

Primer on Fetal Arrhythmia Assessment with Ultrasound

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 April 8, 2019



Objectives

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

Diagnosis of Fetal Arrhythmias

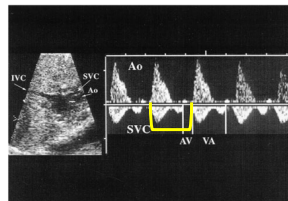
- Fetal ECG not reliable or easily recordable
- Other modalities
 - ✓ Fetal Ultrasound/ echocardiography
 - ✓ Fetal Magnetocardiography

Diagnosis of Fetal Arrhythmias with Fetal Echocardiography

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|--|---|
| What it CAN do: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Give you an ECG • Give exact diagnosis of arrhythmia |
|--|---|

Heart Rate Assessment

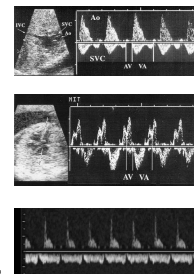
- Use Doppler to measure from the onset of one beat to the next
- Image to Acquire:
 - ✓ Umbilical Doppler
 - ✓ Outflow Doppler



Fouron et al. Doppler and M-Mode Ultrasonography to Time Fetal Atrial and Ventricular Contractions. Obstetrics and Gynecology, 2000; 96: 752-756.

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

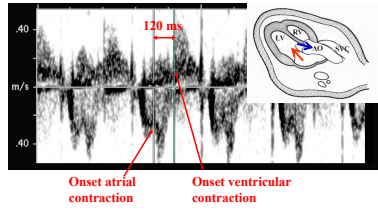


Fouron et al. Doppler and M-Mode Ultrasonography to Time Fetal Atrial and Ventricular Contractions. Obstetrics and Gynecology, 2000; 96: 752-756.
 Canabarro et al. Evaluation of fetal arrhythmias from simultaneous pulsed wave Doppler in pulmonary artery and vein. Heart, 2007; 93: 1448-1453.

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 ventricular contraction (ventricular wall, semilunar valve)

