Managing the Risk of Uterine Rupture During a Trial of Labor After Cesarean Section

By NORCAL Mutual Insurance Company

Introduction

While a successful vaginal birth after cesarean section (VBAC) is associated with less morbidity and mortality than repeat cesarean section (C-section), an unsuccessful VBAC is associated with a small but significant risk of uterine rupture that can result in death or serious injury to both the mother and the infant.[1] When a trial of labor after C-section (TOLAC) ends in uterine rupture, emergency C-section, and the delivery of an infant with brain injuries, there is a good chance that the child's parents will file a lawsuit, or at least consider it. It should be noted that a plaintiff's attorney is supposed to prove duty (responsibility of the physicians involved), negligence (care provided was below the standard of care) and causation (negligence led to the injury) as well as injury. However, the plaintiffs probably won't focus on whether the standard of care was met, and their attorney might not either. In these types of cases, the degree of the infant's brain injuries tends to overshadow other liability issues. This can carry through to trial because juries are generally biased toward severely brain-injured infants and the parents who must provide for them. Because of the complexity involved and the ongoing evolution of guidelines and evidence-based medicine, these cases can be some of the most challenging to defend.

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In August 2010, the American College of Obstetricians and Gynecologists (ACOG) published an updated guideline on TOLAC/VBAC. Although patient needs vary and their care should be personalized, evidence-based guidelines are frequently used during medical malpractice litigation to establish the standard of care. Departures from ACOG guidelines can expose a physician to liability risk if treatment rationale is not documented in the patient record. The new VBAC guidelines include the following recommendations:[1]

- Most women with one prior cesarean section with a low-transverse incision are candidates for TOLAC/VBAC.
- Epidural analgesia may be used during TOLAC.
  Comment: Chestnut's textbook states that "epidural analgesia is an essential component of a successful VBAC program … it seems reasonable to provide analgesia—but not total anesthesia—during labor in patients attempting VBAC … it does not delay the diagnosis of uterine rupture or decrease the likelihood of successful VBAC."[2] The ASA Practice Guidelines for Obstetric Anesthesia[3] state: "Nonrandomized comparative studies suggest that epidural analgesia may be used in a trial of labor for previous cesarean delivery patients without adversely affecting the incidence of vaginal delivery. There are no randomized comparisons of epidural versus other anesthetic techniques. Consultants and ASA members agree that neuraxial techniques improve the likelihood of vaginal delivery for patients attempting VBAC." Thus, the ASA guidelines recommend that neuraxial techniques should be offered to patients attempting VBAC. For those patients, it is also appropriate to consider early placement of a neuraxial catheter that can be used later for labor analgesia or for anesthesia in the event of operative delivery.
- Women at high risk for complications (those with previous classical or T-incision, prior uterine rupture, or extensive transfundal uterine surgery) and women for whom vaginal delivery is otherwise contraindicated (for instance, those with placenta previa) are not generally candidates for planned TOLAC.
- Women who are attempting TOLAC can have labor induced. However, misoprostol should not be used, but augmentation with oxytocin is acceptable.
- Women who have an unknown uterine scar type can attempt TOLAC unless there is a high clinical suspicion of a previous classical uterine incision.
- TOLAC should be attempted only at facilities capable of emergency deliveries.
- If an immediate cesarean delivery is not available, then the patient should be aware of this in weighing the risks and benefits of TOLAC. The hospital should have a plan to provide emergency care for both parturient and neonate.
- The risks and benefits of both TOLAC and elective repeat cesarean section (ERCS) should be thoroughly discussed with the patient.

- After counseling, the ultimate decision should be made by the patient in consultation with her health care practitioner.
- Once the trial of labor has begun, the patient should be evaluated by her obstetric professional, and she should have continuous fetal heart rate (FHR) monitoring.
- Personnel familiar with the potential complications of TOLAC should be present to watch for FHR patterns that are associated with uterine rupture.

