Intrapartum Fetal Heart Rate Monitoring
Case Presentation

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28 year old G3 P2 at 39 5/7 weeks hospitalized in early labor,
cervix 3 cm dilated, 60% effaced, -1 station
When you encounter this FHR tracing, what is the **very first step?**

**Intrapartum Fetal Heart Rate Management Decision Model©**

**Confirm FHR and uterine activity**
After confirming FHR and uterine activity what is the next step?

1. Definition
2. Interpretation
3. Management

Definition...

What are the five components of a FHR tracing?
How do you define baseline?

What is the baseline?

How do you define variability?

Variability is defined as _______________ in the ___________ that are ______________ in ___________ and ___________

What is the variability here?
What is the clinical significance of the variability in this segment of tracing?

Moderate variability reliably predicts the absence of ________________

When?

Variability is defined as “fluctuations in the baseline that are **irregular** in amplitude and frequency”

The sinusoidal pattern demonstrates “fluctuations in the baseline that are **regular** in amplitude and frequency”
Is there good beat-to-beat variability?

The terms “short-term”, “beat-to-beat” and “long-term variability are not included in the standard NICHD definitions because in actual practice, they are visually determined as a unit.

Yeah, but what’s the harm in charting “beat-to-beat” variability?

Are there any accelerations?

How do you define an acceleration?
Are there any decelerations?

Category?
Intrapartum Fetal Heart Rate Management Decision Model©

Confirm FHR and uterine activity

FHR Category?

How frequently are nurses required to chart? How about midwives and doctors?

Is the patient low-risk?

Yes

Routine Surveillance
• Every 30 min in the 1st stage of labor
• Every 15 min in the 2nd stage of labor

No

Heightened Surveillance
• Every 15 min in the 1st stage of labor
• Every 5 min in the 2nd stage of labor
There were four cesareans that night and three other laboring patients throughout the early evening and night.

While everyone was busy, the tracing was being watched intermittently by the charge nurse... it gradually changed.

When the last cesarean was being completed, the tracing was reviewed again...

What do you do now?

1. Definition
2. Interpretation
3. Management
What is the baseline?

What is the variability?

Is it minimal?

Is it absent?

Either way, what is it NOT?

So what does it mean?
Any accelerations?

How do you define acceleration?

What type of decelerations are these?

Are they abrupt?
How do you define abrupt?
Are they gradual?
How do you define gradual?
What do they mean?
Is this a change from previously?

Is this a Category II FHR tracing?

Is it a Category III tracing?

If we can’t agree whether it is a Category II or III, can we at least agree what Category it is NOT?
If the FHR tracing is not in “Category I”, what is the next step?

“ABCD”

Intrapartum Fetal Heart Rate Management Decision Model®

- Confirm FHR and uterine activity

- FHR Category?
  - I
  - II or III

- Is the patient low-risk?
  - Yes: Routine Surveillance
    - Every 30 min in the 1st stage of labor
    - Every 15 min in the 2nd stage of labor
  - No: Heightened Surveillance
    - Every 15 min in the 1st stage of labor
    - Every 5 min in the 2nd stage of labor

“A” – Assess oxygen pathway
What are the steps in the “oxygen pathway”?

How do you assess each?

Lungs
- Airway and breathing

Heart
- Heart rate and rhythm

Vasculature
- Blood pressure
  - Volume status

Uterus
- Contraction strength
- Contraction frequency
- Baseline uterine tone
- Exclude uterine rupture

Placenta
- Placental separation
- Bleeding vasa previa

Cord
- Vaginal exam
- Exclude cord prolapse

"A"
Assess Oxygen Pathway
Some factors unrelated to fetal oxygenation can affect the appearance of the fetal heart rate tracing.

Can you name some maternal factors?

How might they impact the fetal heart rate?

Fetal factors?

How would you expect them to impact the FHR?

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Fetal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
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<tr>
<td>Infection</td>
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<tr>
<td>Medications</td>
<td>Medications</td>
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<tr>
<td>Hyperthyroidism</td>
<td>Anemia</td>
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<td></td>
<td>Anomalies</td>
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<td></td>
<td>Arrhythmia</td>
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<tr>
<td></td>
<td>Extreme prematurity</td>
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<td></td>
<td>Preexisting neurologic injury</td>
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<td></td>
<td>Sleep cycle</td>
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</tbody>
</table>
If your assessment of the oxygen pathway ("A") suggests interruption of the oxygen pathway at one or more points, what is the next step?

Intrapartum Fetal Heart Rate Management Decision Model

Confirm FHR and uterine activity

FHR Category?

II or III

Is the patient low-risk?

