

1  **Segmental Approach**

Fetal Cardiac Imaging Planes

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2  **Orientation**

- Situs
  - Situs solitus
- Axis
  - 45 degrees
  - Levocardia
- Size
  - About one third of the thoracic space

3  **Four Chamber View**

- Position of Heart
- Position of Apex
- Size of Heart relative to thorax
- Verification of
  - Four chambers
- Proportion of Left to Right Ventricles
- Foramenal Flap direction of movement

4  **Four Chamber View Cont.**

- Chamber morphology
- Crux of the heart
- Atrioventricular valve insertions
- Intact Septa
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5  **Septum**

- Ventricular Septum
  - Left Ventricular Outflow
    - Anterior aspect of septum
    - Membranous septum
- Four Chamber
  - Muscular septum

6  **IVC/SVC**

- Begin with the apical four chamber view, rotate the transducer 90°. Move transducer slightly right lateral
  - This view transects the right ventricle, right ventricular outflow, and main pulmonic artery
  - Posteriorly to the aorta the superior vena cava is seen entering the right atrium
- A slight right to left rotation of the transducer is needed to follow the IVC as it enters the right atrium obliquely

7  **Five Chamber View-**

### Left Ventricular Outflow Tract

- From the apical four chamber view, a slight cephalic tilt of the transducer is necessary
  - By turning the transducer while keeping the left ventricle and the aorta in the same plane, one can obtain the left heart views
    - this allows the aortic root exiting the left ventricle to be viewed
- Aorta from the left ventricle
- Spectral and color Doppler

### 8 ■ Outflow Tracts

- Four chamber
  - Angle cephalad
  - Rotate 20 to 30 degrees toward apex
    - Left Ventricular Outflow Tract- 5 Chamber
  - More cephalad angulation
    - Right Ventricular Outflow Tract
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### 9 ■ Left Ventricular Outflow- 5 Chamber View

- Continuity of the MV leaflet with the posterior aortic root
- Anterior aortic root continuous with septum
  - Ventricular septum evaluate with Doppler
- Right ventricle, anterior to aortic root
- Left atrium along posterior wall of aortic root
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### 10 ■ Aortic Arch into Descending Aorta

- Long axis of fetus
  - Visualize the abdominal aorta.
- The aortic arch shaped like a candy cane
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### 11 ■ Sagittal Views of the Great Vessels

- Ductal Arch
  - The transducer is directed in sagittal plane in the fetal chest
    - Ultrasound beam is angled from the right of the fetal sternum with a slight angle to the fetuses left side
  - Ductal arch originates anteriorly to the aorta and has a much broader curve
    - "Hockey Stick" shape should be appreciated
  - Descending aorta is noted anterior to the spine, and the ductus arteriosus travels posteriorly to meet it
  - No vessels should be seen exiting the ductus

### 12 ■ Sagittal Views of the Great Vessels

- 2 ■ Ductal Arch
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### 13 ■ Right Ventricular Outflow Tract: Short Axis

- Direct the transducer to a sagittal plane in the fetal chest
  - This produces a cross sectional image of the fetal heart

- Move cephalad to the level of the great vessels
- RVOT will be seen exiting the right ventricle, the pulmonic valve, main pulmonary artery, and the right pulmonary artery will be included
  - Pulmonary artery 'wraps' around the aorta (cross- section) in a "sausage" shape

#### 14 **3 Vessel View**

- Visualize from left to right
  - Ductal Arch
  - Aortic Arch
  - Transversally the Superior Vena Cava

#### 15 **Cardiac Function**

- Both ventricles should be contracting or squeezing with about the same work force
- Is the rhythm constant:
  - Observe for any skipped beats
  - Periods of increased contraction or decreased contraction
- Evaluate in a short axis plane through both ventricles
  - Moderator band in right ventricle will be seen

#### 16 **M-mode**

- Evaluate heart rate and rhythms
  - Arrhythmias
- Chamber sizes and interventricular septal size
- Wall motion and contractility assessment
- Valve motion

#### 17 **Doppler**

- Abdominal Plane
  - Ductus Venosus
  - Hepatic Veins
  - IVC
- 4 Chamber
  - AV Valves
  - Foramen Ovale
  - Pulmonary Veins
- 5chamber

#### 18 **Summary**

- Fetal heart requires a detailed examination
- Documentation must be clear, concise, and reproducible
- Begin in the fetal abdomen
- Progress superiorly

#### 19 **Eight View Quick Summary**

- 1 ■ Abdomen
  - Situs
  - Fetal Position
- Cardiac Axis
  - 45° to the left of midline
- Four Chamber

- Concordant chambers
- Intact septum
- Foramen Ovale
- AV Valve evaluation
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- 2 ■ 5-Chamber
  - Intact septum
  - Aorta continuation
    - Mitral valve post
    - IVS ant
  - Aortic Arch
    - Exits from LV
    - Neck vessels
  - Pulm Artery
    - PDA into desc. Aorta
    - No neck vessels
- 20  **Eight View Quick Summary**
  - 1 ■ Short Axis Great Vessels
    - Pulm. Artery exits RV
    - Pulm. Arteries bifurcate
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  - 2 ■ 3 Vessel View
    - All outlets of the heart in one view
    - Very easy to obtain
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