This article uses a NORCAL Group closed claim to illustrate five broad elements that can improve the safety of TOLAC/VBAC for mothers and infants and can reduce medical liability risk exposure:

1. Identifying which patients are appropriate candidates for TOLAC
2. Identifying appropriate facilities for TOLAC
3. Engaging in a thorough informed consent process and documentation of that discussion
4. Monitoring the patient's progress during a trial of labor
5. Recognizing the signs of uterine rupture and ensuring a prompt emergency response, should it arise

Even in the best medical practices, unforeseen circumstances can and do arise. The case study in this article illustrates how problems associated with communication, documentation and emergency preparedness can affect patient care and weaken the potential legal defense of the involved health care practitioners.

Identifying Which Patients Are at Increased Risk for Uterine Rupture

The most concerning risk of TOLAC is uterine rupture. If the patient has a high-risk of rupture, TOLAC should not be offered.[1] For some patients, their high-risk status will be clear—for example, if the patient has a previous classical or T-incision, prior uterine rupture, or extensive transfundal uterine surgery. For others, the possibility of uterine rupture must be calculated from the totality of the circumstances. Factors that increase the risk of uterine rupture include:[1,4]

- Having had a single-layer closure in a previous C-section
- Having had more than one or possibly two previous C-sections
- Being induced with misoprostol
- Failing the current trial of labor

- Increased maternal age
- Having a high body mass index
- Having a short interpregnancy interval (less than six months)

Women who have had a prior vaginal delivery are less likely to have a uterine rupture.[1,4] Although these factors appear to statistically increase or decrease an individual's risk for uterine rupture, it cannot be absolutely predicted or ruled out. Therefore, even if the patient seems to have a low probability of uterine rupture, clinicians still need to maintain a high index of suspicion for it during TOLAC.

TOLAC and Maternal Morbidity

A successful TOLAC has a lower rate of maternal injury, as well as decreased rates of complications in future pregnancies, compared to ERCS, but both have risks, including maternal hemorrhage, infection, operative injury, thromboembolism, hysterectomy and death.[1] For a woman undergoing TOLAC, the greatest risk of injury occurs when a repeat C-section becomes necessary. Consequently, the risk of maternal injury is integrally related to the mother's probability of achieving VBAC.[1] Evidence suggests that a woman with at least a 60 to 70 percent chance of VBAC will have maternal morbidity equal to or less than a woman undergoing ERCS. On the other hand, a woman who has a lower than 60 percent chance of VBAC has a greater chance of morbidity than a woman undergoing ERCS.[1] Factors that decrease the probability of a successful trial of labor include:[1]

- gestational age greater than 40 weeks
- high neonatal birth weight
- previous labor dystocia
- current need for labor induction or augmentation
- increased maternal age
- non-white ethnicity
- high body mass index
- preeclampsia
- short interpregnancy interval

Factors that increase the probability of successful TOLAC include a prior successful VBAC and current spontaneous labor.[1] An online tool that estimates the probability of successful VBAC for women with one prior cesarean and vertex presentation may be found at www.bsc.gwu.Edu/mfmu/vagbirth.html.

Uterine Rupture and Perinatal Morbidity

Just as a failed TOLAC is linked to an increased risk of maternal morbidity and mortality, it is also linked to adverse perinatal outcomes, including stillbirth and neonatal death, hypoxic-ischemic encephalopathy (HIE), respiratory distress syndrome, pneumonia, acidosis, intraventricular hemorrhage, and subgaleal bleeding.[4] The rate of perinatal death associated with TOLAC is approximately 5.8 per 1,000 and 3.4 per 1,000 with ERCS—a difference of approximately 1 in 417.[5] Although this may seem like a small number to an outside observer, to a woman making the informed decision between TOLAC and ERCS, it is probably going to be significant. And although it is estimated that the risk of injury to the fetuses of the patients with the highest probability of VBAC is about equal to the risk of injury to fetuses born by repeat C-section,[1] for many patients, ERCS will be the safest option for the fetus.[5]

The Informed Consent Process

Informed consent is an important part of any medical procedure. For TOLAC and VBAC, it is imperative that the woman understand that TOLAC may not result in the vaginal birth of a healthy baby. It is imperative that the obstetrician begin patient education early in the pregnancy, covering TOLAC, the risks associated with TOLAC and VBAC, and the patient's own risk factors. The patient must understand that uterine rupture is an unpredictable event that can happen to any woman who chooses TOLAC, and that uterine rupture can be devastating to both her and her infant. She needs to have the best possible understanding of the risks of TOLAC and VBAC versus the risks of an ERCS, and place them in the context of her future pregnancy planning.

