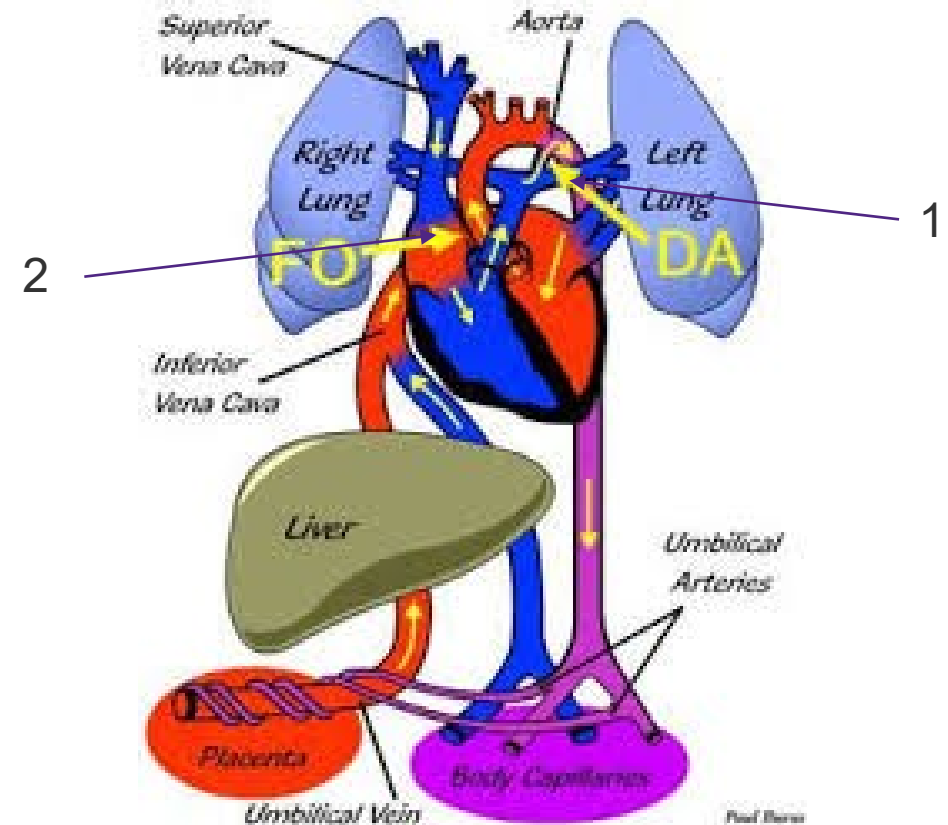
**RIGHT –
Venous
Blood**

Fetal Circulation

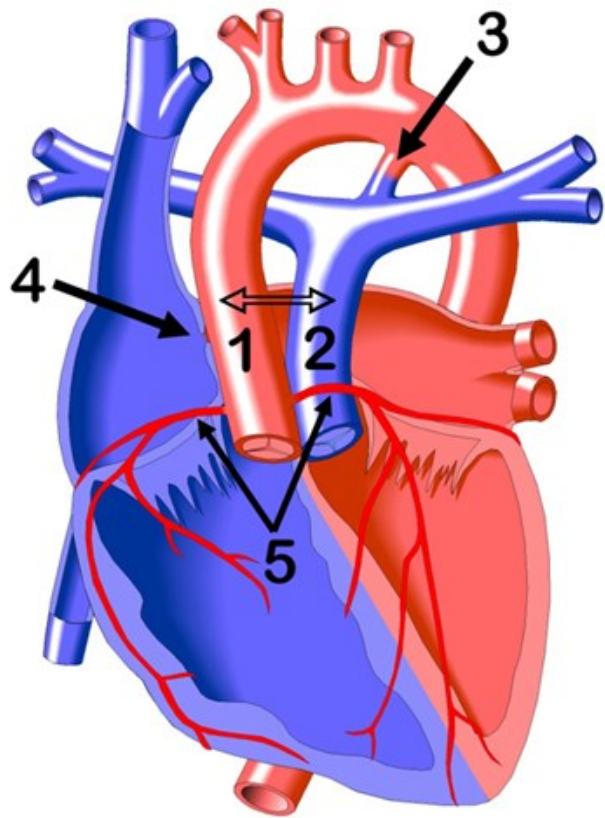
- At birth – when the umbilical cord is clamped, the baby take its first breaths of air, the lungs expand

