Beyond the Basics: The Art and Science of Tracing Interpretation

Session 5:
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No conflicts to disclose.
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Notice of disclosures

• Notice of requirements for successful completion
  – Registrants must attend full session and complete evaluation to receive contact hours

• Conflicts of Interest
  – None to report

• Financial Disclosures
  – None

• Sponsorship or commercial support
  – None

• Non-endorsement of products
  – The speaker does not endorse the use of any particular medications or products as part of this educational session

• Off-label use
  – The speaker may discuss the off-label use of misoprostol and terbutaline as they relate to labor and delivery.
Before we begin...

- Listen-only mode
- Questions – please ask, please answer!
  - Raise your hand
  - Type into the Question Pane
  - Out of time? Email wapc@perinatalweb.org
- Technical problems: Email Barb Wienholtz at wienholtz@perinatalweb.org or call at 608-285-5858, ext. 201
The content presented today is a case study. Components of this case were chosen based on their applicability to achieve learning objectives for this presentation. Do not assume the patient featured in the case was cared for by the instructor or at the facility at which the instructor is employed.

The discussion will focus on interpretation of the electronic fetal monitoring (EFM) tracings for the purpose of education. At times, the discussion may lead to the care decisions made based on EFM interpretation.

IF the instructor shares details regarding actual or potential care decisions, please note those decisions do not necessarily reflect the opinions of the instructor, a particular provider, the standard of care for any particular institution or facility, or of WAPC.
At the conclusion of the session, participants will be able to:

1. Systematically review the fetal monitoring data to identify the fetal heart rate pattern classification (category).
2. Discuss interventions/management of the fetal heart rate patterns based on their pathophysiology.
• Identify required actions correctly to manage women with abnormal fetal heart rate patterns.
The 2008 National Institute of Child Health and Human Development (NICHD) Report of Fetal Heart Rate Monitoring

- Defined standard fetal heart rate nomenclature
- Identified three categories for fetal heart rate interpretation
- Proposed future research
• Report endorsed by:


  – AWHONN-endorsed and incorporated in fetal monitoring curriculum

  – American College of Nurse Midwives

  – American Academy of Family Practice
"Management of Intrapartum Fetal Heart Rate Tracings"

- Reviewed:
  - Nomenclature
  - Fetal Heart Rate Interpretation (categories)

- Provided framework for evaluation and management of intrapartum patterns based on categories

- Assessment algorithm for fetal heart rate patterns

- Intrapartum resuscitative measures

- Management of uterine tachysystole

The following questions are used to evaluate every tracing, followed by specific questions:

1. What is the contraction pattern? (interval, duration, resting tone if appropriate)
2. What is the baseline fetal heart rate?
3. What is the baseline variability?
4. Are there any periodic changes present?
5. Are there any episodic changes present?
6. What are the probable causes of the changes present?
7. When was the last time there was either moderate variability or an acceleration?
• Interpretation
• Interventions/Communication
• Documentation in chart
• **SBAR**
  - *Situation*
  - *Background*
  - *Assessment*
  - *Recommendation*
FOCUS ON CONTRACTION MONITORING
Oxygen Pathway

Environment

- Lungs
- Heart
- Vasculature
- Uterus
- Placenta
- Umbilical Cord

Fetus

- Hypoxemia
- Hypoxia
- Metabolic acidosis
- Metabolic acidemia
Fetal Compensatory Mechanisms

- Redistribute Blood Flow
- Reduce $O_2$ Need
- Increase Extraction
- Fetal Reserves
Poll Question 1

At what intrauterine pressure are the spiral arteries compressed?

a. 20-25 mm Hg
b. >80 mm Hg
c. >35-60 mm Hg
Oxygen Pathway

**Environment**
- Lungs
- Heart
  - Vasculature
  - Uterus
  - Placenta
  - Umbilical Cord

**Fetus**
- Hypoxemia
- Hypoxia
- Metabolic acidosis
- Metabolic acidemia
Uterine Activity Terminology

• Frequency-the onset of one contraction to the onset of next contraction (minutes). Number of contractions in a 10 minute period.
• Duration-length of time from the onset of contraction to the offset of the contraction measured from the baseline resting tone (seconds)
• Intensity-Strength. Peak of the contraction minus the resting tone.
• Resting Tone-intrauterine pressure when uterus is not contracting (relaxation)
• Relaxation Time-Time from the end of one contraction to the beginning of the next.
• Palpation
• Tocodynamometer
• Intrauterine Pressure Catheter
  – Montevideo Units (MVU)
What are the Montevideo units?

a. 240 MVU
b. 120 MVU
c. 360 MVU
Counting Montevideo Units

• Measure the peak intensity or amplitude of mmHg in a 10 minute period of time and add numbers together
  – Contraction amplitude is the difference between resting tone and the peak of the contraction

• Subtract the baseline resting tone from peak contractions pressure for each contraction

• Example:
  - 20+20+20+20+25+20 = 125 (Note baseline subtracted from each contraction)
Montevideo Units and Labor