An additional part of the obstetrician's informed consent process should be informing the parturient as to whether the hospital where she plans to deliver provides 24/7 in-house obstetrician, anesthesiologist, neonatologist, and operating room nursing staff services for an emergency cesarean delivery.

Should anesthesiologists inform the parturient that an epidural has the potential to mask the persistent pain (between contractions) associated with the 10 to 30 percent of uterine ruptures that do result in pain?[6] In the most recent edition of his textbook, Chestnut states that "epidural analgesia does not delay the diagnosis of uterine rupture."[2] Furthermore, in an earlier edition of his textbook, Chestnut stated that "epidural anesthesia may improve the specificity of abdominal pain as a symptom of uterine scar separation or rupture."[7] Of note, escalation of frequency of epidural dosing may be a marker/clinical sign for impending uterine rupture, suggesting that parturients under epidural analgesia may retain the perception of pain associated with uterine rupture.[8] If the patient declines regional analgesia in favor of an unmedicated labor, then it

may be difficult to distinguish pain caused by uterine rupture from the severe pain experiencd by most women during labor. Informed consent should acknowledge and emphasize that FHR abnormalities (present in 71 to 100 percent of ruptures[9]) and changes in fundal tone and fetal station are more reliable signs than pain in signaling rupture. If the parturient can weigh those risks in a meaningful way, then she can make informed decisions. She should not be going into TOLAC thinking, "My doctor is making me do this" or "Internet websites say that VBAC is safe, so I'll be fine."

Recognizing the Signs of Uterine Rupture

The rate of uterine rupture during TOLAC is approximately 0.5 to 0.9 percent for women with low-transverse uterine incisions.[1] Uterine rupture is usually sudden and there are no fail-safe antenatal predictors for it. Although the signs and symptoms of acute uterine rupture vary, they may include:[1]

- Fetal bradycardia and variable decelerations (FHR abnormality has been associated with 70 percent of uterine ruptures.)
- Increased uterine contractions
- Vaginal bleeding
- Loss of fetal station (decrease of fetal head engagement within the pelvis) or sudden shift in position of the fetus (the rupture leads to intra-abdominal fetal presentation). Note that decreased uterine tone is most accurately monitored via an intrauterine pressure catheter.
- New onset of intense uterine pain that does not diminish between contractions. This pain may be breakthrough in nature (requiring more than the usual epidural dosing), in the area of a prior uterine scar (such as that of a myomectomy), or even shoulder pain (from blood under the diaphragm).

By the time many of these signs and symptoms appear, the fetus can already be in significant distress. The most reliable diagnostic tool for uterine rupture remains the fetal heart monitor. Because of this, TOLAC patients must be carefully monitored and the individuals monitoring them must be competent to recognize fetal distress or an impending uterine rupture.

In most birth injury lawsuits, FHM strips (FMS) play an essential role in standard of care and causation arguments. Unfortunately, a fetal monitor cannot always tell the difference between a fetus that is in immediate danger, one that is demonstrating a normal response to the occasional unusual stresses associated with labor, or even one that has suffered a prior antepartum injury.[10] Likewise, FHM cannot predict a uterine rupture. However, viewed retrospectively, FHS can usually provide evidence of the progression of a uterine rupture.