These shunts close:

1. Ductus Arteriosus (PDA)
2. Foramen Ovale (PFO)



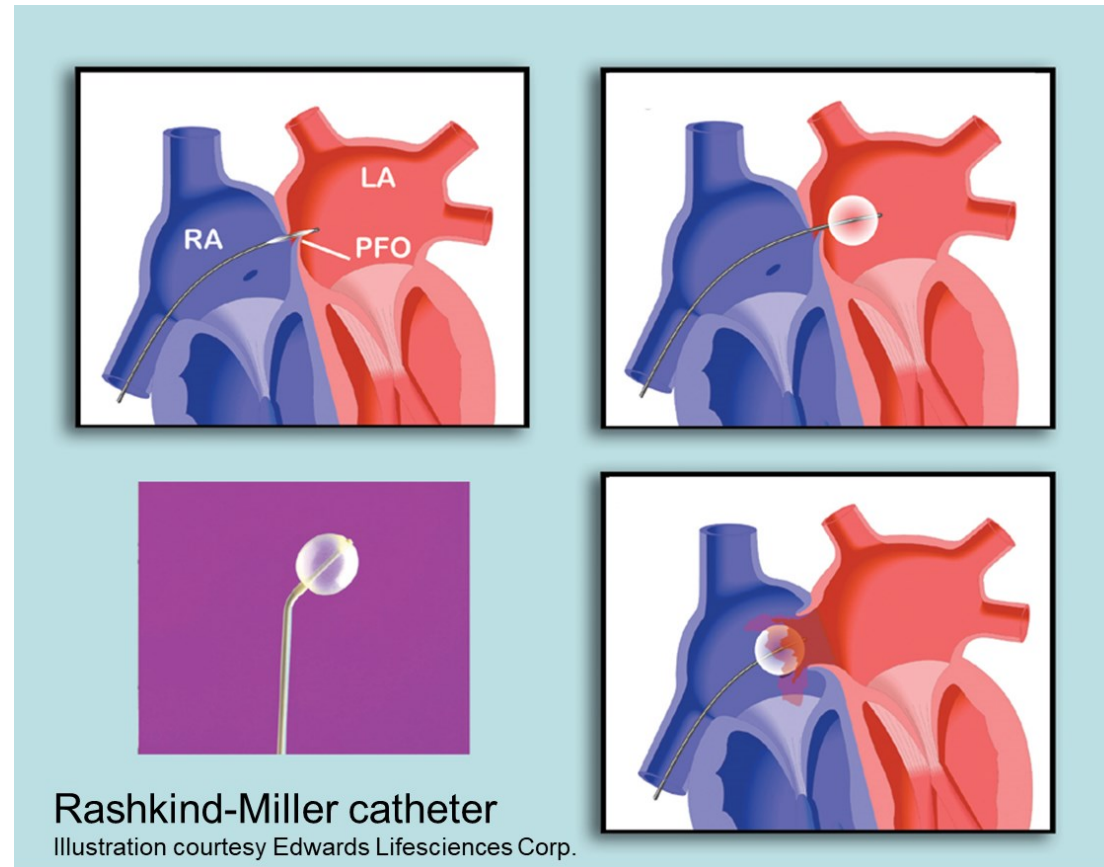
Initial Presentation – TGA



Anatomy & Physiology of TGA

1. Aorta
2. Pulmonary Artery
3. Patent Ductus Arteriosus
4. PFO
5. Coronary Arteries

Balloon Septostomy



Historical background to TGA surgical treatment

- **1950's -** Surgical atrial septostomy, Improved oxygen saturation, may have extended life by a couple of years – but not a long term solution

- **1960's -** **Atrial Switch**
pre-operative mortality 5-10 %
peri-operative mortality 10-15%
late mortality 20%
Oldest survivors now in 50's