• Contraction intensity of 40 mmHg and MVU’s of 80-120 are generally sufficient to initiate labor
• 200 MVU’s in a ten minute period is considered adequate labor
• Usually range from 100-250 MVU in the first stage of labor
• May rise to 400 MVU in the second stage
Excessive Uterine Activity

• Normal- 5 contractions or less in a 10 minute period of time
• Tachysystole- ≥ 5 contractions in a 10 minute period averaged over 30 minutes
• Hypertonus- Uterus does not relax between contractions. Elevated resting tone.
• Inadequate relaxation time
• Tetanic contractions-excessive contraction duration-contractions lasting 2 minutes or more
Tachysystole -

> 5 contractions in a 10 minute period averaged over 30 minutes
Doubling
Low Amplitude High Frequency Contractions
Factors That Affect Uterine Perfusion

• Uterine Overdistension
  – Multiple gestation
  – Hydramnios
  – Amnioinfusion

• Disease states
  – Preeclampsia
  – Infection
  – Abruption

• Maternal Position
Factors That Effect Uterine Perfusion

• Stimulating
  – Acetylcholine
  – Ergonovine
  – Estrogen
  – Norepinephrine
  – **Oxytocin**
  – Propranolol
  – Prostaglandins
  – Quinine
  – Sparteine
  – Vasopressin

• Inhibiting
  – B Sympathomimetics
  – Calcium channel blockers
  – Nitroglycerin
  – Atosiban
  – Halothane
  – Magnesium Sulfate
  – Progesterone
  – Prostaglandin synthetase inhibitors
Effects of oxytocin-induced uterine hyperstimulation during labor on fetal oxygen status and fetal heart rate patterns.

Kathleen Rice Simpson, PhD, RNC; Dotti C. James, PhD, RNC

*Hyperstimulation was associated with significant oxygen desaturation.*
Elevated uterine activity increases the risk of fetal acidosis at birth

P.C.A.M. Bakker, MD; P.H.J. Kurver, MSc; D.J. Kuik, MSc; H.P. Van Geijn, MD, PhD.

*Compared uterine activity parameter to UA pH
Inter-contraction interval <63 seconds is associated with increased incidence of UA pH <7.1*
Decreasing Excess Uterine Activity

Specific to Contractions

- Change maternal position to side lying
- Administer IV bolus
- Remove cervical ripening agents
- Decrease or discontinue oxytocin
- Use tocolytic
Interventions at Work

• Turn off oxytocin: resolution in 14 minutes

• Turn off oxytocin + IV bolus of at least 500 ml of Lactated Ringer’s: resolution: 9-10 minutes

• Turn off oxytocin + IV bolus of at least 500 ml of Lactated Ringer’s + change to lateral position resolution: 6 minutes
Your patient on oxytocin is experiencing runs of doubling and tripling.

You would:

a. Continue to observe
b. Increase the oxytocin
c. Decrease or discontinue the oxytocin
Management of Tachysystole

Uterine tachysystole

Spontaneous labor
- Cat. I
  - No interventions required
- Cat. II or III
  - Intrauterine resuscitative measures
    - If no resolution, consider tocolytic

Labor induction or augmentation
- Cat. I
  - Decrease uterotonics
- Cat. II or III
  - Decrease or stop uterotonics
  - Intrauterine resuscitative measures
    - If no resolution, consider tocolytic

Your patient is 4 cm and contracting every 2 minutes with coupling. She is on oxytocin. How often should you perform an assessment?

a. Every hour
b. Every half hour
c. Every 15 minutes
An assessment of uterine contractions includes:

a. Intensity or strength
b. Duration
c. Resting tone
d. Frequency
e. All of above
### Recommendations for Assessment of Fetal Status During Labor with EFM


<table>
<thead>
<tr>
<th></th>
<th>Latent Phase (&lt;4cm)</th>
<th>Latent Phase (4-5 cm)</th>
<th>Active Phase (&gt;6cm)</th>
<th>Second Stage (passive fetal descent)</th>
<th>Second Stage (active pushing)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low risk without Oxytocin</strong></td>
<td>At least hourly</td>
<td>Every 30 minutes</td>
<td>Every 30 minutes</td>
<td>Every 15 minutes</td>
<td>Every 15 minutes</td>
</tr>
<tr>
<td><strong>With Oxytocin or risk factors</strong></td>
<td>Every 15 minutes with oxytocin, every 30 minutes without</td>
<td>Every 15 minutes</td>
<td>Every 15 minutes</td>
<td>Every 15 minutes</td>
<td>Every 5 minutes</td>
</tr>
</tbody>
</table>
Poll Question 6

What is your Recommendation?

a. Stop the oxytocin and restart in one hour
b. Leave the current oxytocin dose in place
c. Reduce the oxytocin by \(\frac{1}{2}\)
d. Continue to increase the oxytocin
Suggested Clinical Protocol - Oxytocin-Induced Tachysystole - Normal FHR

• Assist the mother to a lateral position
• Give IV bolus of at least 500 ml lactated Ringer’s solution as indicated
• If uterine activity has not returned to normal after 10-15 minutes, decrease oxytocin rate by at least half; if uterine activity has not returned to normal after 10-15 more minutes, discontinue the oxytocin until uterine activity is less than 5 contractions in 10 minutes
• To resume oxytocin after resolution of tachysystole: If oxytocin has been discontinued for less than 20-30 minutes, the FHR is normal and contraction frequency, intensity, and duration are normal, resume oxytocin at no more than half the rate that caused the tachysystole and gradually increase the rate as appropriate based on unit protocol and maternal-fetal status. If oxytocin has been discontinued for more than 30-40 minutes, resume oxytocin at the initial dose ordered.

