



Although a timely delivery is always desirable, it may not always be possible to achieve safely due to intrinsic patient characteristics or situational constraints.

Should the 30-minute rule for emergent cesarean delivery be applied universally?

4 cases cast doubt on the universality of a 30-minute decision to incision interval when the fetal heart-rate tracing is nonreassuring

Suneet P. Chauhan, MD, and Hector Mendez-Figueroa, MD

CASE 1 Term delivery: 45 minutes from decision to incision

P. G. is a 27-year-old woman (G2P1) at 38.2 weeks' gestation who presents to the labor and delivery unit reporting painful contractions after uncomplicated prenatal care. She has a body mass index (BMI) of 40 kg/m². Upon admission, her fetal heart-rate (FHR) tracing falls into Category 1. An examination reveals a cervix dilated to

4 cm and 70% effaced. Epidural analgesia is administered for pain control.

After 4 hours, the FHR tracing reveals minimal variability with occasional variable decelerations. The obstetrician is informed but issues no specific instructions. After 2 more hours, the FHR tracing lacks variability, with late decelerations and no spontaneous accelerations—a Category 3 tracing, which is predictive of abnormal acid-base status. Contractions occur every 3 to 4 minutes.

When fetal scalp stimulation by the nurse fails to elicit any accelerations, intrauterine resuscitation is attempted with an intravenous fluid bolus, left lateral positioning, and oxygen administration. Despite these measures, the FHR pattern fails to improve.

Although she is apprised of the need for prompt delivery, the patient hopes to avoid cesarean delivery, if possible, and insists on more time before a decision is made to proceed to cesarean. After another 2 hours, the FHR pattern has not improved and cervical dilation remains at 4 cm. The patient gives her consent for cesarean delivery.

Approximately 35 minutes are needed to take the patient to the operating room (OR).



Dr. Chauhan is Professor of Obstetrics, Gynecology, and Reproductive Sciences at the University of Texas Health Science Center at Houston.



Dr. Mendez-Figueroa is Assistant Professor of Obstetrics, Gynecology, and Reproductive Sciences at the University of Texas Health Science Center at Houston.

Dr. Chauhan reports that he receives grant or research support from the Eunice Kennedy Shriver National Institute of Child Health and Human Development and is a consultant to Clinical Innovations. Dr. Mendez-Figueroa reports no financial relationships relevant to this article.

IN THIS ARTICLE

Is the 30-minute rule valid?

[page 40](#)

A case of uterine rupture

[page 42](#)

Take-home message

[page 43](#)

CONTINUED ON **PAGE 40**

About 45 minutes after informed consent, the incision is made. Forty-seven minutes later, a male infant is delivered with Apgar scores of 1, 3, and 4 at 1, 5, and 10 minutes, respectively. Umbilical arterial analysis reveals a pH level of 6.9, with a base excess of -21 . The infant has a neonatal seizure within 3 hours and is eventually diagnosed with cerebral palsy.

A claim against the clinicians alleges that deviation from the “standard of care 30-minute rule more than likely caused” hypoxic ischemic injury and cerebral palsy.

Does the literature support this claim?

Approximately 3% of all births involve cesarean delivery for a nonreassuring FHR tracing.¹ Much has been written about the “30-minute rule” for decision to incision time. In this article, we highlight current limitations of this standard in the context of 4 distinct clinical scenarios.

Case 1 highlights several limitations and ambiguities in the obstetric literature. Although a timely delivery is always desirable, it may not always be possible to achieve safely due to intrinsic patient characteristics or situational constraints. Conditions prevailing before the decision to proceed to cesarean delivery also affect overall pregnancy outcomes. Not all cases have the same starting point; fetal status at the time of the cesarean decision also determines the acuity and urgency of the case.

A widely promulgated rule—but is it valid?

Both the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists have published guidelines stating that any hospital offering obstetric care should have the capability to perform emergent cesarean delivery within 30 minutes.^{2,3} This general statement has been touted as the standard by which obstetric services should be evaluated. Regardless of the clinical situation, obstetric providers are expected to abide by this rule.