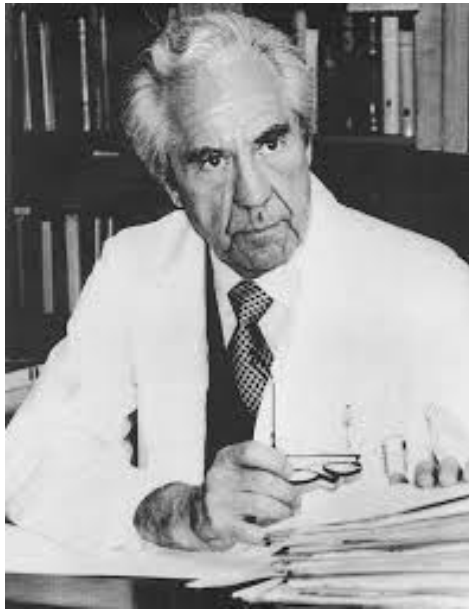
1950

2021



- **1990's -** **Arterial Switch**
Now standard practice across the UK

Pioneers in TGA surgery



Ake Senning



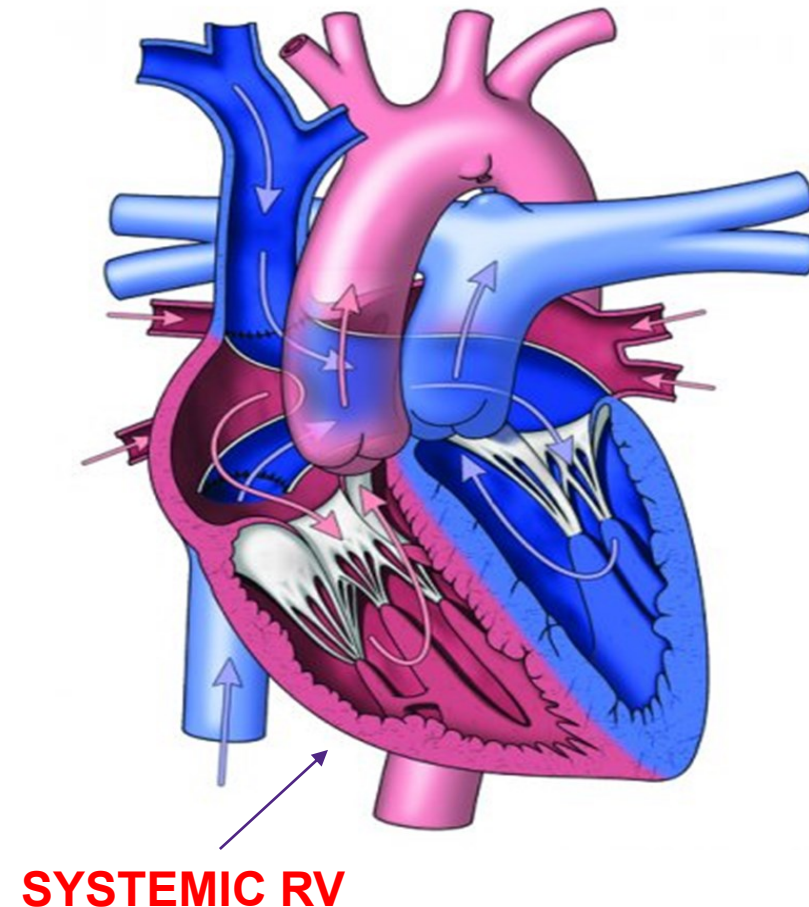
William Mustard



Adib Jatene

Atrial Switch (Mustard/Senning Operation) – 1960's

- Blood is directed at atrial level using a two way baffle:
- Baffles are surgically created tunnels/wall used to redirect the flow of blood.
- Mustard Procedure: made of Dacron® or pericardium
- Senning Procedure: atrial flaps
- **Venous:** Deoxygenated blood from the body > SVC + IVC > Mitral Valve > Morphological LV > Pulmonary Valve > Lungs
- **Systemic:** Oxygenated blood from the Lungs > Pulmonary Veins > systemic AV (Tricuspid Valve) > Morphological RV (systemic RV) > Aortic valve > Aorta > Body

