

Systematic Electronic FHR Tracing Evaluation

1. Evaluate Baseline FHR

- Round the mean FHR in a 10-min window to the nearest 5 beat increment, excluding accelerations, decelerations and periods of marked variability. At least a 2-min segment of identifiable FHR baseline (not necessarily contiguous) must be present in the 10-min window, or the baseline is indeterminate for that period.
- Normal = 110bpm-160 bpm
- Bradycardia = <110 bpm
- Tachycardia = > 160 bpm

2. Evaluate FHR Variability

- Determined in a 10-min window, excluding accelerations and decelerations. It is defined as fluctuations in the baseline FHR that are irregular in amplitude and frequency. They are visually quantified as the amplitude of the peak-trough in bpm. Determined with *either* a U/S transducer or FSE.
 - **Absent FHR Variability:** range of amplitude undetectable
 - **Minimal FHR Variability:** amplitude range > undetectable and ≤ 5 bpm
 - **Moderate FHR Variability:** amplitude range 6-25 bpm
 - **Marked FHR Variability:** amplitude range > 25 bpm

3. Evaluate Accelerations and Decelerations

- **Acceleration:** visually apparent *abrupt* (onset to peak in < 30 seconds) increase in the FHR with the peak ≥ 15 bpm above the baseline and the onset to return to baseline lasting ≥ 15 seconds (15 x 15). In a fetus < 32 weeks gestation, an acceleration is defined as having a peak ≥ 10 bpm and lasting ≥ 10 seconds. *Prolonged acceleration* lasts ≥ 2 min but < 10 min. If it lasts longer than 10 minutes, it is a baseline change.
- **Late Deceleration:** visually apparent, usually symmetrical, *gradual* (onset to nadir ≥ 30 seconds) decrease and return of the FHR associated with a contraction. The decrease is calculated from the onset to the nadir of the deceleration. It is delayed in timing, with the nadir occurring after the peak of the contraction. In most cases, the onset, nadir, and recovery of the deceleration occur after the beginning, peak, and ending of the contraction, respectively.
- **Early Deceleration:** visually apparent, usually symmetrical, *gradual* (onset to nadir ≥ 30 seconds) decrease and return of the FHR associated with a contraction. The nadir of the deceleration occurs at the same time of the peak of the

contraction. In most cases, the onset, nadir, and recovery of the deceleration are coincident with the beginning, peak and ending of the contraction.

- **Variable Deceleration:** visually apparent, *abrupt* (onset to beginning of FHR nadir of < 30 seconds) decrease in the FHR of ≥ 15 bpm, lasting ≥ 15 seconds and < 2 min in duration. When associated with contractions, they are called periodic and commonly vary in onset, depth and duration.
- **Prolonged Deceleration:** visually apparent decrease in the FHR of at least 15 bpm lasting ≥ 2 minutes but < 10-minutes. A deceleration lasting ≥ 10 minutes is a baseline change.

4. Other FHR Characteristics

- **Sinusoidal FHR Pattern:** visually apparent smooth, sine wave-like undulations with a cycle frequency of 3-5/minute lasting ≥ 20 minutes.
- **Recurrent FHR Decelerations:** FHR decelerations occurring with ≥ 50 % of contractions in a 20-minute period.

5. Evaluate Uterine Activity

- **Frequency of contractions:** time interval (in $\frac{1}{2}$ minute or whole minute intervals) from the beginning of one contraction to the beginning of another (i.e. 2 $\frac{1}{2}$ - 3 min; 3-4 min)
 - **Normal:** ≤ 5 contractions in 10 min, averaged over 30 min
 - **Tachysystole:** > 5 contractions in 10 min, averaged over 30 min
 - Tachysystole should also always be qualified as to the presence or absence of FHR decelerations.
 - Tachysystole applies to both spontaneous and stimulated labor. Clinical actions may differ depending on spontaneous or stimulated labor.
 - The terms *hyperstimulation* and *hypercontractility* are not defined and should be abandoned.
- **Duration of contractions:** time interval (10 second increments) between the onset of the contraction and the end of the contraction
 - Usual duration ~ 60 seconds
- **Intensity of contractions:** increase in uterine pressure measured by palpation (with TOCO) or an IUPC
 - **Palpation** (with TOCO): mild, moderate, or strong
 - **IUPC:** peak mmHg or MVUs
- **Baseline Resting Tone:** uterine tone between contractions
 - **Palpation** (with TOCO): Soft or firm
 - **IUPC:** mmHg
 - Usual < 20 mmHg

