Indication for Fetal Cardiac Evaluation

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What you do matters significantly

- 99% of women in the US undergo an OB US in the 2\textsuperscript{nd} or 3\textsuperscript{rd} trimester
- Nationally, 30% of those identified congenital heart disease prenatally
Why perform a fetal echocardiogram?

- Avoiding hemodynamic compromise
- Counseling
- Fetal intervention
Article

- AHA Scientific Statement: *Diagnosis and Treatment of Fetal Cardiac Disease, Donofrio, Circulation, April 24th, 2014*

http://circ.ahajournals.org/content/early/2014/04/23/01.cir.0000437597.44550.5d
<table>
<thead>
<tr>
<th>LEVEL A</th>
<th>LEVEL B</th>
<th>LEVEL C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple populations evaluated*</td>
<td>Limited populations evaluated*</td>
<td>Very limited populations evaluated*</td>
</tr>
<tr>
<td>Data derived from multiple randomized clinical trials or meta-analyses</td>
<td>Data derived from a single randomized trial or nonrandomized studies</td>
<td>Only consensus opinion of experts, case studies, or standard of care</td>
</tr>
</tbody>
</table>

**Suggested phrases for writing recommendations**
- should
- is recommended
- is indicated
- is useful/effective/beneficial
- may/might be considered
- is probably recommended or indicated
- usefulness/effectiveness is unknown/unclear/uncertain or not well established

**Comparative effectiveness phrases**
- treatment/strategy A is recommended/indicated in preference to treatment B
- treatment A should be chosen over treatment B
- treatment/strategy A is probably recommended/indicated in preference to treatment B
- it is reasonable to choose treatment A over treatment B

**Classifications**

<table>
<thead>
<tr>
<th>CLASS I</th>
<th>CLASS IIa</th>
<th>CLASS IIb</th>
<th>CLASS III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefit &gt;&gt; Risk</td>
<td>Benefit &gt;&gt; Risk</td>
<td>Benefit ≥ Risk</td>
<td>No Benefit or Harm</td>
</tr>
<tr>
<td>Procedure/Treatment SHOULD be performed/administered</td>
<td>Additional studies with focused objectives needed</td>
<td>Additional studies with broad objectives needed; additional registry data would be helpful</td>
<td>Procedure/Treatment MAY BE CONSIDERED</td>
</tr>
</tbody>
</table>

**ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT**

- Recommendation that procedure or treatment is useful/effective
- Sufficient evidence from multiple randomized trials or meta-analyses

**LEVEL A**

- Recommendation in favor of treatment or procedure being useful/effective
- Some conflicting evidence from multiple randomized trials or meta-analyses

**LEVEL B**

- Recommendation in favor of treatment or procedure being useful/effective
- Some conflicting evidence from single randomized trial or nonrandomized studies

**LEVEL C**

- Recommendation's usefulness/effectiveness less well established
- Greater conflicting evidence from single randomized trial or nonrandomized studies

**COR III: No Benefit or Harm**
- Excess cost w/o benefit or Harmful
- Harmful to Patients

**COR III: Harm**
- Not Helpful
- No Proven Benefit

**COR III: No Benefit**
- Potentially harmful
- Causes harm associated with excess morbidity/mortality
- Should not be performed/administered/other

**COR III: Harm**
- Not useful/beneficial/effective
- Should not be performed/administered/other

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Indications: Maternal Factors

**Factor**

- Diabetes pre-conception or 1st trimester

- Gestational diabetes if HgbA1c > 6 in the 3rd trimester

**Absolute risk (% live births) & type of association**

- 3-5%; Heterotaxy, Truncus, dTGA, single ventricle; repeat if HgbA1c elevated

- <1%; ventricular hypertrophy in 3rd trimester
## Indications: Maternal Factors

### Factor

<table>
<thead>
<tr>
<th>Factor</th>
<th>Absolute risk (% live births) &amp; type of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKU if level &gt; 10 mg/dL</td>
<td>12-14%</td>
</tr>
<tr>
<td>SSA or SSB antibody +</td>
<td>1-5%; CHB; scans 16-28 weeks every other week</td>
</tr>
<tr>
<td>• Increased risk with maternal ↓ vitamin D or hypothyroid</td>
<td></td>
</tr>
<tr>
<td>• Previous child with CHB ↑ risk of CHB in subsequent pregnancies (11-19%)</td>
<td>11-19%; CHB; scans 16-28 weeks every week</td>
</tr>
</tbody>
</table>
Indications: Maternal Exposures

**Exposure**

- Anticonvulsants, Lithium, ACE-I, Retinoic acid, Vitamin A
- SSRI
- NSAIDs
  - 1\textsuperscript{st} trimester
  - 3\textsuperscript{rd} trimester
- Infection
- IVF

**Absolute risk & type of association**

- RVOT
- 1-2\% for CHD
- 5-50\% ductal constriction; daily scans during exposure
- 1-2; rubella for CHD; parvo, coxsaxie, adeno, CMV myocarditis
- 1.1-3.3\%
Indications: Family History

History

• Maternal structural CHD
• Paternal structural CHD
• Sibling CHD
• 2nd degree relative
• 3rd degree relative
• 1st or 2nd degree relative

Mendelian inheritance

Absolute risk & type of association

• 3-7 all; 10-14 AVSD; 13-18 AS; <3 TOF/dTGA
• 2-3 ↑; 7.5% postnatally
• 3%; 8% HLHS
• If LVOT lesion, screen
• No indication
• No indication with HCM, Marfans, Ehler Danlos
## Indications: Fetal Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Absolute risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspected CHD</td>
<td>&gt;40</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>1</td>
</tr>
<tr>
<td>Bradycardia/CHB</td>
<td>50-55</td>
</tr>
<tr>
<td>Irregular rhythm</td>
<td>0.3; arrhythmia = 2%</td>
</tr>
</tbody>
</table>
Indications: Fetal Factors

Factors

• Non-cardiac defect

• Chromosomal anomaly

• ↑Nuchal translucency

Absolute risk + associations

- 30 omphalocele; 20 duodenal atresia; 30 CDH; 5-15 CNS; 71 GU

- Depending on the anomaly

  - 3-3.4 mm = 3
  - 3.5-6 mm = 6
  - 6-8.5 mm = 24
  - >8.5 mm = >60
Indications: Fetal Factors

**Factors**
- Abnormality of umbilical cord, placenta or intra-abdominal venous anatomy
- Monochorionic twins
- Hydrops fetalis

**Absolute risk + associations**
- 3.9; single umbilical artery; absence of the DV -> cardiac volume overload -> CHF
- 2-10; TTTS increases risk
- 15-25%
If a fetus with significant CHD is identified...

- Delivery site
- Gestational age
- Counseling & preparation
Questions?