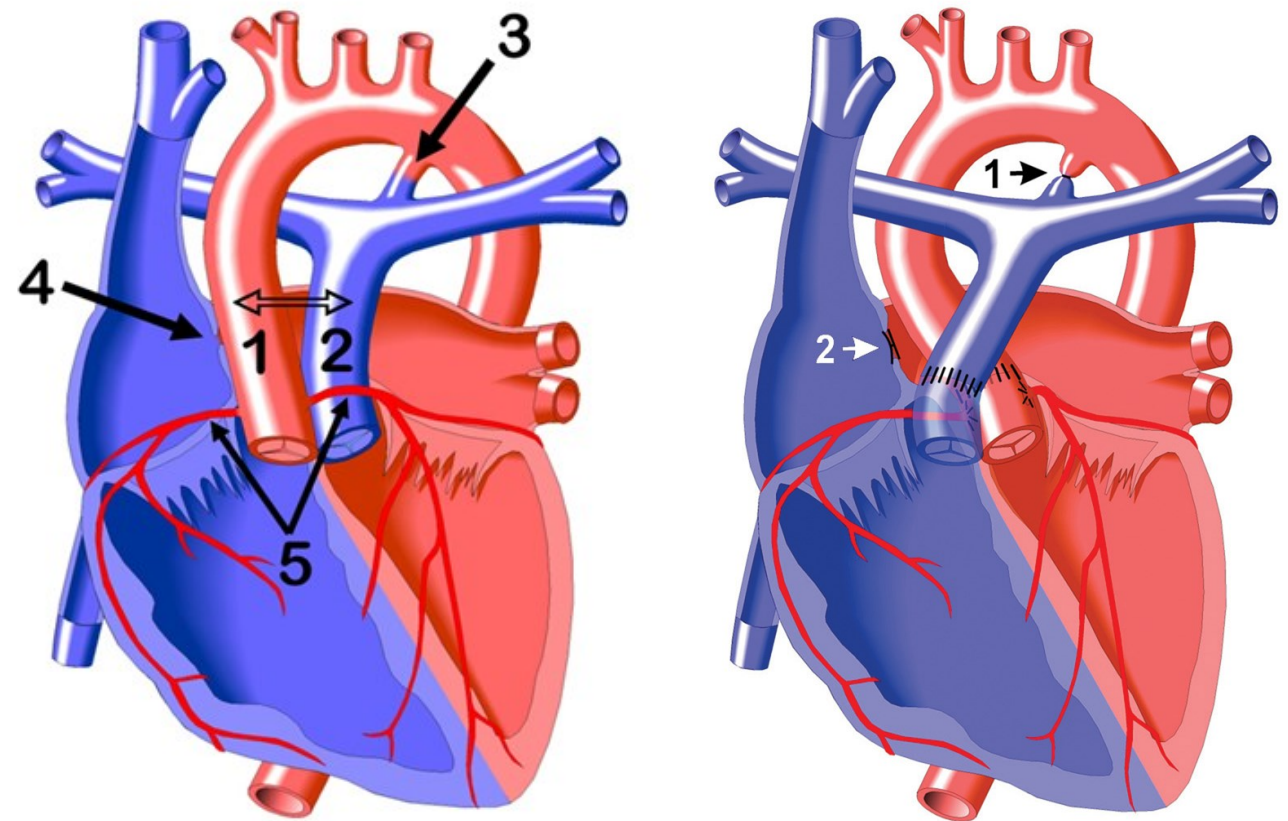


Complications + Long Term Outcomes of Atrial Switch

- Systemic RV dysfunction and failure
- Progressive TR (systemic atrio-ventricular valve)
- Arrhythmias – sinus node dysfunction, atrial and ventricular
- Baffle Stenosis + leakage

