Update on 2008 NICHD Fetal Heart Rate Terminology

Tekoa L. King CNM, MPH
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Objectives

- What happened in FHR research between the NICHD 1996 meeting and the NICHD 2008 meeting?
- 2008 NICHD Meeting to Reassess FHR Terminology
- Interpretive Guidelines for FHR Patterns That Are Associated with Acidemia: Categories I, II, and III
- New NICHD Terminology for Uterine Contractions
- What is Missing? What is Next?

FHR Research Prior to 1996

- 12 Randomized trials of EFM vs Intermittent monitoring that included N = 59,324 births
- EFM associated with ↑ in C/S and operative deliveries
- No change in incidence of cerebral palsy, neonatal neurologic impairment or perinatal death rates
- Major impediment to FHR research was the lack of standard nomenclature for FHR patterns


1996 NICHD FHR Conference

- Purpose: "to propose a standardized and rigorously, unambiguously described set of definitions that can be quantified and to develop recommendations for the investigative interpretation of FHR tracings so that the predictive value of monitoring can be assessed more meaningfully in appropriately designed observational studies and clinical trials."
- Goal: "research direction should lead to more evidence-based clinical management of intrapartum fetal compromise"

Research Findings 1996-2008

- FHR variability is the best reflection of a functioning metabolically normal nervous system
- Umbilical artery cord gasses are the best postnatal indicator of intrapartum asphyxia
- FHR patterns most likely to cause fetal acidemia were identified
- Essential criteria for attributing cerebral palsy to intrapartum events was defined
- Interpretive categories with 2 or 3 or 5 tiers developed


2005-2006: AWHONN, ACNM, and ACOG Endorse NICHD Terminology

- JCAHO Sentinel Event Alert issue 30 July 21, 2004
  “Educate nurses, residents, nurse-midwives, and physicians to use standardized terminology to communicate abnormal fetal heart rate tracings”

- 2005-2006: AWHONN, ACOG and ACNM, endorsed use of NICHD terminology for description of FHR characteristics

2008 NICHD Conference

Purpose:
- "Review and update the FHR pattern definitions
- Assess existing classification systems for interpreting specific FHR patterns and make a recommendation about a system for the United States
- Make recommendations for research priorities"

To address some of the misconceptions that were common in clinical practice when the report was written

Macones et al 2008

2008 NICHD Conference

Result:
- Terminology defined in 1996 was confirmed
- Terminology for uterine activity was added
- FHR patterns were categorized for interpretation in clinical practice into 3 categories: "normal," "abnormal," and "indeterminate"

Macones et al 2008

NICHD 2008: Three Tier Fetal Heart Rate Interpretation System

- **Category I**
  - FHR patterns that are "normal": Associated with fetal wellbeing

- **Category II**
  - FHR patterns that are "indeterminate": Inconsistently associated with fetal acidemia

- **Category III**
  - FHR patterns that are "abnormal": Consistently associated with fetal acidemia

Macones et al 2008

Category I “Normal”

Includes 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

Macones et al 2008

What is New in 2008?

Accelerations are not necessary to determine “normal” when evaluated in labor

What is New in 2008? What is the Baseline?

- In any 10-minute window the minimum baseline duration must be at least 2 minutes or the baseline for that period is indeterminate
- There must be at least 2 minutes of identifiable baseline segments (not necessarily contiguous) in any 10-minute window, or the baseline for that period is indeterminate.

Macones et al 2008
Category II, “Indeterminate”

- Includes all FHR patterns not categorized as normal or abnormal. Examples:
  - Baseline rate:
    - Bradycardia not accompanied by absent variability
    - Tachycardia
  - Baseline FHR variability
    - Minimal variability
    - Absent variability not accompanied by recurrent decelerations
    - Marked variability

Category II, “Indeterminate” cont.

- Accelerations
  - Absence of induced acceleration after fetal stimulation
- Periodic or episodic decelerations
  - Recurrent variable decelerations accompanied by minimal or moderate baseline variability
  - Variable decelerations with other characteristics such as slow return to baseline, overshoots
  - Prolonged decelerations ≥ 2 min but < 10 min
  - Recurrent late decelerations with moderate baseline variability

The Varied Types of Variables

“Variable decelerations may be accompanied by other characteristics the clinical significance of which requires further research investigation.”

Interpretation of FHR Patterns: Category III “Abnormal”

- Absent baseline FHR variability and:
  - Recurrent late decelerations
  - Recurrent variable decelerations
  - Bradycardia
- Sinusoidal pattern

NICHD 2008: Uterine Activity

- Uterine contractions are quantified by the number of contractions present in a 10-minute window, averaged over 30 minutes
- Terminology
  A. Normal: ≤ 5 contractions in 10 min
  B. Tachysystole: > 5 contractions in 10 min
  C. Characteristics of uterine contractions

NICHD 2008: Uterine Activity

- Tachysystole should always be qualified as to the presence or absence of FHR decelerations
- The term tachysystole applies to both spontaneous or stimulated labor although the clinical response to tachysystole may differ depending on whether contractions are spontaneous or stimulated
- The term “hyperstimulation” and “hypercontractility” are not defined and should be abandoned
A full description of a FHR tracing requires a qualitative and quantitative description of:

1. Uterine contractions
2. Baseline rate
3. Baseline FHR variability
4. Presence of acceleration
5. Periodic or episodic decelerations
6. Changes or trends of FHR pattern over time

What is Missing?
- Pseudo-sinusoidal?
- Accelerations have to stay at 15 bpm above baseline for the whole 15 seconds?
  - "To be called an acceleration, the peak must be > 15 bpm and the acceleration must last > 15 seconds from the onset to return"
- Minimal variability with recurrent late decelerations is not mentioned in either category II or category III

How Are These Interpretive Guidelines Being Used?

Category II: How Long Does it Take to Develop Fetal Acidosis when You See Recurrent Decelerations?

"The individual components of defined FHR patterns do not occur independently and generally evolve over time" (Macones et al. 2008)

"PATTERN EVOLUTION"

It takes approximately 1 hour from the start of absent or minimal variability with recurrent late or variable decelerations to the development of significant fetal acidemia in a previously healthy fetus


Pattern Evolution

Recurrent variable or late decelerations

The variability goes from moderate to minimal to absent

Compensatory tachycardia

Decelerations get deeper and possibly more frequent

Ultimately a terminal bradycardia

Conclusion: Relationship between FHR Patterns and Newborn Acidemia Today....

I. FHR patterns not associated with fetal or newborn acidemia: NORMAL
II. FHR patterns inconsistently associated with fetal or newborn acidemia: INDETERMINATE
III. FHR patterns consistently associated with fetal or newborn acidemia: ABNORMAL

Macones et al. 2008
Should Category II be subdivided?

- No these patterns are all inconsistently associated with fetal acidemia

- Yes there should be two subdivisions: category IIA for the FHR patterns that are most likely to be normal and category IIB for those that show signs of pattern evolution and developing acidemia

- Yes there should be three subdivisions: Blue, Yellow and Orange based on increasing risk of acidemia