Yes

Routine Surveillance
• Every 30 min in the 1st stage of labor
• Every 15 min in the 2nd stage of labor

No

Heightened Surveillance
• Every 15 min in the 1st stage of labor
• Every 5 min in the 2nd stage of labor

"A" – Assess oxygen pathway
"B" – Begin corrective measures

“What letter follows “A”?"
What are 7 conservative corrective measures that should be considered in this setting?

Lungs → Supplemental oxygen
Heart
  Vasculature → Position change
                Fluid bolus
                Correct hypotension
Uterus
  Placenta → Stop or reduce uterine stimulant
            Consider uterine relaxant
Cord → Consider amnioinfusion

What are two additional corrective measures than can relieve second stage decelerations?

Do all 7 conservative corrective measures need to be done in this setting?
Despite conservative corrective measures, decelerations continue

After ("A") assessing the oxygen pathway and ("B") beginning conservative corrective measures as indicated, when do you plan to review the tracing again?
Is the patient low-risk?

Yes

Routine Surveillance
- Every 30 min in the 1st stage of labor
- Every 15 min in the 2nd stage of labor

Heightened Surveillance
- Every 15 min in the 1st stage of labor
- Every 5 min in the 2nd stage of labor

No

FHR Category?
- II or III

What are the options here?

FHR Category?
- I

Is the patient low-risk?

Yes

Routine Surveillance

Heightened Surveillance

No

FHR Category?
- II or III

Expedite Delivery

FHR Category?
- III
Is the patient low-risk?

**“ABCD”**

“A” – Assess oxygen pathway
“B” – Begin corrective measures

**FHR Category?**

**II or III**

**Is the patient low-risk?**

**Routine Surveillance**
- Every 30 min in the 1st stage of labor
- Every 15 min in the 2nd stage of labor

**Heightened Surveillance**
- Every 15 min in the 1st stage of labor
- Every 5 min in the 2nd stage of labor

**Expedite Delivery**

- Heightened Surveillance
- Expedite Delivery
Exclude significant interruption of the oxygen pathway

How?

Exclude on-going hypoxic injury...

How?
Are there clinically significant decelerations?

Is there moderate variability?

Are there any accelerations?

If conservative measures “A” and “B” do not resolve decelerations and result in moderate variability and/or accelerations to your satisfaction, what is the next step?

Make this EASY on yourself…

It does NOT have to be complicated…

If you have ANY question

Just proceed to the next step
If you can’t say for sure that moderate variability is present
If you can’t say for sure that accelerations are present
If you can’t say for sure that there are no clinically significant decelerations…
Just move on to “C”

Clear common obstacles to rapid delivery.
This does not commit you to delivery
This is nothing more than PLANNING AHEAD…

When planning ahead for the possible need for rapid delivery, you should consider individual characteristics of…

Facility
Staff
Mother
Fetus
Labor
What are some examples of common obstacles to rapid delivery?

- Facility...
- Staff...
- Mother...
- Fetus...
- Labor...

By the time you’ve reached the “C” stage of management, who should be notified?
After addressing steps “A”, “B” and “C”, what is the next step?

Who needs to be making decisions for “D” and beyond?
Intrapartum Fetal Heart Rate Management Decision Model©

**Confirm FHR and uterine activity**

- **I**
  - Is the patient low-risk?
    - Yes
      - **Routine Surveillance**
        - Every 30 min in the 1st stage of labor
        - Every 15 min in the 2nd stage of labor
    - No
      - **Heightened Surveillance**
        - Every 15 min in the 1st stage of labor
        - Every 5 min in the 2nd stage of labor

- **II or III**
  - **“ABCD”**
    - “A” – Assess oxygen pathway
    - “B” – Begin corrective measures
    - “C” – Clear obstacles to rapid delivery
    - “D” – Determine decision to delivery time

**FHR Category?**

- I
  - Presence of moderate variability or accelerations
    - Yes
      - **Heightened Surveillance**
    - No/Unsure
      - **Expedite Delivery**

- II or III
  - Absence of clinically significant decelerations
    - Yes
      - **Routine Surveillance**
    - No/Unsure
      - **Expedite Delivery**

**What factors need to be considered when estimating the time from decision to delivery?**

- **Facility**
- **Staff**
- **Mother**
- **Fetus**
- **Labor**
What are some examples?

Facility...
Staff...
Mother...
Fetus...
Labor...

Intrapartum Fetal Heart Rate Management Decision Model©

Confirm FHR and uterine activity

FHR Category?

I

II or III

Is the patient low-risk?