Simpson and O’Brien-Abel (2013). In, AWHONN’s Perinatal Nursing 343-344.
Suggested Clinical Protocol --

Oxytocin-Induced Tachysystole-
Indeterminate or Abnormal FHR

• Discontinue the oxytocin
• Assist the mother to a lateral position
• Give IV bolus of at least 500 ml of lactated Ringer’s solution as indicated
• Consider oxygen at 10L/min via non-rebreather face mask (discontinue as soon as possible based on the FHR pattern. If no response, consider 0.25 mg terbutaline SQ)
• To resume oxytocin after resolution of tachysystole: If oxytocin has been discontinued for less than 20-30 minutes, the FHR is normal and contraction frequency, intensity, and duration are normal, resume oxytocin at no more than half the rate that caused the tachysystole and gradually increase the rate as appropriate based on unit protocol and maternal-fetal status. If oxytocin has been discontinued for more than 30-40 minutes, resume oxytocin at the initial dose ordered.

Simpson and O'Brien-Abel (2013). In, AWHONN’s Perinatal Nursing 343-344.
Poll Question 7

Modification of second stage management to promote fetal well-being includes all of the following except:

a. Stop pushing
b. Push in a lateral position
c. Perform closed glottis pushing
d. Push every second or third contraction
Tracing 9
Tracing 12
Why Focus on Oxytocin?

- High Alert Medication
- Most commonly used induction agent
- Varying protocols-
- Medico-legal implications in adverse outcomes

Common Allegations:

- FHR Pattern and Communication
- Elective Induction of Labor
- Misoprostol for Cervical Ripening and Induction
- Oxytocin for Labor/Induction/Augmentation
- Uterine Tachysystole
Oxytocin Facts

• Onset of action 3-4 minutes (IV)
• Half-life-10-15 minutes
• 30-40 minutes to reach a steady state
  – Initial dose (incremental) increases in frequency, strength, and duration
  – Stable phase-continued increases in oxytocin does not increase contractions
    • “Push the pit; Pit through the pattern; Pit to distress.”
  – Continued increases lead to tachysystole
• **Standardization**
  – Nomenclature (NICHD, 2008, ACOG Practice Bulletin #116
  – Policies, procedures, protocols that are interdisciplinary using guidelines and resources from professional organizations
  – Fetal assessments until birth
• **Multidisciplinary Interpretation and Management**
  – ACOG Practice Bulletin #116 “Intrapartum Fetal Heart Rate Monitoring: Nomenclature, Interpretation and General Management Principles”
• **Communication/Collaboration**
  – Chain of Communication
  – SBAR
  – Multidisciplinary Case Reviews
  – Joint provider/nurse FM education
Competency


- Competency
  - **Intermittent Auscultation**: palpate uterine contractions for frequency, duration and intensity, assess resting tone between contractions, and determine whether abnormal findings are present; (normal or tachysystole)

  - EFM-assess uterine contraction frequency, duration, intensity, and baseline resting tone (verified by palpation), MVU, normal uterine activity vs tachysystole

- **Competency Validation**
  - Electronic fetal monitoring tracing reviews
  - Simulation with models for skill practice
  - Programed self study
  - Computer simulation
  - ETC
• Evaluation of components of uterine contractions: Frequency, strength, duration, resting tone
• Frequency of FHR and uterine contraction assessment/evaluation
• Institutional policies that address assessment, communication, and documentation.
  – Use of summary statements such as tachysystole vs component of UC
  – Labor or non-laboring patients
• **Triage of the Pregnant Patient**
  – Assessment
    • Maternal VS
    • Uterine Contractions
    • Chief Complaint
    • Status of labor: presence of contractions, vaginal bleeding, status of membranes
    • Woman’s perception of fetal movement
    • Any high risk or obstetric conditions as identified in a review of the history or the woman’s report

• **Transfer of the Pregnant Patient**
  – “Uterine activity of maternal patients and fetal heart rates need to be monitored before and after transport; continuous uterine activity or fetal heart rate monitoring during transport need to be individualized.”


References


References


Questions?

Comments?
• Fax or email attendance list to WAPC
  • fax: 608-285-5004
  • email: wapc@perinatalweb.org

• Evaluation will be sent via email from WAPC. Please complete to receive Continuing Education Credit.

• Continuing Education Certificate will be sent via email upon completion of evaluation.

• Archived version

• Become a member of WAPC! Join online: https://www.perinatalweb.org/npay/membership.asp

• 2018 Series brochure coming soon!
Thank-you