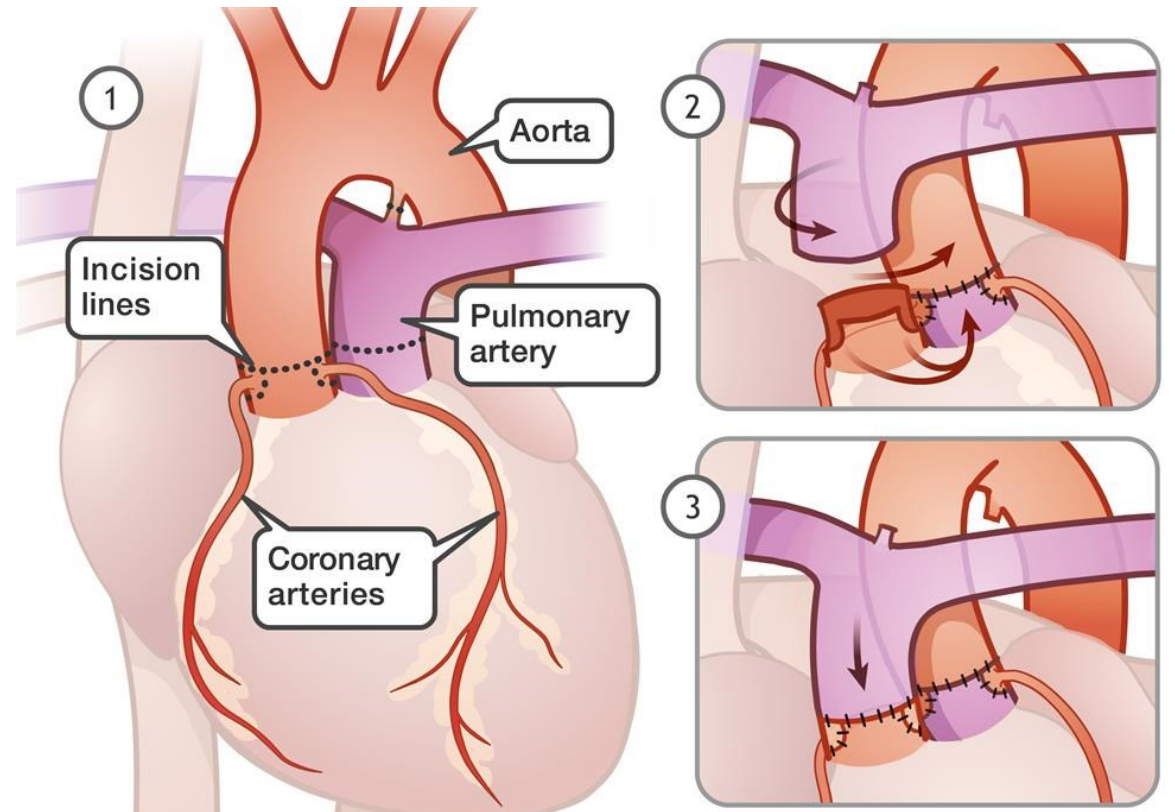
Arterial Switch

- Blood is redirected at the great artery level
- The aorta and pulmonary artery are switched into “normal” position
- The coronary arteries have to be translocated



Re-implantation of the Coronary Arteries

- The coronary arteries must stay with the aorta
- They are removed from the area above the valve and re-implanted separately above the new aortic valve.
- Technically very challenging for the surgeon.

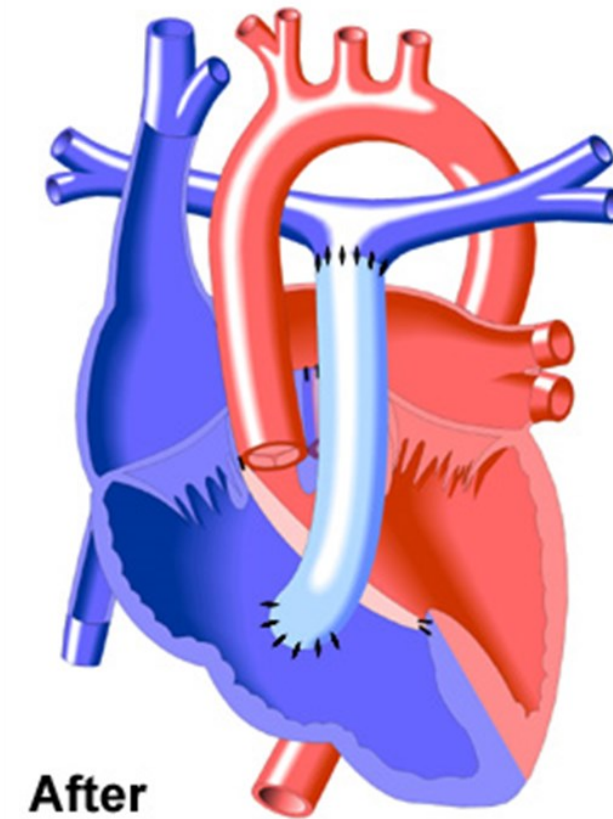


Complications + Long Term Outcomes – Arterial Switch

- Supravalvular pulmonary stenosis
- Ostial coronary artery disease
- Progressive neo-aortic root dilatation and aortic valve regurgitation

