The Normal 3VV and 3VT view and common abnormalities

Dr Victoria Jowett
Consultant Fetal Cardiologist
Great Ormond Street Hospital
3VT view

• What is the 3VT view?
• What are we looking for?
• What can we pick up in this view?
3 Vessel and tracheal view
Aortic and ductal arches in the fetus
Why is this view important?

**Duct dependent lesions**

- 15% of CHD.
- Duct dependent systemic circulation
- Duct dependent pulmonary circulation

**Neonatal collapse**

Morbidity and mortality with ductal closure.
CONGENITAL HEART DISEASE

Prenatal diagnosis of coarctation of the aorta improves survival and reduces morbidity

O Franklin, M Burch, N Manning, K Sleeman, S Gould, N Archer

Heart 2002;87:67–69

Detection of Transposition of the Great Arteries in Fetuses Reduces Neonatal Morbidity and Mortality

Damien Bonnet, MD; Anna Coltri, MD; Gianfranco Butera, MD; Laurent Fermont, MD;
Jérôme Le Bidois, MD; Jean Kachaner, MD; Daniel Sidi, MD

Background—Transposition of the great arteries (TGA) is a life-threatening malformation in neonates, but it is amenable to complete repair. Prenatal detection, diagnosis, and early management may modify neonatal mortality and morbidity.

Methods and Results—Preoperative and postoperative morbidity and mortality were compared in 68 neonates with prenatal diagnosis and in 250 neonates with a postnatal diagnosis of TGA over a period of 10 years. The delay between birth and admission was 2±2.8 hours in the prenatal group and 73±210 hours in the neonatal group (P<0.01). Clinical condition at arrival, including metabolic acidosis and multiorgan failure, was worse in the neonatal group (P<0.01). Once in the pediatric cardiology unit, the management was identical in the 2 groups (atrioventricular, PGE, infusion, operation date). Preoperative mortality was 15 of 250 (6%; 95% CI, 3% to 9%) in the neonatal group and 0 of 68 in the prenatal group (P<0.05). Postoperative mortality was not different (25 of 235 versus 6 of 68), but hospital stay was longer in the neonatal group (30±17 versus 24±11 days, P<0.01). In addition, postoperative mortality was significantly higher in the neonatal group (20 of 235 versus 0 of 68, P<0.01); however, the known risk factors for operative mortality were identical in the 2 groups.

Conclusions—Prenatal diagnosis reduces mortality and morbidity in TGA. Prenatal detection of this cardiac defect must be increased to improve early neonatal management. In utero transfer of fetuses with prenatal diagnosis of TGA in an
Many duct dependent lesions are detectable on 3VT view

- Coarctation of the aorta
- Critical Aortic Stenosis
- Critical Pulmonary Stenosis
- Pulmonary atresia
- HLH
- Interrupted aortic arch
- TGA
Introduction of 3VT view UK fetal anomaly screening programme
Increased detection of right and double aortic arch

Antenatal diagnoses

- Double aortic arch
- Right aortic arch
Detecting abnormality in the three vessel and tracheal view

1. Abnormal vessel number

2. Abnormal vessel position
   - Arrangement (left right)
   - Position (anterior/posterior)
   - Direction (passing trachea)

3. Abnormal vessel size
   \( PA > AO > SVC \)

4. Abnormal direction of flow
How many vessels 2,3,4...
2 Vessels Seen

Actually only 2 vessels
- Truncus
- PAT VSD

Impression of only 2 vessels due to abnormal arrangement e.g. TGA
3 Vessels Seen

Normal?

Check order of vessels

Left D A S Right
4 Vessels Seen

- Left SVC
- (0.3% adult population)
- Ascending Vein TAPVC
Abnormal Position of Vessels

Disturbance of anterior posterior arrangement of the arteries

Disruption of the normal left to right linear arrangement of the arteries

Examples
- Tetralogy of Fallot – dilated aorta displaced anteriorly
- HLH/IAA - Aorta may be posteriorly displaced
- TGA – aorta anterior and rightward
- Right aortic arch – aorta to right of trachea
Normal /Tetralogy of Fallot
TGA and CCTGA

- TGA

- CCTGA
Importance of Identifying RAA

• Identify other abnormalities
• Increased risk of chromosomal abnormalities
• Potential for vascular ring (ALSCA)

D’Antonio et al UOG 2016
Double aortic arch
Abnormalities of size

Hypoplastic vessel
Aorta < PA (Coarctation HLH, AS)
PA < Aorta (TOF, PS, PAT)

Dilated vessel
Aorta (AS, Aortopathy)
Pulmonary artery (PS)
SVC (Azygous/ TAPVC/ ECA)
Coarctation of the aorta

4-6% of CHD

Excellent Surgical Outcome
What does colour Doppler add?
Summary

3VT view

Important clues to duct dependent lesions

- Number of vessels
- Size of vessels
- Position of vessels
- Direction of colour flow