Obstetricians also tend to have differing opinions when interpreting FHS. One study showed that when four obstetricains examined 50 FHS, they agreed in only 22 percent of the cases. When they reviewed the same 50 tracings two months later, the obstetricians interpreted 21 percent of the tracings differently than they had initially. Furthermore, a reviewer is more likely to find evidence of fetal hypoxia if he or she knows that there was a poor outcome.[11] This issue can make a seemingly defensible birth injury case unpredictable because it will be up to a jury (based on the opinions of experts) to determine whether the defendant health care professionals reacted to the evidence of fetal distress and uterine rupture in a time frame that is consistent with the standard of care.

Epidural analgesia is *not* contraindicated during TOLAC, and in fact, as outlined above, has been cleared of causing delay in diagnosing uterine rupture or of adversely affecting the likelihood of successful VBAC. Modern labor analgesic techniques typically utilize lower concentrations of local anesthetics, typically in combination with an opioid. Pain that is unusual, sudden in onset, severe, or persistent in nature should signal the obstetrician to evaluate for possible uterine rupture. The anesthesiologist should alert the obstetrician if the patient has atypical analgesic requirements, suggesting the need for an evaluation for uterine rupture. Anesthesiologists should be proactive participants, not just reactionary technicians.

Case Study

Allegation Failure to recognize uterine rupture and timely perform a C-section caused the infant's brain damage.

Labor Summary At 38 weeks' gestation, the patient was admitted to the hospital for a TOLAC. She was 42 years old and had delivered her prior child by C-section for failure to progress. The older child weighed 10 pounds 2 ounces at birth. Her OB decided that an induction was the appropriate course due to his concern that this infant would also be macrosomic if the pregnancy was allowed to proceed to 40 weeks. When the OB examined the patient at 0715 on the morning of her admission, he noted that the fetus was not engaged and that the mother was 25 percent effaced. The OB told the patient that he would allow her two hours of active labor, and if the trial of labor wasn't successful at that point, then a C-section would be necessary.

At 0730 he inserted Cervidil. By 1930, there had been no progress, so he removed and replaced the Cervidil. He told the nurses to call him if they had any concerns and then went home. The facility did not have an in-house OB, pediatrician or anesthesiologist. No one informed the on-call anesthesiologist

or pediatrician that a VBAC patient was in the hospital for a trial of labor that night.

At 0130 the next morning, the mother was having strong contractions. Her membranes ruptured shortly thereafter. At 0300 the patient reported that she was in severe, persistent abdominal pain that did not stop following the contractions. She was given Nubain, but her pain was not relieved.

At 0402, the nurse noticed that there were occasional variable decelerations. At this point, she did her first vaginal exam of the patient and determined that the cervix was completely dilated and the fetus was at -2 station. She called the OB, who misunderstood her and thought that she reported that the patient was almost completely dilated. She did not tell him about the mother's pain or the decelerations and did not ask him to come to the hospital. The OB said he would be in later.

At 0435, the nurse did another vaginal exam and found the fetus at -3 station. She was also having trouble getting a good fetal heart tracing. She called the OB again and asked him to come in to assess the patient. The OB arrived at 0450. He confirmed that the cervix was completely dilated with the fetus at -3 station. He placed a fetal scalp electrode because of problems with the tracings from the external monitor. After reviewing the FMS from the internal monitor for a few minutes, he determined that they were showing normal patterns for a woman in the second stage of labor. He then went to the nurse's station to do some charting.

By 0513, there had been no further progress and the FMS showed decreasing variability and deeper variable decelerations. He decided to do a C-section and asked the nursing supervisor to gather together an OR crew as soon as possible (but not stat). He then called the pediatrician and anesthesiologist. The mother was prepared for surgery. By 0520 the FHR had started to drop into the sixties and the OB could no longer feel the fetal head.