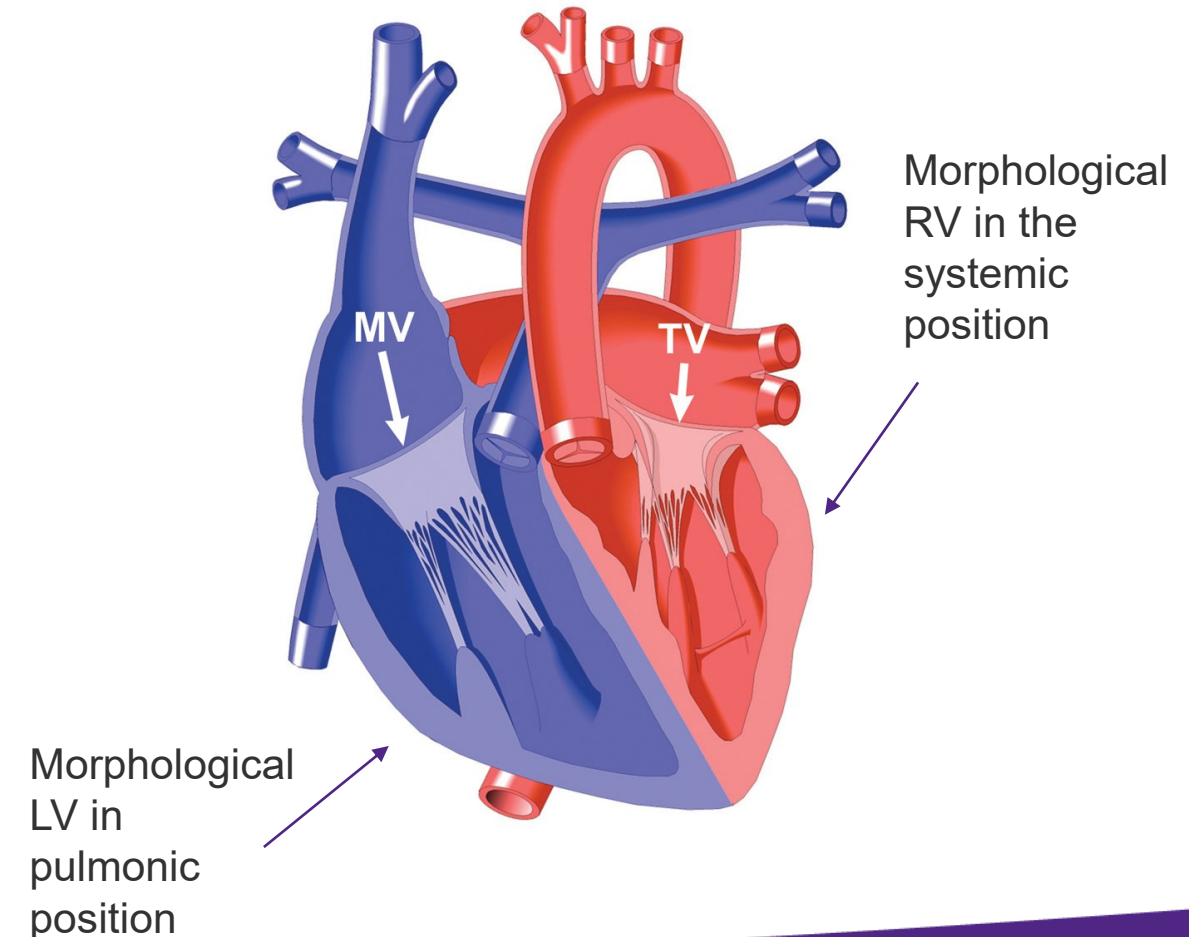
Rastelli Procedure

- For patients with VSD and pulmonary/sub-pulmonary stenosis
- Blood is redirected at ventricular level
- Valved conduit is placed in Right Ventricle plumbed into the pulmonary artery

