

# ANESTHESIOLOGY™ 2014

OCTOBER 11-15 | NEW ORLEANS, LA

Session: L094  
Session: L129

## **Anesthetic Considerations for the Jehovah's Witness Patient Undergoing Trial of Labor After Cesarean Delivery (TOLAC)**

Chawla LaToya Mason, M.D.  
Baylor College of Medicine, Houston, TX

**Disclosures:** Lippincott William Silkins (Associate Editor), Royalties

### **Stem Case and Key Questions Content**

A 29-year-old G3P2 woman at 36 weeks' gestation presents for a routine antenatal visit (including pre-anesthesia consultation and evaluation) to discuss plans for her upcoming labor. Her first child was born via cesarean delivery performed for breech presentation. With her last pregnancy two years ago, she achieved vaginal birth after cesarean delivery (VBAC). She reports no other significant medical history. She is a member of the Worldwide Association of Jehovah's Witnesses (WAJW) and has expressed her desire to attempt TOLAC.

#### Key Questions:

1. What is TOLAC? Why is it significant for anesthesia providers to understand?
2. Which parturients are considered *NOT* appropriate candidates to attempt TOLAC (ie, what are the relative and absolute contraindications)?
3. What are the maternal-fetal benefits and risks associated with TOLAC? How frequently does uterine rupture occur?
4. What are the current ASA and ACOG recommendations for facilities offering TOLAC services?
5. Are there any other issues that warrant special preoperative attention in this patient who is a member of WAJW?
6. What are some examples of blood conservation strategies? Discuss these techniques.

#### Stem Case:

Two weeks later, the parturient presents to the labor and delivery unit with painful, regular uterine contractions. Cervical examination by an obstetrician reveals that her cervix is 3 cm dilated. It is confirmed that the parturient is in active labor. She remains an appropriate candidate for and continues to desire TOLAC. You are asked to evaluate her for labor analgesia. Her height and weight are 5'3" and 77 kg, respectively. Her airway is Mallampati class II with otherwise normal parameters. Hemoglobin/Hematocrit/Platelets: 11.3/32.7/257.

#### Key Questions:

7. What anesthetic provisions/techniques should be considered?
8. When, if ever, is the earliest time during TOLAC that neuraxial labor analgesia may be initiated?
9. What are the effects of neuraxial analgesia on progress and outcome of labor?

# ANESTHESIOLOGY™ 2014

OCTOBER 11-15 | NEW ORLEANS, LA

## Stem Case:

You proceed with uneventful epidural catheter placement. The patient reports improvement in pain scores and bilateral T9 dermatomal sensory level after epidural loading dose. An infusion of local anesthetics with opioids begins. Over the next two hours, the patient requires several epidural “top-offs” and seems to have an appropriate response to each intervention. Three hours later, you are present at the bedside in response to the patient’s complaint of intense pain that is independent of her contraction pattern.

## Key Questions:

10. How would you proceed with the management? Would you consider epidural catheter replacement at this time?
11. What else should be considered differentially as a source of the parturient’s discomfort?
12. How might uterine rupture be recognized?

## Stem Case:

Non-reassuring fetal heart tones become present that do not recover substantially despite institution of left uterine displacement, oxygen, vasopressor, and terbutaline administration. The obstetrician decides that emergent cesarean delivery is necessary.

13. What is your anesthetic plan for this emergent cesarean delivery?

## Stem Case:

You manage to bolus the epidural catheter with 20 mL of 3% chlorprocaine as the patient is rapidly moved to the operating room. The patient has signs of motor block and requires much assistance to be moved onto the operating table. Although the patient describes overall discomfort, she does not respond to skin clamping with the Allis tissue forceps. You instruct the obstetricians to proceed with surgery. Entry into the abdomen immediately reveals the fetus/infant as uterine rupture has occurred.

14. What are the anesthetic considerations in the management of uterine rupture?
15. How have you prepared to manage the anticipated blood loss?
16. Would you consider cell salvage? Is it safe to use in the obstetrics patients?
17. Would you consider acute normovolemic hemodilution (ANH)? If so, how would you determine the quantity of volume to remove?