These guidelines recently have come under scrutiny. For example, a 2014 meta-analysis involving more than 30 studies and

22,000 women revealed that only 36% of all cases with a Category 2 FHR tracing were delivered within 30 minutes.⁴ Interestingly, investigators reported that infants with a shorter delivery interval had a higher likelihood of having a 5-minute Apgar score below 7 and an umbilical artery pH level below 7.1, with no difference in the rate of admission to a neonatal intensive care unit (NICU) when the time from decision to delivery was examined.⁴ This finding highlights the questionable nature of the current clinical standard, as well as the conflicting findings currently present in the literature.

In general, patients who have graver clinical findings will be delivered at a shorter interval but may still have worse neonatal outcomes than infants delivered 30 minutes or more after the decision for cesarean is made.

Although Case 1 is complicated by FHR abnormalities, the association between such abnormalities and adverse long-term outcomes in neonates is questionable. Fewer than 1% of cases involving late decelerations or decreased variability during labor lead to cerebral palsy,⁵ highlighting the weak association between FHR abnormalities and neurologic sequelae. Most adverse neurologic neonatal outcomes are multifactorial in nature and may not be attributable to a single prenatal event.

With such limitations, the application and use of the 30-minute “standard” by hospitals, professional societies, and the medicolegal community may not be appropriate. The literature may not justify using this arbitrary rule as the standard of care. Clearly, there are gaps in our knowledge and understanding of FHR abnormalities and the optimal interval for cesarean delivery. Therefore, it may be unfair and inappropriate to group all cases and clinical situations together.

CASE 2 25 minutes from decision to preterm delivery

J. P. (G2P1) undergoes an ultrasonographic examination at 33.4 weeks’ gestation because of concern about a discrepancy between fetal size and gestational age. The estimated



Approximately 3% of all births involve cesarean delivery for a nonreassuring FHR tracing

fetal weight is in the 5th percentile. Amniotic fluid level is normal, but the biophysical profile is 6/8, with no breathing for 30 seconds. Umbilical artery Doppler imaging reveals absent end-diastolic flow, and FHR monitoring reveals repetitive late decelerations.

The patient is admitted immediately to the labor and delivery unit and placed on continuous electronic fetal monitoring. Betamethasone is given to enhance fetal lung maturity. FHR monitoring continues to show repetitive late decelerations with every contraction.

After 10 minutes on the labor floor, a decision is made to proceed to emergent cesarean delivery. Within 25 minutes of that decision, a female infant weighing 1,731 g (3rd percentile) is delivered, with Apgar scores of 1, 1, and 4 at 1, 5, and 10 minutes, respectively. The infant is eventually diagnosed with moderate cerebral palsy.

Could this outcome have been prevented?

Published reports on the association between abnormal FHR patterns and adverse perinatal outcomes in preterm infants are even more scarce than they are for infants delivered at term. Case 2 highlights the fact that achievement of a 30-minute interval from decision to delivery doesn't necessarily eliminate the risk of adverse neonatal outcomes and long-term morbidity.

One of the best evaluations of this association was published by Shy and colleagues in the 1980s.⁶ In that study, investigators randomly assigned 173 preterm infants to intermittent auscultation or continuous external fetal monitoring. Use of external fetal monitoring did not improve neurologic outcomes at 18 months of age. Nor did the duration of FHR abnormalities predict the development of cerebral palsy.⁶

A recent secondary analysis from a randomized trial evaluating the use of antenatal magnesium sulfate to prevent cerebral palsy revealed that preterm FHR patterns labeled as "fetal distress" by the treating physician were associated with an increased risk of cerebral palsy in the newborn.⁷ Although this analysis revealed an association, a causal link could not be established. Damage to a preterm infant's central nervous system

can occur before the mother presents to the ultrasound unit or clinic, and alterations to FHR patterns can reflect previous injury. In such cases, a short decision to incision interval would not prevent damage to the central nervous system of the preterm infant.