The patient arrived in the OR at 0521, but the anesthesiologist (who lived 15 minutes away from the hospital) had not arrived. The FMS showed an FHR of 50 with no variability. At 0535 the anesthesiologist arrived. The first incision was made at 0540. On entry to the abdomen, the OB saw that the fetus had completely extruded into the abdomen through a tear at the site of the previous incision. The infant was delivered at 0545. He was born pale, flaccid, and with no respirations. He was 9 pounds 7 ounces. Apgars were 2 at one minute, 3 at five minutes and 6 at 10 minutes. He was intubated by the pediatrician. Cord gasses showed a pH of 6.8 and base excess of -25. By 0700 he had started

having seizures. He was transferred to the children's hospital where he stayed for the next month.

The infant was diagnosed with hypoxic-ischemic encephalopathy (HIE) secondary to the uterine rupture and developed spastic quadriplegia with athetosis and dystonia. The parents sued the OB and the hospital alleging:

- The labor was not adequately monitored by the nurses or the obstetrician.
- The nurses negligently failed to report the patient's severe pain to the obstetrician.
- The nurses negligently failed to report the decelerations to the obstetrician.
- The nurses and the obstetrician negligently failed to recognize the impending uterine rupture.
- An appropriate team of practitioners was not immediately available when the infant's condition required an emergency C-section.
- The C-section was not done quickly enough.

At trial, plaintiff and defense experts gave completely opposite standard of care and causation testimony. The defense experts opined that there was no indication of a uterine rupture until it was too late for the OB to do anything that would have saved the child from brain damage. At trial, however, the jury found the plaintiff experts' opinions more persuasive and awarded the plaintiffs a multimillion-dollar verdict.

Discussion Neonatal outcome following a uterine rupture will depend primarily on the speed with which the C-section is accomplished.[12] Every minute counts. Do not assume fetal injuries will be avoided if the "30-minute decision-to-incision rule" is met.[13] Fetal hypoxia research suggests that babies born within 10 minutes of complete anoxia or severe hypoxia will survive neurologically intact, while babies born after 17 minutes may have severe damage, or will not survive at all.[14] Because a uterine rupture cannot be reliably predicted or its timing confirmed, it is of utmost importance to have a tested, effective protocol in place to ensure that a cesarean section can be performed as quickly as possible after a possible uterine rupture has been identified. The anesthesiologist should be made aware of all TOLAC patients so that he/she may perform a pre-anesthetic evaluation and be familiar with the patient in case an emergency cesarean delivery is needed.

Risk Management Recommendations[1,15]

- A patient should not be offered a TOLAC in a facility where practitioners capable of performing cesarean sections, anesthesiologists, pediatricians, nurses and technical staff are not in place in a time frame that adequately protects maternal and neonatal safety in the event of an emergency.
- The personnel necessary for an emergency cesarean section should be aware that a VBAC candidate is in labor, and all the personnel should be immediately available during TOLAC.
- There should be agreement on the definition of "immediately available."
- Members of the labor and delivery team should know how to contact the anesthesiologist in case of an emergency.
- The anesthesiologist should be contacted in the event of any maternal bleeding, FHS indicating fetal intolerance of labor, abnormalities in maternal vital signs, change in fundal tone/fetal station/progress of labor, or atypical need for pain relief.
- A sterile "crash" cesarean operative tray should be immediately available in the event of a uterine rupture.
- There should be regular emergency cesarean drills to ensure that all team members can meet targeted decison-to-incision goals.
- A rapid response protocol for obstetric emergencies should be developed.[15]
- In settings where the staff needed for emergency delivery are not "immediately" available, the process for gathering needed staff when emergencies arise should be clear, and all centers should have a plan for managing uterine rupture and other obstetric emergencies.

Conclusion

When a patient is attempting TOLAC, it is best to develop a mind-set and strategies to anticipate problems, prepare accordingly, and react promptly. Make sure that the patient knows enough about the risks and benefits of and alternatives to TOLAC/VBAC to feel confident in her informed decision to go forward—despite the risks. Good communication not only increases patient safety, but it also increases patient trust in her health care practitioners and increases her engagement in her health care encounters. (Practitioners who establish and maintain rapport and communicate effectively are less likely to be sued.[16])

Whether an infant's injuries were caused by medical negligence or the inherent risks associated with TOLAC is a central issue during litigation. For the relevant health care practitioners, the optimal resolution of these claims often hinges on whether there is enough documentation to show that there was informed consent and that the health care team's recognition of and reaction to the emergency met the standard of care, and if not, that the infant's brain injuries were not caused during labor and delivery. The task of creating a complete picture of a woman's pregnancy, labor and delivery in the medical record is complicated by a multitude of factors, but in the event that a lawsuit is filed, it will have been well worth the time and effort to document the process thoroughly.

