When the Dream is Shattered
Case Study in Fetal Monitoring

What would you have done?

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Disclosure

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- Off Label use of Terbutaline
Learner Goals

By the end of this presentation the learner should...

- Classify Fetal Heart Rate patterns according to NICHD definitions
- Conduct a systemic approach to interpreting Fetal Heart Rate patterns
- Identify common differential findings found in Fetal Heart Rate patterns
- Understand legal considerations in misinterpretation of Fetal Heart Rate patterns
Joint Recommendations for FHR Interpretation

Joint publication in 2008 on Electronic Fetal Heart Monitoring. Included:
- Review the Nomenclature
- Standardized terminology for Interpretation
- Category Development for Research
- Definitions for Uterine Activity

Created/Adopted By:
- National Institute of Child Health and Human Development (NICHD)
- Society for Maternal-Fetal Medicine
- American College of Obstetricians and Gynecologists (ACOG)
- Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN)

NCC Monograph, Volume 3, No. 1, 2010
Operational Principles of NICHD Terminology

- **Definitions:**
  - Are centered around VISUAL interpretation
  - Apply to patterns obtained from a FSE or an external Doppler device
  - Include Intrapartum or Antepartum patients

- **FHR patterns are defined as periodic or episodic**
  - Periodic patterns are associated with contractions
  - Episodic patterns are not associated with contractions

- **FHR and Uterine activity are determined through good quality tracings**

NCC Monograph, Volume 3, No. 1, 2010
Operational Principles of NICHD Terminology

- FHR patterns should be assessed over time
- No differentiation between Short and Long Term Variability
- Deceleration definitions are based on Abrupt vs. Gradual onset
- Descriptive names should be used when communicating between care givers and when documenting in the medical record (such as accelerations, and early, late or variable decelerations)
- Categories were introduced mainly as a consideration for Research consistency

NCC Monograph, Volume 3, No. 1, 2010
Baseline Rate

- In a 10 minute segment, Baseline is the approximate Mean FHR rounded in increments of 5 bpm
- Ranges are not used
- Excludes Accelerations or Decelerations
- Excludes Marked Variability
- Must be $\geq$ 2 minutes of identifiable baseline segments
  - Not necessarily contiguous
  - In any 10 minute window
- Labeled as “Indeterminate” if does not meet above Criteria

- **Bradycardia**: Baseline rate of < 110 bpm
- **Tachycardia**: Baseline rate of > 160 bpm

Variability

- **Absent**: Amplitude Undetectable
- **Minimal**: Amplitude $\leq 5$ bpm (greater than undetectable)
- **Moderate**: Amplitude 6 - 25 bpm
- **Marked**: Amplitude $> 25$ bpm

Accelerations

- Visually abrupt increase in FHR (15 x 15)
  - Peak must be $\geq 15$ bpm
  - Acceleration must last $\geq 15$ seconds from Onset to Return
- Accelerations lasting $\geq 10$ minutes is a change in Baseline
- Prolonged Acceleration: Acceleration $\geq 2$ min but $< 10$ min in duration

Decelerations (Early)

- Visually apparent
- Usually Symmetrical
- **Gradual** decrease and return of FHR associated with a Uterine Contraction

Decelerations (Late)

- Visually apparent
- Usually Symmetrical
- **Gradual** decrease and return of FHR associated with a Uterine Contraction
- Onset to Nadir ≥ 30 seconds

Decelerations (Variable)

- Visually apparent **abrupt** decrease in FHR
- **Abrupt** decrease in FHR
- Onset to Nadir < 30 seconds
- Decrease in FHR > 15 bpm
- Lasting ≥15 seconds
- Lasts < 2 minutes
- May or may not be associated with Uterine Contractions

Decelerations (Prolonged)

- Visually apparent decrease in FHR from baseline
- \( \geq 15 \text{ bpm} \)
- Lasts \( \geq 2 \text{ minutes but less than 10 min} \)
- If \( > 10 \text{ minutes} \) it is a baseline change

Recurrent vs. Intermittent

- **Recurrent**: Occurs with $\geq 50\%$ of contractions in 20 minutes
- **Intermittent**: Occurs with $< 50\%$ of contractions in 20 minutes