Yes

Routine Surveillance
• Every 30 min in the 1st stage of labor
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Heightened Surveillance
• Every 15 min in the 1st stage of labor
• Every 5 min in the 2nd stage of labor

Expedite Delivery

“ABC”
– Assess oxygen pathway
– Begin corrective measures

“C”
– Clear obstacles to rapid delivery

“D”
– Determine decision to delivery time
After all conservative corrective measures have been considered and employed as deemed necessary ("ABCD"), what is the next step?

Intrapartum Fetal Heart Rate Management Decision Model©

Confirm FHR and uterine activity

FHR Category?

II or III

I

Is the patient low-risk?

No

Yes

Routine Surveillance

• Every 30 min in the 1st stage of labor
• Every 15 min in the 2nd stage of labor

Heightened Surveillance

• Every 15 min in the 1st stage of labor
• Every 5 min in the 2nd stage of labor

Expedite Delivery

“I” – Assess oxygen pathway
“B” – Begin corrective measures

FHR Category?

II

II

III

Presence of moderate variability or accelerations
Absence of clinically significant decelerations

“C” – Clear obstacles to rapid delivery
“D” – Determine decision to delivery time

Is vaginal delivery likely before the onset of metabolic acidemia and potential injury?
The cervix 5 cm dilated, completely effaced. The fetal head is at +1 station.

What should the physician do here?

**Hypoxic Injury**  **Vaginal delivery**

**“ABCD”**

“**A”** – Assess oxygen pathway
“**B”** – Begin corrective measures
“**C”** – Clear obstacles to rapid delivery
“**D”** – Determine decision to delivery time

**FHR Category?**

- **I**
- **II or III**

**Is the patient low-risk?**

- **Yes**
  - Routine Surveillance
  - Every 30 min in the 1st stage of labor
  - Every 15 min in the 2nd stage of labor
  - Heightened Surveillance
  - Every 15 min in the 1st stage of labor
  - Every 5 min in the 2nd stage of labor

- **No**

**FHR Category?**

- **I**
  - Moderate variability and/or accelerations
  - No clinically significant decelerations
  - Yes
  - No/Unsure

- **II**
  - Moderate variability and/or accelerations
  - No clinically significant decelerations
  - Yes
  - No/Unsure

- **III**
  - No/Unsure

**Intrapartum Fetal Heart Rate Management Decision Model©**
Is vaginal delivery likely before the onset of metabolic acidemia and potential injury?

The most important aspect of this question is that it MUST be answered using the best information available.

AVOID THIS PITFALL

The scientific name of this syndrome?
Kickin’ the can down the road

60 minutes later
If a standardized management protocol had been followed, do you think this would have ended long ago?

Considerably later, the patient was delivered by Cesarean. Would you be surprised by a low 5-minute Apgar score? By metabolic acidemia? By neurologic injury? Would a systematic “ABCD” approach have avoided this?
Factual accuracy (Standard definitions and interpretation)  
Ability to articulate a plan (Standard management... “ABCD”)  
  ↓  
Credibility  
  ↓  
Reasonableness  
  ↓  
Standard of care  
  ↓  
Optimize outcomes  
Minimize medical-legal risks

Intrapartum Fetal Heart Rate Management Decision Model

Confirm FHR and uterine activity  
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Is the patient low-risk?  
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No  
  ↓  
Heightened Surveillance  
  • Every 15 min in the 1st stage of labor  
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  ↓  
FHR Category?  
  ↓  
II or III

“ABCD”  
  “A” – Assess oxygen pathway  
  “B” – Begin corrective measures
  ↓  
FHR Category?  
  ↓  
II  
  ↓  
Moderate variability and/or accelerations  
  and  
  No clinically significant decelerations
  ↓  
Yes  
  ↓  
“C” – Clear obstacles to rapid delivery  
  “D” – Determine decision to delivery time
  ↓  
Is vaginal delivery likely before the onset of metabolic acidemia and potential injury?

  ↓  
No
  ↓  
No/Unsure

  ↓  
No/Unsure

  ↓  
Expedite Delivery
Does a tracing like this guarantee normal newborn outcome?

Are there conditions other than interrupted oxygenation that can cause newborn depression?

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Does a tracing like this guarantee the absence of metabolic acidemia from ANY cause?

Are there conditions other than interrupted oxygenation that can cause metabolic acidemia?

Maternal

Infection
Medications

Fetal

Infection
Medications
Errors of metabolism
If this tracing is followed immediately by delivery of a newborn with metabolic acidemia and newborn depression, how do you explain your management?

Summary

A standardized approach to intrapartum FHR definition, interpretation and management demonstrates *reasonableness*

The essential element that defines the standard of care