Applying the risk management strategies proposed in this article can potentially minimize the incidence of bad perinatal outcomes and increase the probability of successfully defending them when they do occur.

References

1. American College of Obstetricians and Gynecologists, Practice Bulletin Number 115: Vaginal Birth after Previous Cesarean Delivery. Washington, DC: ACOG; August 2010.
2. Chestnut D. "Vaginal Birth After Cesarean Delivery," in *Obstetric Anesthesia: Principles and Practice*, 4th ed., Chestnut D (ed), 2009 (Philadelphia: Mosby Elsevier), p. 383.
3. American Society of Anesthesiologists, Practice Guidelines for Obstetric Anesthesia. *Anesthesiology* 2007; 106:843–863.
4. Smith J, Mertz, H, Merrill, D. "Identifying risk factors for uterine rupture." *Clin Perinatol* 35 2008; 85–99.
5. Greene, MF. "Vaginal delivery after cesarean section—is the risk acceptable?" *N Engl J Med* 2001; 345:54–55.
6. Craver Pryor E, Mertz H, Beaver B, et al. "Intrapartum predictors of uterine rupture." *Am J Perinatol* 2007; 24:317–322.
7. Chestnut D. "Vaginal Birth After Cesarean Section," in *Obstetric Anesthesia: Principles and Practice*, 3rd ed., Chestnut D (ed), 2004 (Philadelphia: Mosby Elsevier), p. 403.
8. Cahill A, Odibo A, Allsworth J, et al. "Frequent epidural dosing as a marker for impending uterine rupture in patients who attempt vaginal birth after cesarean delivery." *Am J Obstet Gynecol* 2010; 202:355.e1-5.
9. Landon M. "Cesarean Delivery," in *Obstetrics: Normal and Problem Pregnancies*, 5th ed., Gabbe SG, Niebyl JR, Simpson JL (eds.), 2007 (Philadelphia: Churchill Livingstone Elsevier.
10. Task Force on Neonatal Encephalopathy and Cerebral Palsy, Staff American College of Obstetricians and Gynecologists with American Academy of Pediatrics Staff, "Neonatal Encephalopathy and Cerebral Palsy: Defining the Pathogenesis and Pathophysiology." Washington, DC: ACOG; 2003.

11. American College of Obstetricians and Gynecologists, Practice Bulletin Number 106. Washington, DC: ACOG; July 2009.

12. Toppenberg K, Block W. "Uterine Rupture: What Family Physicians Need to Know." *Am Fam Physician* 2002 Sept; 66(5): 823–8.

13. Zakowski M. "Obstetric anesthesiology: What's new, what's old and what's standard?" *CSA Bulletin*; 60:87–96.

14. Leung, et al. "Uterine Rupture after Previous Cesarean Delivery: Maternal and Fetal Consequences." *Am J Obstet Gynecol* 1993;169: 945–950.

15. Catanzarite V, Almryde K, Bombard A. "Grand Rounds: OB Team Stat: Developing a Better L&D Rapid Response Team." *Contemporary OB/GYN* 2008 September; 1–7; Clements C, Flohr-Rincon S, Bombard A, Catanzarite V. "OB Team Stat: Rapid Response to Obstetrical Emergencies." *Nursing for Women's Health* 2007;11:194–199.

16. Hickson G, Entman S. "Physician Practice Behavior and Litigation Risk: Evidence and Opportunity." *Clin Obstet Gynecol* 2008 Dec; 51(4): 688–99.

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