Sinusoidal Patterns

- Visually apparent
- Smooth
- Wave-like (Undulating)
- Rate of 3-5 per minute
- Persists for ≥ 20 minutes

Uterine Activity: Normal Pattern

- Based on the number of contractions occurring in a 10 minute segment (averaged over a 30 minute period)
- Normal is $\leq 5$ in a 10 minute segment

Uterine Activity: Tachysystole

- Greater than 5 contractions in a 10 minute segment averaged over a 30 minute period
- Can result in both spontaneous and stimulated labor

Category I

Must include all of the following

- Baseline Rate: 110-160 bpm
- Moderate Variability
- No Late or Variable Decelerations
- Early Decelerations may or may not be present
- Accelerations may or may not be present

Category III

Includes either

- Absent baseline FHR variability and any of the following
  - Recurrent late decelerations
  - Recurrent variable decelerations
  - Bradycardia

OR

- Sinusoidal Pattern

Category II

Everything NOT included in Category I or III

- Tracings are not predictive of abnormal acid-base status
- These may or may not be emergent situations

Terminology Updates

• 1998
  - Fetal Distress and “all inclusive” terms for “fetal distress” except “Metabolic Acidemia” were removed from the Perinatal International Classification of Diseases codes

• 2008
  - Hyperstimulation and Hypercontractility abandoned due to lack of consistent definitions
  - Tachysystole recommended to describe “excessive uterine activity”
  - Reassuring and Nonreassuring also removed from appropriate terminology
  - Recommendation is to use naming conventions described in NICHD terminology

What Category is This???

- Moderate Variability
- Recurrent Variable Decelerations
- CATEGORY II Tracing
What Category is This???

- Absent Variability
- Recurrent Variable Decelerations
- CATEGORY III (Abnormal) Tracing
Case Study
Real Patient Event
Case Study
Admit (1200)

36 y.o. G 3 P2. Hispanic patient, at 39.3 weeks gestation, admitted on a Sunday, by her Family Practice Physician, for induction of labor. She has intact membranes.

- Patient and Husband do not speak English
- 12 year old daughter used as Interpreter
- Her other 2 children were born outside of the United States and no medical records were available
- Education: completed 6th grade. Husband completed 8th grade
- Treatment for depression during pregnancy
- Denies previous CS or uterine surgeries
Case Study
Admitting Tracing (1210)

- **T: 98.5, P: 50, R: 20, BP: 189/79**
- VE: 2 cms/80%/-3
- Cervix soft/Midposition/vtx
- High-dose oxytocin per hospital protocol
- Provider indicated he would be over shortly to AROM
Case Study
1230

- Oxytocin Started @ 4 mu/min
Case Study 1330

- Oxytocin increased 12 μg/min
- VS normal
Case Study 1430

- Oxytocin increased 20 μu/min
- HR 72  BP 105/75
- External Monitors readjusted
- Acoustic Stimulation done
- c/o Pain, Refused Medication

NICDH INTERPRETATION

- Baseline 135, Moderate Variability,
- Accelerations present,
- No Decelerations
- Uterine Contractions: q 1 1/2 - 2 1/2
  Resting Tone 15
- Category I
Case Study 1530 (Provider has not yet seen patient)

- Provider notified of status
- States he will be in shortly but continue present plan
- VS normal
- Toco and Doppler adjusted
- Acoustic Stimulation done
- Pitocin continued at 20 mu/min ...Can you interpret the contractions?
"Unable to determine Uterine Contraction Pattern"

- Oxytocin continues at 20 mu/min
- Provider calls in: States he will be in shortly but asks to have present plan continued
- VE: 2 cm / 70% / -2

- Maternal Pulse 62, BP 126/84
- Uterine Contractions every 2-3 min, 45-90 sec duration
- Toco and Doppler adjusted
- Up to Bathroom
Case Study
1730

- T 99.2, R 22, HR 78, BP 111/72
- SROM (meconium)
- VE: 2-3 cms / 70% / -2 (unchanged)
- Unable to determine Uterine Contraction Pattern
- Oxytocin continues at 20 mu/min
- Patient crying with pain. Refuses pain intervention
- Provider notified (he has still not come in to see patient)
Case Study
Would you be doing something different?