CASE 3 5 minutes from decision to incision after uterine rupture

G. P. is a patient (G2P1) at 38 weeks' gestation who has had a previous low uterine transverse cesarean delivery. She strongly wishes to attempt vaginal birth after cesarean (VBAC) and has been extensively counseled about the risks and benefits of this approach. This counseling has been appropriately documented in her chart. Her predicted likelihood of success is 54%.

Upon arrival in the triage unit, she reiterates that she hopes to deliver her child vaginally. Upon examination, she is found to be dilated to 4 cm. She is admitted to the labor and delivery unit, with reevaluation planned 2 hours after epidural administration. At that time, her labor is noted to be progressing at an appropriate rate.

After 5 hours of labor, the baseline FHR drops into the 70s. Immediate evaluation reveals significant uterine bleeding, with the fetus no longer engaged in the pelvis. The attending physician immediately suspects uterine rupture.

The patient is rushed to the OR, and delivery is complicated by the presence of extensive adhesions to the uterus and anterior abdominal wall. After 20 minutes, a female infant is delivered, with Apgar scores of 0, 0, and 1 at 1, 5, and 10 minutes, respectively. Medical care is withdrawn after 3 days in the NICU.

In a true obstetric catastrophe such as uterine rupture, should the decision to incision interval be 30 minutes?

Although it is rare, uterine rupture is a known complication of VBAC attempts. The actual rate varies across the literature but appears to be approximately 0.5% to 0.9% in women attempting vaginal birth after a prior lower uterine incision.⁸



Achievement of a 30-minute interval from decision to delivery doesn't necessarily eliminate the risk of adverse neonatal outcomes

If uterine rupture develops, both mother and fetus are at increased risk of morbidity and mortality. The risk of hypoxic ischemic encephalopathy after uterine rupture is about 6.2% (95% confidence interval [CI], 1.8–10.6), and the risk of neonatal death is about 1.8% (95% CI, 0–4.2).⁹ Uterine rupture also has been linked to an increase in:

- severe postpartum hemorrhage (odds ratio [OR], 8.51; 95% CI, 4.6–15.1)
- general anesthesia exposure (OR, 14.20; 95% CI, 9.1–22.2)
- hysterectomy (OR, 51.36; 95% CI, 13.6–193.4)
- serious perinatal outcome (OR, 24.51; 95% CI, 11.9–51.9).¹⁰

Case 3 again highlights the limitations and difficulties of encompassing all cases within a 30-minute timeframe. Although the newborn was delivered within this interval after the initial insult, the intervention was insufficient to prevent severe and long-term damage.

In cases of true obstetric emergency, the catastrophic nature of the event may lead to adverse long-term neonatal outcomes even if the standard of care is met. Immediate delivery still may not allow for the prevention of neurologic morbidity in the fetus. When evaluating such cases retrospectively, all parties involved always should consider these facts before drawing any conclusions on causality and prevention.

CASE 4 Twins delivered 20 minutes after cesarean decision

P. R. (G1P0) presents for routine prenatal care at 36 weeks' gestation. She is carrying a dichorionic/diamniotic twin gestation that so far has been uncomplicated. She has been experiencing contractions for the past 2 weeks, but they have intensified during the past 2 days. When an examination reveals that she is dilated to 4 cm, she is admitted to the labor and delivery unit.

Both fetuses are evaluated via external FHR monitoring. Initially, both have Category 1 tracings but, approximately 1 hour later, both tracings are noted to have minimal variability with variable decelerations, with a nadir at

80 bpm that lasts 30 to 45 seconds. These abnormalities persist even after intrauterine resuscitation is attempted. The cervix remains dilated at 4 cm.

After a Category 2 tracing persists for 1 hour, the attending physician proceeds to cesarean delivery. Both infants are delivered within 20 minutes after the decision is made. Two female infants of appropriate gestational size are delivered, with Apgar scores of 7 and 8 for Twin A and 8 and 9 for Twin B. The newborns eventually are discharged home with the mother. Twin B is subsequently given a diagnosis of cerebral palsy.

Should the decision to incision rule be applied to twin gestations?

