Is the Three Tier Fetal Heart Rate Categorization Beneficial?

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Learning Objectives

1. To review the 2008 development of a three tier intrapartum fetal heart rate categorization.
2. To review the components within the three tiers.
3. To review management in relation to timing and within each tier.
4. To review subsequent reports regarding benefits of the categorization.

Fetal Heart Rate Patterns: Monitoring, Interpretation, and Management
EFHRM Categories

- Reassuring (normal)
- Nonreassuring (abnormal)

ACOG Technical Bulletin #207, 1995

NICHD EFHRM Workshop 1997

- Primarily
  1. Definitions
  2. Research priorities

AJOG, 1997

Problems with 2 Categories

- “In between” patterns
  - Time (duration)
  - Persistence (≥50%)
  - Degree of abnormality
Case

- 25 y/o p0
- Term, low risk
- Spontaneous labor
- Cervix 4 / 75 / -3
2250 Hours
- 6 contractions (10 min.)
- Late decelerations vs. Moderate variable
- Moderate variability
- Cervix C / C / +1
2320 Hours

- 5 contractions (10 min.)
- Late decelerations (severe)
- Absent variability
0010 Hours

$ 5 contractions (10 min.)
$ Late decelerations
$ Absent variability

0027 Hours

$ Outlet forceps

0027 Hours

$ Apgars 2 / 5 / 8
$ RNICU observation 6 hrs.
Normal Ua

- pH: 7.28
- $\text{HCO}_3$: 22
- $\text{pCO}_2$: 48
- BD: 0 to -10

Ua Case

<table>
<thead>
<tr>
<th></th>
<th>2SDs</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.10</td>
<td>7.09</td>
</tr>
<tr>
<td>$\text{HCO}_3$</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>$\text{pCO}_2$</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>BD</td>
<td>0 to -14</td>
<td>-12.8</td>
</tr>
</tbody>
</table>

Mild Metabolic Acidemia

Conclusion

- Management appropriate?
- Management delayed?
- A near miss?
- A near hit?
The 2008 National Institute of Child Health and Human Development Workshop Report on Electronic Fetal Monitoring

*Update on Definitions, Interpretation, and Research and Management Guidelines*

*Obstet Gynecol 2008;112:661-6*

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**EFM Interpretation Systems**

- 1997 NICHD: 2 tier
- Royal College OG: 3 tier
  - Extensive vetting and peer review
  - National implementation, 50% drop in intrapartum death rate
- Society OB Canada: 3 tier
  - Extensive vetting and peer review

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**Systems: General Concepts**

- System needs to be SIMPLE
- Evidence based
- Consistency of FHR definitions
- Systems generally agree on the good and bad FHR patterns
Category I

Include all of the following:
- Baseline rate: 110-160 bpm
- Baseline FHR variability: moderate
- Late or variable decelerations: absent
- Early decelerations: present or absent
- Accelerations: present or absent

Category II

Includes all not categorized as I or III.

Represent an appreciable fraction encountered in clinical care.

Category III

Include either:
- Absent FHR variability and any of the following:
  • Recurrent late decelerations
  • Recurrent variable decelerations
  • Bradycardia
- Sinusoidal Pattern for ≥20 min.
FHR Management Principles

- Correlate with fetal acid-base status
- Do NOT predict cerebral palsy
- Are only relevant for a point in time

FHR Categories: Meaning and Action

- Category I (Normal)
  - Strongly predictive of normal acid base status
  - Follow “in a routine manner”

Category II

- Indeterminate
  - Not predictive of abnormal acid base status
  - Continued re-evaluation
  - FHR acceleration testing
  - Nonsurgical interventions
FHR Acceleration Testing
- Induced by:
  - Fetal scalp stimulation
  - Vibroacoustic
  - Transabdominal halogen light

Nonsurgical Interventions
- Exclude cord prolapse
- Maternal 0₂ and position
- Correct hypotension (MAP)
- Stop oxytocin

Mean Arterial Pressure (MAP)
Systolic (+) 2 Diastolic
3

MAP Ranges
130/85 = 100
100/60 = 73
90/50 = 63
FHR Categories: Meaning and Action

- Category III (Abnormal)
  - Predictive of abnormal acid base
  - Prompt evaluation required
  - Abnormal with interventions
  - Deliver

3 Tier Categorization

Subsequent clinical reports

Category II FHR and fetal acidemia 30 min. prior to preterm delivery

- 920 preterm births
- 382 category II
- pH < 7.1
  - 1.5% category I
  - 6.3% category II
  - AJOG SMFM 2012
Multivariable Analyses

- In labor, only decreased variability increased occurrence of pH <7.1
- Without labor, category II tracing have increased pH<7.1

Problem

- Only 30 min. before birth
- No category III tracings
- No correlation with neonatal outcomes

Second stage EFM categories 30 min. prior to delivery and NN acidemia

- 5 year retrospective
- 5388 deliveries ≥37 weeks
- 57 (1.1%) acidemia

+ AJOG SMFM Abstracts 2012
### Associations with Acidemia

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
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<tbody>
<tr>
<td>Yes</td>
<td>Baseline tachycardia</td>
</tr>
</tbody>
</table>
| No        | Categories I or II
            | Minimal variability |
            | Late decelerations |
            | Prolonged decelerations |

### Problem

- Only 30 min. before birth
- No category III tracings
- No correlation with neonatal outcomes

### Time in FHR Category II and Newborn Ph in Late Preterm Births

- 5519 births 34-36.9
Summary 2008
NICHD Workshop

- Updated definitions
- EFHRM 3 tier categorization
- Management expanded
- Research specified