At this point in the patients progress...

- Provider continued to tell nurse he would be coming in
- Nurse continues to re-adjust Toco and Doppler, but never places IUPC or request IUPC placement from provider
- Patient screaming in pain but refuses pain medication
- Oxytocin is never reduced or stopped
- Contractions are unable to be interpreted due to poor monitoring

Would you manage the patient in the same way?
Case Study 1815

- **T** 99.3   **P** 97   **R** 18   **BP** 135/89   **SaO2** 97%   Pain Score 9
- FHR Baseline “Stable”
- Moderate Variability
- Accelerations Noted
- UCs every 2-3, 50-60 sec (Toco Readjusted)

Accurate Documentation according to NICHD???
Case Study 1830

- Requests Epidural “Writhing in Pain” (Pain Score 9-10)
- FHR Baseline 145
- Moderate Variability (do you agree???)
- Accelerations Noted (really...where???)
- UCs every 2-3, 50-60 sec (Toco Readjusted) (How can you tell???)
VE: 3 cms / 80% / -1 (slight change)
Anesthesia present.
FHR Baseline 140, Moderate Variability, Accelerations Noted
Variable Decelerations (first mention of decelerations)
UCs every 2-3, 50-60 sec (Toco Readjusted)
Provider notified “patient writhing in pain” (states he will be there shortly) (He still has not been in to see the patient)
Case Study 1910 (Sitting for Epidural)

- Anesthesia in Room
- Patient positioned for epidural
- Maternal HR 120
- FHR Baseline 140

No FSE or IUPC... How do you know if you are seeing Maternal or Fetal HR???
Case Study 1918

- Epidural in place/Test dose given
- Maternal HR 162
- No documentation in Medical Record of FHR or UC interpretation
Case Study 1922-1929

- c/o dizziness/lightheadedness
- Maternal HR 160, BP 60/37
- Screaming in pain
- O2 @ 10 L/min per face mask

- Pit remains @ 20 mu/min
- Intrauterine resuscitation performed
- VE: Anterior Lip / 100% / -1
- No FHR or UC interpretation in Record
Case Study
1930-1937

- Oxytocin Off @ 1930 (Finally)
- VE: Anterior Lip / 100% / -1
- Maternal **HR** 171
- **BP** 60/37
- “FHTs Flat with very minimal variability”
- Intrauterine resuscitation performed
- Provider Paged
- Started patient pushing (“pushed poorly with no descent”)
- Provider returned page. RN tells him to come immediately to deliver patient and provides update on patient status
- “Patient screaming in pain”
Case Study
1930-1937

Oxytocin off @ 1930
Case Study 1930-1937

- RN decides to take patient to OR @ 1938
Case Study

- Family Practice Provider was at a different facility with a patient in labor (20 minutes away). (He never told the RN this)
- Provider called an Obstetrician that lived closest to facility to go STAT to hospital @ 1932
  - Patient in OR when Obstetrician arrived
  - Emergency Cesarean Section performed
  - 1500 ml blood in abdomen when it was opened
  - Baby was found to be half-way expelled from the uterus

Delivered @ 1948
Case Study

- Delivered Female Infant @ 19:48
  - Apgars: 2, 4, 5
  - Cord Blood Gases:
    - pH: 6.68
    - PO2: 20.3
    - pCO2: 78.8
    - BE: -22

- Family Practice Provider arrived two minutes after delivery
  - Baby totally limp, no respiratory effort, no color and no reflexes
  - Apgars 2/4/5
  - Immediately to SCN and Transport Team called to Tertiary facility
Case Study

- Patient underwent an emergency Cesarean Section and Hysterectomy due to a rupture of the uterus and had a diagnosis of acute perioperative disseminated intravascular coagulation (DIC)

- A Uterine tear down the lateral wall of uterus and 5 cms into both the posterior and anterior parts of the vagina.

