



Stop staring at that Category-II fetal heart-rate tracing...

⤵ ...and *do something* instead to improve fetal status!

CASE Reverie on L & D

The obstetrician stared, mesmerized, at the fetus's Category-II heart rate tracing. She was worrying about fetal acid-base status, and wondered to herself: "Should I do something to improve fetal status?"

She was also hoping that the mother, lying flat on her back, would deliver—soon.

In 2009, ACOG reaffirmed the clinical utility of assigning a fetal heart rate (FHR) tracing to one of three categories¹:

Category I—nothing amiss

The Cat-I FHR tracing is an OB's dream tracing. It reflects **normal fetal acid-base status** at the time it is observed.

A Cat-I tracing is characterized by:

- baseline rate of 110–160 beats/min
- moderate variability
- no late or variable decelerations



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Robert L. Barbieri, MD
(Editorial, October 2008)

- early decelerations being present or absent
- accelerations being present or absent.

For laboring women who exhibit a Cat-I FHR tracing, FHR monitoring during labor may either be continuous or intermittent.

Category III—highly troubling and damaging

Conversely, the Cat-III tracing is an OB's nightmare. It is clearly abnormal and is associated with increased risk of fetal acidemia, neonatal encephalopathy, and cerebral palsy.

A Cat-III tracing is characterized by absent variability plus any one of the following:

- recurrent late decelerations
- recurrent variable decelerations
- bradycardia.

Recurrent late or variable decelerations are defined as those decelerations that occur with 50% or more of contractions. A sinusoidal pattern—characterized by a smooth, sine wave-like, undulating pattern with a cycle frequency of 3–5 waves/min that persists for 20 minutes or longer—is also classified as a Cat-III tracing.

Delivery is often warranted if a Cat-III tracing cannot be resolved, promptly, by means of obstetrical interventions.

The great gray zone—Category II

The label of "Cat-II tracing" is given to all FHR patterns that cannot be assigned to Cat I or Cat III.

A Cat-II tracing is neither normal nor definitively abnormal. Namely:

- If FHR accelerations or moderate variability are detected, the fetus is **unlikely to be currently acidemic**.
- If fetal heart accelerations are absent and variability is absent or minimal, **the risk of fetal acidemia increases**.

Cat-II tracings should be monitored closely and evaluated carefully.

Sometimes, when an OB nurse, an OB, or a midwife assigns a tracing to Cat II, she (or he) decides to take no action to improve fetal status. Why not? Because she is temporarily paralyzed with the hope that the tracing will improve. A common rationalization is that a Cat-II tracing is caused by a fetal sleep cycle, and that (again—it's hoped) the tracing will improve once the fetus awakens.

There is an alternative to such hopeful watching and waiting: you can **do something to improve the fetal status** so that the FHR tracing converts to Category I.

Suggestions for moving to a better category

In 2010, ACOG offered a number of recommendations for obstetrical

In utero resuscitation for Category-II and Category-III FHR tracings

✓✓✓ AN ACTION CHECKLIST ✓✓✓

**Make a check mark alongside the interventions that you plan to execute.
Recheck the fetal heart rate pattern 15 to 20 minutes after each intervention.**

- Change maternal position—preferably, to a lateral position
- Fluid bolus: Administer 500–1,000 mL lactated Ringer’s solution IV over 20 min
- Maternal oxygen: Administer 10 L/min of O₂ by nonrebreather face mask for at least 15 min
- Decrease or stop infusion of oxytocin
- Discontinue cervical ripening agent
- Consider amnio-infusion if recurrent deep, variable decelerations are present
(*For transcervical amnio-infusion, place an intrauterine pressure catheter and administer 1) a bolus of 250–1,000 mL of lactated Ringer’s solution at 10 to 15 mL/min and then 2) continuous infusion at 100–200 mL/h by infusion pump or gravity.*)
- If clinically appropriate, consider 1) a cervical check to assess the progress of labor and 2) fetal scalp stimulation to assess for FHR acceleration (*Digital scalp stimulation is performed by vigorously rubbing the fetal scalp for 15 sec using an examining finger. Following stimulation, acceleration in the FHR >15 beats/min above baseline, lasting longer than 15 sec, is associated with a low prevalence of fetal acidemia.*)
- Consider vibro-acoustic stimulation as an alternative method of fetal stimulation that does not require vaginal examination (*Apply a vibro-acoustic stimulator to the abdominal wall for 5 sec to assess fetal status. After the stimulus, acceleration in the fetal heart >15 beats/min above baseline, lasting longer than 15 sec, is associated with a low prevalence of fetal acidemia.*)
- If the mother is relatively hypotensive, which may occur in association with an epidural anesthetic, consider ephedrine, in a 5-mg IV bolus (*Note: Ephedrine may increase FHR.*)
- Consider administering terbutaline, 0.25 mg subcutaneously, if tachysystole is present
- Consider placing a fetal scalp electrode if the FHR tracing is of suboptimal quality

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maneuvers that might improve Cat-II and Cat-III FHR tracings.² These include advice to:

- change the position of the mother³ (see below)
- give her an intravenous bolus of 500–1,000 mL of lactated Ringer’s solution over 20 minutes⁴
- administer O₂ to her⁴
- decrease or stop oxytocin infusion (especially if tachysystole is present)
- discontinue cervical ripening agents
- consider administering a tocolytic, such as terbutaline, if tachysystole is present or if uterine contractions are prolonged or coupled⁵
- consider amnio-infusion if variable decelerations are present.⁶

Cervical examination and digital scalp stimulation. These two interventions are not discussed in the 2010 ACOG recommendations, but they are often useful for assessing the progression of labor and fetal status. After digital scalp stimulation, acceleration in the FHR is evidence that the fetus is unlikely to be acidemic.^{7,8}

If you prefer not to perform a vaginal examination, an alternative method of fetal stimulation is to use vibro-acoustic stimulation to assess fetal status.⁹

Last, when the mother has a regional anesthetic, such as an epidural, and her blood pressure is lower than it was at baseline, interventions to increase blood pressure, such as an IV bolus of ephedrine and fluids, may be effective.¹⁰

Changing maternal position may be pivotal

In the case example with which I began this discussion, the Cat-II tracing

was occurring while the mother was lying flat on her back. Consider this finding: In a study of more than 900 laboring patients, 14% had an FHR tracing characterized by late decelerations.³ Of that subset of subjects, the late decelerations resolved in approximately 20% when they were moved from a supine to a lateral position. Furthermore, late decelerations recurred in some of those women when they were returned to a supine position.

In that same study, laboring in the supine, as opposed to the lateral, position was associated with lower femoral arterial blood pressure, lower toe capillary pulse pressure, and lower fetal scalp capillary pH. Other studies^{11,12} have also reported a decrease in fetal oxygen saturation when the mother labors supine.

CASE Delivery accomplished

The OB snapped out of her reverie and instructed the labor nurse to change the patient’s position, administer a fluid bolus and O₂, and recheck the blood pressure to assess for hypotension.

Twenty minutes after these interventions, the FHR tracing became Category I.

Later that night, the patient delivered a girl—Apgar scores, 8/9.

Value of a checklist

Long used in the aviation industry, checklists are thought to help practitioners remember what interventions are available when it’s necessary to respond to evolving, and potentially risky, situations. Checklists also help to build a joint vision of management options among providers on a clinical team.

I’ve provided a checklist for you on page 8 that lists the interventions available for responding to a Cat-II tracing—so that you don’t find yourself staring at it.... 📄



OBG@QHC.COM

References

1. Intrapartum fetal heart rate monitoring: nomenclature, interpretation and general management principles. ACOG Practice Bulletin No. 106. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2009;114(1):192–202.
2. Management of intrapartum fetal heart rate tracings. ACOG Practice Bulletin No. 116. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2010;116(5):1232–1240.
3. Abitbol MM. Supine position in labor and associated fetal heart rate changes. *Obstet Gynecol.* 1985;65(4):481–486.
4. Simpson KR, James DC. Efficacy of intrauterine resuscitation techniques in improving fetal oxygen status during labor. *Obstet Gynecol.* 2005;105(6):1362–1368.
5. Pullen KM, Riley ET, Waller SA, et al. Randomized comparison of intravenous terbutaline versus nitroglycerin for acute intrapartum fetal resuscitation. *Am J Obstet Gynecol.* 2007;197(4):414.e1–6.
6. Pitt C, Sanchez-Ramos L, Kaunitz AM, Gaudier F. Prophylactic amnioinfusion for intrapartum oligohydramnios: a meta-analysis of randomized controlled trials. *Obstet Gynecol.* 2000;96(5 Pt 2):861–866.
7. Skupski DW, Rosenberg CR, Eglinton GS. Intrapartum fetal stimulation tests: a meta-analysis. *Obstet Gynecol.* 2002;99(1):129–134.
8. Clark SL, Gimovsky ML, Miller FC. The scalp stimulation test: a clinical alternative to fetal scalp blood sampling. *Am J Obstet Gynecol.* 1984;148(3):274–277.
9. Irion O, Stuckelberger P, Moutquin JM, Morabia A, Extermann P, Beguin F. Is intrapartum vibratory acoustic stimulation a valid alternative to fetal scalp pH determination. *Br J Obstet Gynaecol.* 1996;103(7):642–647.
10. Kreiser D, Katorza E, Seidman DS, Etchin A, Schiff E. The effect of ephedrine on intrapartum fetal heart rate after epidural analgesia. *Obstet Gynecol.* 2004;104(6):1277–1281.
11. Carbonne B, Benachi A, Leveque ML, Cabrol D, Papiernik E. Maternal position during labor: effects of fetal oxygen saturation measured by pulse oximetry. *Obstet Gynecol.* 1996;88(5):797–800.
12. Aldrich CJ, D’Antona D, Spencer JA, et al. The effect of maternal posture on fetal cerebral oxygenation during labour. *Br J Obstet Gynaecol.* 1995;102(1):14–19.