## **Model Discussion Content**

### Discussion:

Trial of labor after previous cesarean delivery (TOLAC) is the term used to describe a planned attempt to labor by a woman who has had a previous cesarean delivery. Vaginal birth after cesarean delivery (VBAC) is the term used to denote vaginal delivery after TOLAC; that is, it describes a successful TOLAC. Pre-labor repeat cesarean delivery (PRCD), also referred to as elective repeat cesarean delivery, is the term used to describe planned repeat cesarean delivery at 39 weeks’ gestation without attempt at TOLAC<sup>1-4</sup>. Although this topic is largely an issue directly related to obstetrical management, it is important that anesthesia providers are cognizant of key concepts relevant to this topic because anesthesiologists are routinely called upon to play an integral role in the care of women undergoing TOLAC. This role may include

provision of labor analgesia for uneventful vaginal delivery, provision of surgical anesthesia for cesarean delivery, or anesthetic management of TOLAC-related complications<sup>2</sup>.

### *Parturient Eligibility for TOLAC*

A TOLAC attempt gone awry may be the source of significant morbidity and even mortality to both mother and fetus. Therefore, it is paramount that parturients who attempt TOLAC have been identified as appropriate candidates. This process requires consideration of numerous factors. Absolute and relative contraindications to TOLAC appear in **Tables 1** and **2**.<sup>2,3</sup>

### *Maternal and Fetal Benefits and Risks of TOLAC*

The short- and long-term benefits and risks presented to both mother and infant during TOLAC attempt have been the subject of intense debate for several decades.

Benefits from intended TOLAC in comparison to intended PRCD include avoidance of major abdominal surgery with prolonged physical recovery, and return to lower-risk status for future pregnancies. Furthermore, TOLAC (when successful) offers a lower likelihood of surgical morbidity (bowel, bladder or ureter injury), future abnormal placental implantation (previa, accreta/increta/percreta), chronic pain syndromes, secondary infertility, and perhaps future fetal loss<sup>2-5</sup>.

The least frequent but most feared outcome of TOLAC is symptomatic uterine rupture with its potentially lethal maternal-fetal consequences. It is challenging to ascertain the exact rate of uterine rupture, because studies often combine symptomatic uterine ruptures with asymptomatic uterine scar dehiscence in their reporting. The 2010 NIH Development Consensus offers the following estimates for uterine rupture rate. The incidence of uterine rupture is 0.3% (325 per 100,000) in women undergoing TOLAC when all gestational ages are considered. This rate increases to 0.77% (778 per 100,000) in term women who attempt TOLAC<sup>1,2</sup>. Uterine rupture risk is 0.026% (26 per 100,000) in women who undergo PRCD<sup>1,2</sup>. Hysterectomy, thromboembolic disease, and operative injury are also amongst the most severe adverse maternal risks reported in the literature. Other maternal risks include postpartum hemorrhage requiring blood transfusion, infectious processes (i.e., endometritis, wound infections, puerperal fever), and prolonged hospitalization<sup>2-5</sup>.

Consequences to the fetus of the mother attempting TOLAC include hypoxia, acidosis, Apgar scores <7, NICU admissions, hypoxic ischemic encephalopathy, and perinatal demise<sup>4,5</sup>.

### *American Society of Anesthesiologists (ASA) and American Congress of Obstetricians and Gynecologists (ACOG) Joint Recommendations*

In 2008, the ASA and ACOG issued a joint statement titled "Optimal Goals for Anesthesia Care in Obstetrics". This statement addresses issues of concern to both specialties; it also presents goals that all hospitals providing obstetrical services should strive to achieve. In this statement, "immediate availability" of appropriate personnel and equipment to facilitate an emergency cesarean delivery is advocated should the need arise<sup>6</sup>. Other portions of this joint statement that directly pertain to the provision of TOLAC/VBAC services appear in **Table 3**.

## *Special Concerns in Caring for the Jehovah's Witness Parturient*

The Worldwide Association of Jehovah's Witnesses (WAJW) is a religious organization whose membership numbers are presently estimated to be more than 7 million worldwide and 1.5 million in the United States<sup>7</sup>. Cesarean delivery represents the most commonly performed surgical procedure, accounting for 31.8% of births in 2007<sup>8</sup>. Knowing these facts, the likelihood of encountering the WAJW parturient who desires TOLAC is increasing. Cesarean delivery may be associated with significant blood loss. Special considerations must be factored into the perioperative care of such parturients since many members of WAJW strictly refuse transfusion of allogeneic blood products<sup>7,9</sup>.