6. Categorization of FHR Tracings

- **Category I FHR Tracings:** Include *ALL* of the following:
 - **Baseline FHR:** 110-160 bpm
 - **Baseline FHR Variability:** Moderate
 - **Late or Variable Decelerations:** Absent
 - **Early Decelerations:** Present or absent
 - **Accelerations:** Present or absent
- **Category II FHR Tracings:** Include all FHR tracings not categorized as Category I or Category III. Examples include *ANY* of the following, and will include an appreciable amount of FHR tracings encountered in clinical care:
 - **Baseline Rate:**
 - Bradycardia not accompanied by absent baseline variability
 - Tachycardia
 - **Baseline FHR Variability:**
 - Minimal baseline FHR variability
 - Absent baseline FHR variability not accompanied by recurrent FHR decelerations
 - Marked baseline FHR variability
 - **Accelerations:** absence of induced accelerations after fetal stimulation
 - **Periodic or Episodic** (not associated with a contraction)
Decelerations:
 - Recurrent variable decelerations accompanied by minimal or moderate baseline variability
 - Prolonged deceleration
 - Recurrent late decelerations with moderate variability
- **Category III FHR Tracings:** Include *EITHER*:
 - **Absent FHR variability and any of the following: bradycardia or recurrent late or recurrent variable decelerations**
 - OR*
 - **Sinusoidal Pattern**

Content adapted from:

-Macones, G.A., Hankins, G.D.V., Spong, C.Y., Hauth, J., & Moore, T. (2008). The 2008 National Institute of Child Health and Human Development Workshop Report on Electronic Fetal Monitoring: Update on Definitions, interpretation and Research Guidelines. *Obstetrics & Gynecology*, 112(3), 661-666; *JOGNN*, 37(5), 510-515.

-ACOG Practice Bulletin # 106, *Intrapartum Fetal Heart Rate Monitoring: Nomenclature, Interpretation, and General Management Principles*, 2009.

(Interventions section not included in NICHD Workshop report)

General management principles were agreed upon based on their predictive value of the *current fetal acid-base status*. FHR patterns cannot predict the development of cerebral palsy. Categorization evaluates the FHR at a certain point in time; patterns of tracings, and, thus, categories of FHR tracings, can and will change over time. Therefore, frequent reassessment of the FHR pattern is required.

- **Category I FHR Tracings** are *normal* and are strongly predictive of a normal fetal acid-base status at the time of observation. They may be followed in a routine manner; no specific action is required.
- **Category II FHR Tracings** are *indeterminate*. They are not predictive of abnormal fetal acid-base status, yet cannot be classified as Category I or III. They require evaluation and continued surveillance with reevaluation, taking into account the entire associated clinical circumstances, including the evolution of the FHR pattern. Clinical interventions vary depending on the circumstances, and may range from heightened surveillance to other ancillary tests to intra-uterine resuscitation techniques to decisions regarding birth.
- **Category III FHR Tracings** are *abnormal*. They are predictive of abnormal fetal acid-base status at the time observed. Category III tracings require prompt evaluation. Depending on the clinical situation, efforts to expeditiously resolve the pattern may include, but are not limited to, provision of maternal oxygen, maternal position change, discontinuation of labor stimulation, and treatment of maternal hypotension. If the tracing does not quickly resolve with these measures, delivery should be undertaken.

Interventions: Interventions depend on the FHR pattern, clinical situation and fetal and maternal response to previously completed interventions. Further interventions, *in addition to the intra-uterine resuscitation techniques listed above*, may include:

- Check VS
- Perform SVE and assess for bleeding
- Consider internal methods of monitoring if external methods inadequate to obtain interpretable tracing of FHR and/or uterine activity.
- Decrease uterine activity by discontinuing or decreasing oxytocin or administering tocolytics
- Perform fetal stimulation to illicit FHR acceleration. This is *not* an intervention of fetal resuscitation for FHR not in normal baseline range.
- Assemble team members in anticipation of cesarean birth
- Additional interventions may be appropriate depending on the clinical situation