KAWITA BAPAT

Volume 13

Title

Learn simply

Intrapartum Fetal Testing

Hard work

Perform electronic fetal heart rate monitoring (EFM) in all pregnancies in early labor[2, 3]

Reactive EFM[4] (Category I)

- **Low-risk pregnancies[5]**
  - Proceed with labor and fetal monitoring using either intermittent EFM or fetal heart rate auscultation[6]
- **High-risk pregnancies[5]**
  - Proceed with labor, but recommend continuous fetal heart rate monitoring[6]

Non-reactive but not non-reassuring EFM[7] (Category II)

- Identify the cause if possible
- Consider AROM and placement of an internal fetal scalp electrode (FSE)
- Attempt interventions to improve EFM performance[8]
- Consider a tocolytic if uterine hyperstimulation is suspected

  - **Improvement in EFM tracing**
    - Proceed with labor and continuous fetal heart rate monitoring
  - **No improvement in EFM tracing**
    - Confirm fetal wellbeing before proceeding (such as fetal scalp stimulation or fetal scalp pH sampling[9]) OR proceed with immediate operative delivery

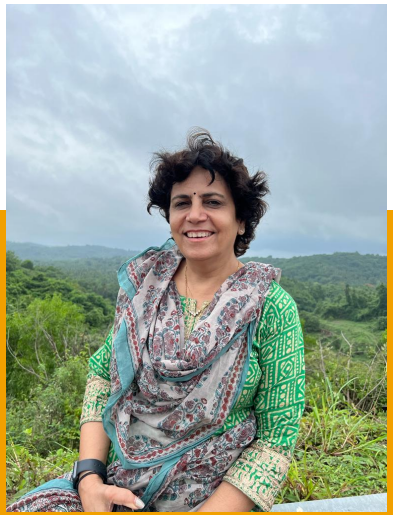
Non-reassuring EFM[10] (Category III)

- Identify the cause if possible
- Consider a tocolytic if uterine hyperstimulation is suspected
- **Consider placement of an FSE**

Proceed with emergent cesarean delivery if no response to in utero resuscitative measures[8]

- Pediatricians present at delivery
- Immediately after delivery, √ pH and base excess in umbilical artery and vein
- Send placenta for pathologic examination

1. Fetal morbidity and mortality can occur as a consequence of labor. A number of tests have therefore been developed to assess fetus wellbeing in labor. Attention has focused on hypoxic ischemic encephalopathy (HIE) as a marker of birth asphyxia and a predictor of long-term outcome.
2. HIE is a clinical condition that develops within the first hours or days of life. It is characterized by abnormalities of tone and feeding, alterations in consciousness, and convulsions. In order to attribute such a state to birth asphyxia, the following four criteria must all be fulfilled: (i) profound metabolic or mixed acidemia (pH < 7.00) on an umbilical cord arterial blood sample, if obtained; (ii) Apgar score of 0–3 for longer than 5 min; (iii) neonatal neurological manifestations (seizures, coma); and (iv) multisystem organ dysfunction. At most, only 15% of cerebral palsy and mental retardation can be attributed to HIE.
3. Electronic fetal heart rate monitoring (EFM) – also known as cardiotocography (CTG) – refers to changes in the fetal heart rate pattern over time. It reflects maturity and integrity of the fetal autonomic nervous system as measured indirectly through patterns in the fetal heart rate.
4. External EFM is non-invasive, simple to perform, readily available, and inexpensive. EFM interpretation is largely subjective and should always take into account gestational age, the presence or absence of congenital anomalies, and underlying clinical risk factors.

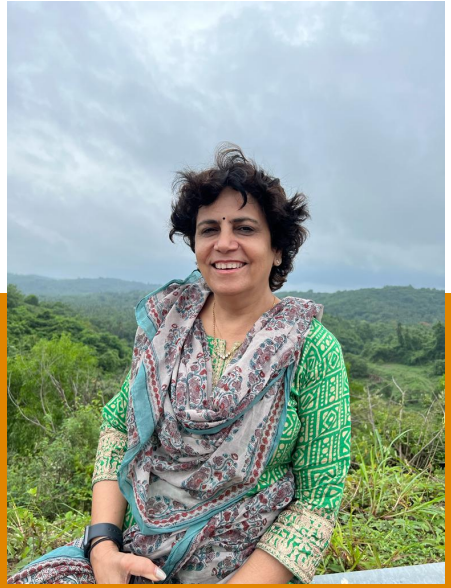


1. Fetuses who are premature or growth-restricted are less likely to tolerate episodes of decreased placental perfusion and, as such, may be more prone to hypoxia and acidosis during labor. Drugs can also affect heart rate and variability.

