Primer on Fetal Arrhythmia Assessment with Ultrasound

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Objectives
- Assessment of fetal arrhythmias using ultrasound
- Basic understanding of different fetal arrhythmias
  - Irregular rhythms
  - Bradyarrhythmias
  - Tachyarrhythmias

Diagnosis of Fetal Arrhythmias
- Fetal ECG not reliable or easily recordable
- Other modalities
  - Fetal Ultrasound/ echocardiography
  - Fetal Magnetocardiography

Diagnosis of Fetal Arrhythmias with Fetal Echocardiography
What it CAN do:
- Heart Rate Assessment
- Rhythm Assessment (Regular or irregular)
- Approximation of rhythm subtype using pulsed Doppler: Tissue Doppler imaging and M-Mode
- Assess for structural abnormalities
What it CANNOT do:
- Give you an ECG
- Give exact diagnosis of arrhythmia

Heart Rate Assessment
- Use Doppler to measure from the onset of one beat to the next
- Image to Acquire:
  - Umbilical Doppler
  - Outflow Doppler

Rhythm Assessment: Pulsed Doppler
- Measures velocities of Venous/ Arterial structures
- Use: Changes in Doppler patterns can suggest various arrhythmias
- Doppler Locations:
  - SVC Aorta
  - Mitral valve/ Aortic Valve
  - Pulmonary veins/ Pulmonary artery
Rhythm Assessment: Pulsed Doppler

- **Mechanical PR Interval**
  - Time from beginning of the atrial kick to the onset of systole
  - Approximates the PR interval on an ECG

Rhythm Assessment: M-Mode

- Records the sequence of mechanical events in the heart (wall motion, valve opening) in a single plane
- Use: Rapid assessment of relationship of atrial and ventricular contraction
- Position cursor so that it crosses one structure that moves with atrial contraction (atrial wall/AV valve) and one structure that moves with systolic contraction (ventricular wall, semilunar valve)