In an effort to achieve the most optimal patient outcomes in this challenging clinical situation, anesthesiologists (and all healthcare providers involved) must make sure that autonomy of the parturient is respected and maintained. The parturient's specific desires regarding care in the event of an emergency must be clearly and precisely communicated, understood, and legally documented. This may include establishing advanced directives, addressing issues of ethical and legal liability, as well as ensuring care for any minors who may be involved. It is important to know what (if any) blood components the parturient will or will not accept. Similarly, it is important to educate the patient regarding the use of various blood conservation strategies and determine which strategies (if any) she is in agreement with<sup>9</sup>. (Blood conservation techniques are discussed in the subsequent section.) All in all, there is no consensus on what therapies are desired and agreed upon by the WAJW parturient in the event of an emergency; in fact, there may be considerable variability in what is deemed as appropriate therapy. Therefore, it is of utmost importance that the unique desires of the parturient of interest are clearly elucidated, consented for, and appropriately documented in the medical record. The patient-physician relationship must ensure that the individual patient's desires are accurately communicated, respected, and documented in the patient's medical record<sup>7,9</sup>. Jehovah's Witnesses recognize the complexities to medical management that their religious practices present. Their dedication to establishing cooperative and communicative relationships between medical institutions, legal entities, and themselves is manifested in their creation of more than 1700 hospital liaison committees (HLCs) worldwide. This network facilitates access to health care for WAJW patients by serving as an authoritative source for information regarding their religious beliefs and practices and clinical strategies to avoid blood transfusion. The HLC may be contacted for support services (718-560-4700 or [his@jw.org](mailto:his@jw.org))<sup>10</sup>.

When caring for the Jehovah's Witness attempting TOLAC, communication between the patient and a multidisciplinary team (comprised of anesthesiologist, obstetrician, other surgeons, blood-banking specialist/hematologist, interventional radiologist, neonatologist, nursing, and support personnel) must be established early and maintained throughout the labor and delivery period<sup>7</sup>. Utilization of the Perioperative Surgical Home (PSH) model as described by the American Society of Anesthesiologists may be beneficial in achieving the coordination of care necessary to ensure that an appropriate plan of care is developed early, understood by all parties, and maintained throughout the peripartum period. The PSH model is a "patient-centered and physician-led multidisciplinary and team-based system of coordinated care that guides the

patient throughout the entire surgical experience, from decision for the need for surgery to discharge from a medical facility”<sup>11</sup>.

### *Blood Conservation Techniques*

The anesthesiologist is obligated to be familiar with blood conservation strategies when caring for patients who will not accept transfusion of allogeneic blood products. Acute normovolemic hemodilution (ANH) and intraoperative blood cell salvage are examples of blood conservation techniques.

ANH entails the removal of blood from a patient either immediately before or short after induction of anesthesia. An isovolemic state is maintained using crystalloid and/or colloid replacement. The amount of blood to withdraw may be calculated based upon the formula for allowable blood loss (ABL):  $ABL = \frac{[\text{Estimated blood volume} \times (\text{Hct starting} - \text{Hct final})]}{\text{Hct average}}$ . The withdrawn blood is collected in standard CPD-A blood storage bags and may be re-infused as needed. The withdrawn blood may be stored in the operating room unrefrigerated for up to four hours. The blood with the lowest hematocrit should be transfused first<sup>12</sup>. Some members of WAJW will agree to ANH if the blood is maintained in a closed circuit continuous flow system as has been described in several case reports<sup>13-15</sup>. ANH may be used as the sole blood conservation technique, or it may be combined with other techniques such as intraoperative cell salvage<sup>15</sup>.

Intraoperative blood cell salvage is the process whereby blood loss encountered during a surgery is collected, washed, and filtered for the purpose of producing autologous red cells that may be transfused to the patient. For many years, the hesitation related to utilization of intraoperative cell salvage in the obstetrical clinical setting stemmed from the theoretical concern of administering blood that contains amniotic fluid components, thereby potentially precipitating amniotic fluid embolism. Notably, Waters et al demonstrated that leukocyte depletion filtering of cell-salvaged blood obtained during cesarean deliveries significantly reduces particulate contaminants to a concentration equivalent to maternal venous blood<sup>16</sup>. Furthermore, support for cell salvage use in cases of obstetric hemorrhage encompasses 390 reported cases in which blood contaminated with amniotic fluid was washed, filtered, and re-administered without adverse outcome<sup>7</sup>. When a closed circuit continuous flow system to the patient is carefully maintained, intraoperative blood cell salvage represents a safe blood conservation strategy that may be acceptable for use in the WAJW parturient who refuses allogeneic blood transfusion.