Multifetal gestations carry an increased risk not only of fetal and neonatal death but also of handicap among survivors, compared with singleton pregnancies.¹¹ The literature evaluating the link between abnormal FHR patterns and adverse neonatal outcomes in twin pregnancies is sparse. Adding to the confusion is the fact that signal loss from fetal monitoring during labor occurs more frequently in twins than in singletons, with a reported incidence of 26% to 33% during the 1st stage of labor and 41% to 63% during the 2nd stage.¹² Moreover, the FHR pattern of one twin may be recorded twice inadvertently and the same tracing erroneously attributed to both twins.

The decision to incision and delivery time in twin gestations should be evaluated in the context of all the limitations the clinician faces when managing labor in a twin gestation. The 30-minute rule never has been specifically evaluated in the context of multifetal gestations. The pathway and contributing factors that lead to adverse neonatal outcomes in twin gestations may be very different from those related to singleton pregnancies and may be more relevant to antepartum than intrapartum events.

Take-home message

The 4 cases presented here call into question the applicability and generalizability of the



The 30-minute rule never has been specifically evaluated in the context of twin gestations

30-minute decision to incision rule. Diverse clinical situations encountered in practice should lead to different interpretations of this standard. No single rule can encompass all possible scenarios; therefore, a single rule

should not be touted as universal. All clinical variables should be weighed and interpreted in the retrospective evaluation of a case involving a cesarean delivery performed after a 30-minute decision to incision interval. 🚫

References

1. Chauhan SP, Magann EF, Scott JR, Scardo JA, Hendrix NW, Martin JN Jr. Cesarean delivery for fetal distress: rate and risk factors. *Obstet Gynecol Surv.* 2003;58(5):337-350.
2. American College of Obstetricians and Gynecologists, Committee on Professional Standards. *Standards for Obstetric-Gynecologic Hospital Services.* 7th ed. Washington, DC: ACOG; 1989.
3. National Institute for Health and Care Excellence. *Caesarean Section Guideline.* London, UK: NICE; 2011.
4. Tolcher MC, Johnson RL, El-Nashar SA, West CP. Decision-to-incision time and neonatal outcomes: a systematic review and meta-analysis. *Obstet Gynecol.* 2014;123(3):536-548.
5. Nelson KB, Dambrosia JM, Ting TY, Grether JK. Uncertain values of electronic fetal monitoring in predicting cerebral palsy. *N Engl J Med.* 1996;334(10):613-618.
6. Shy KK, Luthy DA, Bennett FC, et al. Effects of electronic fetal heart-rate monitoring, as compared with periodic auscultation, on the neurologic development of premature infants. *N Engl J Med.* 1990;322(9):588-593.
7. Mendez-Figueroa H, Chauhan SP, Pedroza C, Refuerzo JS, Dahlke JD, Rouse DJ. Preterm cesarean delivery for nonreassuring fetal heart rate: neonatal and neurologic morbidity. *Obstet Gynecol.* 2015;125(3):636-642.
8. Macones GA, Cahill AG, Samilio DM, Odibo A, Peipert J, Stevens EJ. Can uterine rupture in patients attempting vaginal birth after cesarean delivery be predicted? *Am J Obstet Gynecol.* 2006;195(4):1148-1152.
9. Landon MB, Hauth JC, Leveno KJ, et al. Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery. *N Engl J Med.* 2004;351(25):2581-2589.
10. Al-Zirqi I, Stray-Pedersen B, Forsen L, Daltveit AK, Vangen S. Uterine rupture: trends over 40 years [published online ahead of print April 2, 2015]. *BJOG.* doi: 10.1111/1471-0528.13394.
11. Ramsey PS, Repke JT. Intrapartum management of multifetal pregnancies. *Semin Perinatol.* 2003;27(1):54-72.
12. Bakker PC, Colenbrander GJ, Verstraeten AA, Van Geijn HP. Quality of intrapartum cardiotocography in twin deliveries. *Am J Obstet Gynecol.* 2004;191(6):2114-2119.

This space has purposely been left blank.