2. Biophysical profile (BPP), umbilical artery Doppler velocimetry, and contraction stress test (CST) have not been well validated for use in labor. As such, they should not be used to document fetal well-being in labor. The addition of fetal pulse oximetry to EFM does not reduce the overall cesarean delivery rate or the incidence of neonatal encephalopathy and, as such, is not generally recommended.

3. A "reactive" EFM – defined as a normal baseline heart rate (110–160 bpm), moderate variability (which refers to peak-to-trough excursions of 5–25 bpm around the baseline), and at least two accelerations in 20 min each lasting ≥15 sec and peaking at ≥15 bpm above baseline (or ≥10 bpm for ≥10 sec if <32 weeks) – is reassuring and is associated with normal neurologic outcome. According to the 2008 NICHD Workshop Report on electronic fetal monitoring, this is referred to as a "Category I" tracing.

4. The designation "low-risk" and "high-risk" pregnancies refer to whether or not pregnancies are at risk of uteroplacental insufficiency

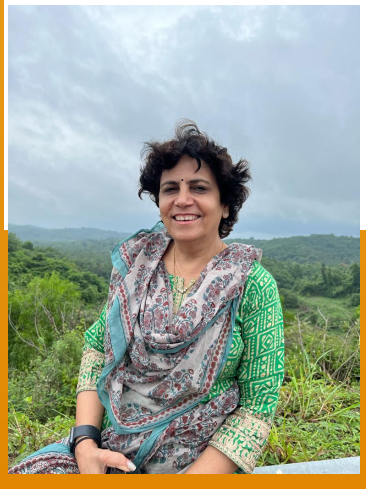


1. When compared with intermittent fetal heart rate auscultation, continuous fetal heart rate monitoring during labor is associated with a decrease in the incidence of seizures in the first 28 days of life, but no difference in other measures of short-term perinatal morbidity or mortality.

2. Moreover, the increase in neonatal seizures does not translate into differences in long-term morbidity (cerebral palsy, mental retardation, or seizures after 28 days of life). However, continuous fetal heart rate monitoring is associated with a significant increase in obstetric intervention, including operative vaginal and cesarean delivery.

3. According to the 2008 NICHD Workshop Report on EFM, a "Category II" fetal heart rate tracing is one that falls between "Category I" and "Category III." It is an EFM tracing that is not formally reactive, but is not non-reassuring. It is also referred to as suspicious, equivocal, or indeterminate. It is the most common type of tracing, and can be seen in up to 60% of labors, suggesting that it is not specific to fetal hypoxia.

4. A "Category II" tracing at term is associated with poor perinatal outcome in only 20% of cases. The significance of such a tracing depends on the clinical end-point. If the end-point is a 5-min Apgar score <7, then it has a sensitivity of 50–60% and positive predictive value of 10–15% (assuming a prevalence of 4%). If the end-point of interest is permanent cerebral injury, then it has a 99.9% false-positive rate.



1. Interventions to improve EFM performance include: discontinuation of oxytocin infusion, repositioning the patient (in an effort to improve venous return), oxygen supplementation by facemask, and intravenous fluid infusion.

2. Fetal scalp sampling refers to sampling of capillary blood from the fetal scalp during labor to measure pH. Capillary pH lies between that of arterial and venous blood. This technique was introduced by Saling in 1962, and is most useful in labor when alternative non-invasive tests are unable to confirm fetal well-being. Suggested management based on fetal scalp pH is as follows: (i) pH >7.25, continue expectant management; (ii) pH 7.20–7.25, repeat at 20–30 min intervals until delivery; and (iii) pH <7.20, proceed with immediate and urgent delivery.

3. According to the 2008 NICHD Workshop Report on EFM, a "Category III" fetal heart rate tracing is one that is ominous and requires immediate action. It is also referred to as non-reassuring. It occurs in only 0.3% of intrapartum fetal heart rate tracings, but is associated with adverse events in over 50% of cases. It is characterized by absent fetal heart rate variability (defined as peak-to-trough excursions of 0 bpm around the baseline), absence of accelerations, and repetitive late or severe variable decelerations. Decelerations are regarded as "repetitive" if they occur with more than 50% of contractions.