Deliberate hypotension, deliberate hypothermia, and administration of drugs (i.e., erythropoietin and desmopressin) are other techniques that have been described in the care of WAJW patients undergoing non-obstetrical procedures (i.e., cardiac, cranial, orthopedic, and urologic)<sup>7,9</sup>. Anesthetic and surgical management of the WAJW patient who refuses blood transfusion is a challenge. However, it may be safely achieved by utilizing perioperative techniques that aim to decrease surgical blood loss, minimize oxygen consumption, and maximize oxygen delivery.

### *Timing of Neuraxial Labor Initiation and Effects on Labor Progress and Outcome*

It is reasonable to pursue epidural catheter placement early in the case of the parturient who is attempting TOLAC. Once the parturient has received counseling from the obstetrician and anesthesiologist regarding the risks and benefits of their labor plan, the timing of labor analgesia is ultimately the patient's decision. Maternal request alone (regardless of how early during the labor process) is sufficient indication for establishment of neuraxial labor analgesia. In years past, neuraxial analgesia has been unfairly blamed as a proponent for slowing labor and for causing an increased incidence of operative deliveries (i.e., instrumental and cesarean). In 2005, Wong et al disproved this theory in the landmark study that concluded that "neuraxial analgesia in early labor did not increase the rate of cesarean delivery, and it provided better analgesia and resulted in a shorter duration of labor than systemic analgesia"<sup>17</sup>. The population of parturients attempting TOLAC have a reasonable likelihood of requiring cesarean delivery; hence, it becomes especially important and perhaps prudent to establish good, reliable labor epidural analgesia early in the labor process as an 'insurance policy' against the need for general anesthesia should emergent cesarean delivery become necessary. The utilization of epidural analgesia in the setting of the parturient attempting TOLAC is endorsed by both the ASA and ACOG<sup>2,3,6</sup>.

### *Recognition of Uterine Rupture*

Recognition of uterine rupture relies heavily upon identification of the classically described signs and symptoms of uterine rupture that include fetal heart rate abnormalities, vaginal bleeding, maternal pain, and maternal hemodynamic instability. In the past, the utility of neuraxial labor analgesia in the setting of TOLAC was questioned as there was great concern regarding whether the maternal pain caused by uterine rupture is blunted and not easily detected in the setting of epidural use<sup>2,3</sup>. Evidence now exists to prove that this is not the case. Good and consistent evidence support the recommendation that epidural analgesia for labor is appropriate for use in women attempting TOLAC. Both ACOG and ASA endorse the utilization of neuraxial labor analgesia during TOLAC upon maternal request. Epidural analgesia is not a causal risk factor for an unsuccessful TOLAC. While its use does not appear to enhance success rates, its use is certainly not contraindicated. According to a 2010 study by Cahill et al, increased requirements for epidural dosing were observed immediately before uterine rupture relative to the women who did not experience uterine rupture. Women who experienced uterine rupture received more epidural doses on average than those who did not (4.1 vs. 3.5 doses, respectively;  $P = 0.04$ )<sup>18</sup>. Hence, epidural dosing patterns may actually serve as a marker for impending or evolving uterine rupture.

### *Management of Uterine Rupture*

Successful management of the parturient who experiences uterine rupture requires a multidisciplinary approach. Immediate availability of and maintenance of communication amongst the following health care providers is a necessity: obstetrician (or other physician capable of performing emergent cesarean delivery), anesthesiologist, neonatologist, blood banking specialist, and operating room support staff. Fundamentals of the management plan include a complete pre-anesthetic evaluation (including airway assessment), informed consent,

# ANESTHESIOLOGY™ 2014

OCTOBER 11-15 | NEW ORLEANS, LA

early establishment of large-bore intravenous access, a complete operating room set up, and readily available cross-matched products (preferably at an institution wherein a massive blood transfusion protocol exists). The anesthesiologist must be prepared to perform general endotracheal anesthesia in the event that an adequate and appropriately functioning regional anesthetic technique is not in place<sup>2</sup>. In the setting of the Jehovah's Witness parturient who undergoes uterine rupture, the anesthesiologist must be prepared to perform blood conservation strategies. The execution of each of these measures is strongly encouraged given the potential for rapid and catastrophic blood loss that can occur in the setting of uterine rupture.