- In OR just under 3 hours

- Mother was transferred to ICU on ventilator x 2 days

- 28 units Blood/Blood Products
Case Study
Depositions

- **Depositions (you knew there would be depositions)**
  - Nurse said she told provider multiple times of concerning tracing and that she couldn’t pick up uterine contractions very well (no mention of this in medical record)
  
  - Nurse indicates Provider kept telling her he would be in shortly
  
  - Provider said he was never told of concerning pattern or inability to monitor contraction pattern
  
  - Provider was at another hospital awaiting a delivery. He never told the nurse he was unavailable to come in or asked her to contact someone else to cover him
Patient and Husband both said they begged for a cesarean section early in the day.

Patient said pain unbearable during epidural and that she again begged to lie back down and have a cesarean section instead.

RN blamed Anesthesia for making her move the external monitors so that she could not pick up the FHR during epidural placement.

Provider said he “just never knew things were bad”

Evidence that Provider looked at FHR strip on several occasions remotely.

Provider denied this in Deposition.
Case Study

Provider Addendum to Medical Record 5 month post delivery

“Cesarean Section had been suggested to the patient when it was realized that there were adverse decelerations, but both the patient and her husband were adamantly opposed to this procedure. As a result, a decision was made to try and delivery the baby in light of the above notes and findings”
Litigation Action Allegations

As a result of inappropriate FHM and interpretation:

- The patient suffered a Uterine Rupture which was not recognized or acted upon in a timely manner

- The baby suffered serious brain and other neurological injuries

- MULTI-MULTI Million Dollar Claim
Litigation Action Allegations

- Care and Treatment provided was wrongful, careless and negligent:
  - Inappropriate induction of labor
  - Inappropriate management of labor
  - Delay in recognition and treatment of complications of labor and delivery
  - Failure to interpret FHR patterns correctly
  - Failure to provide continuously fetal heart rate monitoring throughout labor and delivery
Case Study
Plaintiff Experts Opinions

- Contraction pattern poorly monitored
- IUPC never placed or requested Provider to place
- Oxytocin continued to be increased in light of inability to monitor contractions effectively
- Patient repetitively complained of high levels of pain
- FHR not monitored during epidural placement
- Maternal HR incorrectly interpreted on FHM as Fetal Heart Rate
- RN continued to interpret FHR as being within normal limits
- ↑ in Maternal Pulse and ↓ in BP not recognized early
- S/S of Abruption missed
- Terbutaline never given for Tachysystole
Difficult Case to Defend

- Documentation of FHR and UC interpretation didn’t always match the actual tracing
- Communication between RN and Provider not well documented
- Nurse kept anticipating Provider to show up at any minute
- No hospital interpreter was utilized to ensure correct communication with patient
- Hospital policy indicated “Continuous” fetal monitoring will be implemented with patients on Oxytocin. Plaintiff's attorney’s interpreted “continuous” as “Never missing a Beat”
Results

- The Baby has severe neurological impairment and requires life-long full time care

- Two weeks prior to trial, a settlement was reached between the parties for an undisclosed amount

- Settlement was primarily based difficulty of defending the inadequate continuous monitoring of the FHR during Epidural placement and a contraction pattern that was largely unable to assess while continuing to run Oxytocin
Post Event Documentation
What Should Be in the Medical Record???

- Accurate documentation of FHR and Contraction Pattern
- Troubleshooting mechanisms
- Time the adverse FHR pattern was recognized
- Provider and Nursing interventions for maternal or fetal resuscitation
- Continued assessment and responses by mother or fetus
- Accurate and detailed narrative of the Communication between caregivers (especially Nurse-Provider)
- Times of arrival of staff members, anesthesia, providers
- Newborn status at birth
- Narrative note by Nursing and Provider
- Provider discussion with patient and family
Legal Considerations in Patient Care

- Labor and Delivery is high risk
- Fetal Heart Monitoring is performed in nearly all births in the United States and Canada
- Signs of fetal compromise must be quickly detected and acted upon
- Medical record is often the single most important document available in the defense of negligent care

*Is it enough for the staff nurse to just tell the obstetrician there is a problem or to document “Provider notified” in the Medical Record?* 

*Oh what to do, what to doooo?*
Questions?