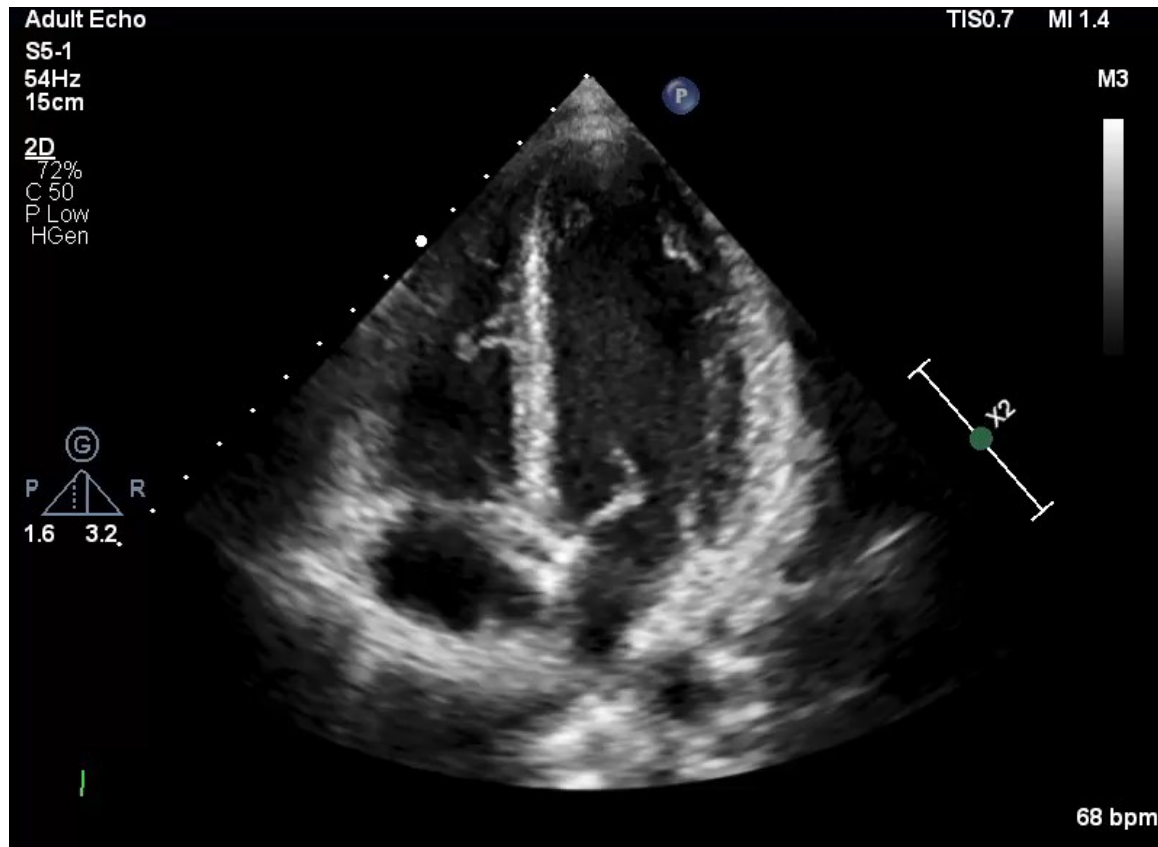


Congenitally Corrected TGA

- ccTGA is rare – less than 1% of all CHD.
- The ventricles are the wrong way round.
- The right ventricle has to pump blood at high pressure to the whole of the body
NB. This ventricle isn't designed for this!!!
- The left ventricle only needs to pump blood at low pressure to the lungs.



Normal Heart – Echo



- Apex at the top of the image
- Right ventricle (top left)
- Left Ventricle (top right)
- Right Atrium (bottom left)
- Left Atrium (bottom right)

Guess the operation....?



Case Study – Patient “X”

- Patient “X” was born in May 1987
- Had a balloon septostomy in May 1987
- Had a cardiac catheter in August 1987
- Senning Operation in November 1987

- Uneventful childhood since Senning Operation – on low dose ACEi

- In May 2015 – admitted to hospital with dizziness and loss of consciousness
- Presentation: peripheral oedema++ and HR ↑
- Diagnosed with SVT – had TOE + DCCV
- Medications: Diuretics, ACEi titrated, Bisoprolol + Warfarin

Case Study – No.1 (continued)

- Echo showed: severe systemic AV regurgitation
Impaired Bi-ventricular function
EF 10%

Discussed extensively at the NW ACHD MDT

July 2015	Admitted for an elective ablation
March 2016	Followed by an elective admission for ICD insertion + cardiac catheter
June 2016	Referred to Newcastle Freeman for transplant assessment
December 2016	Listed on the active transplant list + R-VAD fitted
2021	Patient “X”

Any Questions?

Thank you for listening

**The ACHD Nurses are happy for anyone to come
and observe the work we do**

ACHD Helpline: 0151 254 3333

**ACHD Nurse on Call (Monday – Friday 8 - 6pm):
07542229889**