Outflow Tract View: Normal and Abnormal

Anitha Parthiban MD, FAAP
Director, Pediatric Echocardiography
Children’s Mercy Hospitals & Clinics

Outline

- Review anatomy of normal outflow tracts
- Imaging of the outflow tracts in the fetal heart
- Differential diagnosis of abnormal outflow tract view
- Brief review of Conotruncal defects
Conotruncal Defects

- Defects of the outflow tracts, constitute 15-20% of CHD
- Key events in formation of outflow tracts
  - Leftward shift of the conotruncus to override the muscular septum
  - Septation of the contruncus
  - Spiraling of the outflow tracts

Outflow Tracts- Checklist

- Are there two outflow tracts?
- Ventriculoarterial concordance?
- Great arteries cross each other?
- Caliber of pulmonary trunk vs ascending aorta
- Excursion /size of aortic and pulmonic valves and sub valvar area
**Truncus Arteriosus**

- Single arterial trunk arises from the heart giving rise to aorta, pulmonary arteries and the coronary arteries
- 1.2% of CHD
- 33% of patients have Di-George syndrome (Deletion in chromosome 22q11)

**Truncus Arteriosus**

- Truncal valve overrides the large ventricular septal defect
- Truncal valve is dysplastic and often insufficient (50%), stenotic in about 33% of patients
- Neonatal congestive heart failure necessitating repair
Transposition of Great Arteries (d-TGA)

- 4.7% CHD
- VSD may be present (40%) or intact ventricular septum (IVS)
- Pulmonary/ sub pulmonic stenosis may be present

Transposition of Great Arteries (d-TGA)

- With TGA/IVS, severe cyanosis is present
- Patency of the foramen ovale and ductus arteriosus for mixing
Tetralogy of Fallot

- Large ventricular septal defect (VSD)
- Aorta is large and overrides VSD
- Size discrepancy in 3 vessel view (pulmonary trunk smaller than aorta)
Tetralogy of Fallot

- Ductus arteriosus frequently small
- Absent pulmonary valve – aneurysmal dilation of the pulmonary arteries
- Pulmonary atresia (valve does not form)
- Reversal of flow in the ductus arteriosus indicates critical pulmonary stenosis (ductal dependent)
Critical Aortic Stenosis

- Severely obstructive aortic valve- thick, doming
- Dilated poorly functioning left ventricle
- Restricted mitral valve opening
- Mitral regurgitation
- Aortic valve velocity may be normal
Critical Aortic Stenosis

- Reversal of flow in the aortic arch and foramen ovale (FO)
- Restrictive FO – cardiomegaly and left atrial dilation
- Mid gestation severe aortic stenosis may evolve to hypoplastic left heart syndrome
- Role for fetal aortic valvuloplasty
Critical Pulmonary Stenosis

- Mild to moderate pulmonary stenosis (PS) difficult to diagnose
- Severe PS – right ventricular hypertrophy
- Right to left shunt at the FO- left heart enlargement
- Tricuspid regurgitation

Critical Pulmonary Stenosis

- Retrograde flow in the ductus arteriosus
- Treatment- balloon valvuloplasty, radiofrequency perforation, surgical
Outflow tract view

- Outflow tract evaluation is an essential aspect of fetal cardiac evaluation
- Normal 4 chamber view does not rule out critical congenital heart disease
- Systematic imaging key for accurate diagnosis

References

Echocardiographic Anatomy in the Fetus: Chiappa EM, Cook CC, Botta G, Silverman NH

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