Category 2 Fetal Heart Rate Tracings

Learning Objectives

1. Identify characteristics of each of the 3 categories of fetal heart rate tracings.
2. Identify the characteristics of significant decelerations.
3. Describe the management of Category 2 fetal heart rate tracings.

Disclosures

- I have no disclosures.
Category 1 Tracing

- Baseline 110-160
- Accelerations present or absent
- Moderate variability
- No late, variable or prolonged decelerations
- Early decelerations may be present

Three-Tier Fetal Heart Rate Interpretation System. Obstet Gynecol 2008; 112:665

Category 2 Tracing

- Not Category 1 or 3
- Wide variety of severity so not straightforward management
- Cahill did a study looking at the last 30 minutes of tracings in over 500 patients
  - 2.2% were Category 1
  - 97.6% were Category 2
  - 0.0% were Category 3


Category 3 Tracing

- Absent variability with:
  - Recurrent late decelerations
  - Recurrent variable decelerations
  - Bradycardia for at least 10 minutes
  - Sinusoidal pattern for at least 20 minutes

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Category 2 Tracing

- Baseline Rate
  - Bradycardia not accompanied by absent variability
  - Tachycardia
- Baseline FHR variability
  - Minimal baseline variability
  - Absent baseline variability not accompanied by recurrent decelerations
  - Altered baseline variability
- Accelerations
  - Absence of induced accelerations after fetal stimulation
- Periodic or episodic decelerations
  - Recurrent variable decelerations with moderate baseline variability
  - Prolonged decelerations > 2 minutes but < 10 minutes
  - Recurrent late decelerations with moderate baseline variability
  - Variable decelerations with other characteristics such as slow return to baseline or other atypical features

Category 2 Tracing Management

Repercussions

Category 1 Tracing

- Recurrent Decelerations or Minimal/Absent Variability
  - 60-90 minutes
- Metabolic acidemia
Fetal Metabolism

- Normal fetal base excess entering labor is -2 mmol/L.
- In a fetus exhibiting repetitive FHR decelerations for periods of hours:
  - BE decreases by approximately 4 mmol/L during the 2 hours prior to delivery or 1 mmol/L per 30 minutes (Low, AJOG, 1997).
  - Severe cord occlusion or marked reductions in uterine blood flow (rupture) may decrease BE in sheep or human fetus by 1 mmol/L per 2-3 minutes.
- A frequency of complete umbilical cord occlusion occurring for 1 minute every 5 minutes allows for sufficient recovery time (4 minutes), resulting in minimal development of metabolic acidosis over time.
- More frequent umbilical cord occlusion (1 per 2 minutes) may result in rapid development of metabolic acidosis.
- Sheep study: BE normalizes at 0.1 mmol/L per minute between umbilical cord occlusion or after bradycardic event. For a fetus with a BE of -12, it would take 2 hours for BE to normalize if umbilical cord occlusion is completely abolished.
- Ross, M, Labor and fetal heart rate decelerations: Relation to fetal metabolic acidosis. Clinical OBGYN, 2011;52;74-82.

Category 2 Tracing Algorithm

Algorithm Clarifications

- Variability refers to predominant baseline FHR pattern (marked, moderate, minimal, absent) during a 30 minute evaluation period, as defined by NICHD.
- Marked variability is considered the same as moderate variability for purposes of this algorithm.
- Minimal and absent variability are considered the same for the purposes of this algorithm.
- Significant decelerations are defined as any of the following:
  - Variable decelerations lasting longer than 60 seconds and reaching a nadir more than 40 bpm below baseline.
  - Variable decelerations lasting longer than 40 seconds and reaching a nadir less than 40 bpm below baseline.
  - Any late decelerations.
- Any prolonged deceleration as defined by NICHD. Due to the broad heterogeneity inherent in this definition, identification of a prolonged deceleration should prompt discontinuation of the algorithm until the deceleration is resolved.
Clarifications continued

- Application of algorithm may be initially delayed for up to 30 minutes while attempts are made to alleviate Category 2 pattern with conservative therapeutic interventions (e.g., correction of hypotension, position change, amnioinfusion, tocolysis, reduction or discontinuation of oxytocin).
- Once a Category 2 FHR pattern is identified, FHR is evaluated and algorithm is applied every 30 minutes.
- Any significant change in FHR parameters should result in reapplication of algorithm.
- For Category 2 FHR patterns in which the algorithm suggests delivery is indicated, delivery should ideally be initiated within 30 minutes of decision for cesarean section.

- If at any time the tracing reverts to Category 1 status or deteriorates for even a short time to Category 3 status, the algorithm no longer applies. However, the algorithm should be reinitiated if Category 1 or 3 pattern again reverts to Category 2.
- This algorithm is not intended as a guide to the management of a fetus with extreme prematurity because neither the significance of FHR patterns of concern in a more mature fetus (e.g., minimal variability) or the ability of such fetuses to tolerate intrapartum events leading to certain types of Category 2 patterns are well defined.
- The algorithm may be overridden at any time if after evaluation of the patient, the provider believes it is in the best interest of the fetus to intervene sooner.

Definitions

- Variability
  - Absent: undetectable
  - Minimal: detectable but <5 bpm
  - Moderate: range from 6-25 bpm
  - Marked: >25 bpm

- Decelerations
  - Late: gradual descent over 30 seconds to the nadir, nadir appears after the peak of the contraction
  - Variable: abrupt decrease in FHR below the baseline, with the time from the onset of the deceleration to the nadir of the deceleration as less than 30 seconds
  - Prolonged: >2 minutes but <10 minutes
  - Early: symmetrical, gradual decrease in FHR and return to baseline associated with contractions, onset to nadir >30 seconds, nadir usually coincides with the peak of the contraction
References

- FHR, fetal heart rate; NICHD, Eunice Kennedy Shriver National Institute of Child Health and Human Development


- Figure 1., Intrapartum management of category II fetal heart rate tracings: towards standardization of care. Reprinted from AJOG. 209: Aug. 2013, with permission from Elsevier


- Three-Tier Fetal Heart Rate Interpretation System. Obstet Gynecol 2008;112:445