### *Anesthetic Considerations*

In the care of the Jehovah's Witness parturient attempting TOLAC, the anesthesiologist fulfills an integral role. This role may solely mean the provision of epidural labor analgesia for women who successfully achieve VBAC. For those whose TOLAC attempts are unsuccessful due to failure to progress or other non-emergent obstetric indications, the anesthesiologist's role may translate to the provision of surgical anesthesia for uncomplicated repeat cesarean delivery. If the maternal-fetal status is reassuring, the anesthetic technique may be handled per routine fashion. If an epidural catheter is in place and has been functioning well, it may be dosed appropriately to achieve surgical anesthesia<sup>2,7</sup>.

In other cases where attempts at TOLAC go awry and dire obstetric emergencies are at hand, the role of the anesthesiologist may be extended further to include the provision of surgical anesthesia for emergent cesarean delivery. The choice of anesthetic technique should be made on a case-by-case basis. Depending upon the clinical situation, a regional technique may be reasonable or induction of general endotracheal anesthesia may be mandated. In other cases, it may also become necessary for anesthesia providers to aid in the management of serious complications that may occur such as uterine rupture and its coinciding consequences on the mother and/or fetus. In such circumstances, it is not uncommon for the anesthesiologist to assume responsibility in fluid and electrolyte resuscitation, administration of blood products, and provision of overall supportive care as indicated<sup>7</sup>.

In summary, the exact course of labor as well as the exact role of the anesthesia provider cannot be absolutely predicted in the Jehovah's Witness parturient undergoing TOLAC. The appropriate anesthetic management technique must be made on an individual basis. Anesthesia providers must make every effort to be thoroughly prepared to ensure optimal peripartum outcomes for the parturient and fetus through meticulous planning and multidisciplinary communication.

Table 1

<b>TOLAC <i>Absolute</i> Contraindications</b>
<ul style="list-style-type: none"><li>• No immediately available staff for emergency care</li><li>• General contraindications to labor or vaginal delivery</li><li>• Prior uterine perforation or rupture</li><li>• Transmural myomectomy</li><li>• Prior hysterotomy with vertical component</li><li>• Congenital uterine anomaly</li><li>• Cornual resection (for interstitial ectopic)</li><li>• Three or more prior CD</li></ul>

Table 2

<b>TOLAC <i>Relative</i> Contraindications</b>
<ul style="list-style-type: none"><li>• Predicted success &lt;50-60% (e.g., recurrent CD indication, multifetal pregnancy)</li><li>• Estimated fetal macrosomia</li><li>• Maternal obesity, short stature</li><li>• Postterm induction of labor</li><li>• Prior shoulder dystocia</li><li>• Increased maternal age</li><li>• Two prior CD without vaginal delivery</li></ul>

Table 3

<b>ASA and ACOG Joint Statement</b>
<i>Highlights from “Optimal Goals for Anesthesia Care in Obstetrics”</i>
<ul style="list-style-type: none"> <li>• Immediate availability of appropriate facilities and personnel, including obstetric anesthesia, nursing personnel, and a physician capable of monitoring labor and performing cesarean delivery, including an emergency cesarean delivery in cases of vaginal birth after cesarean delivery (VBAC).</li> </ul>
<ul style="list-style-type: none"> <li>• Availability of anesthesia and surgical personnel to permit the start of a cesarean delivery within 30 minutes of the decision to perform the procedure.</li> </ul>

## References

1. National Institutes of Health Consensus Development Conference Statement: Vaginal birth after cesarean: new insights march 8-10, 2010. *Semin Perinatol.* 2010 Aug; 34 (4): 293-307.
2. Mason CL and Zacharias N. Anesthesia for Vaginal Birth After Cesarean Delivery. In: Suresh MS, Segal BS, Preston R, Fernando R, Mason CL, eds. *Shnider and Levinson’s Anesthesia for Obstetrics*, 5<sup>th</sup> ed. Philadelphia: Lippincott Williams Wilkins, 2012: 144-157.
3. American College of Obstetricians and Gynecologists. ACOG practice bulletin no. 115: Vaginal birth after previous cesarean delivery. *Obstet Gynecol.* 2010 Aug; 116 (2 Pt 1): 450-63.
4. Guise JM, Eden K, Emeis C, et al. Vaginal birth after cesarean: New insights. *Evid Rep Technol Assess (Full Rep).* 2010 Mar; (191): 1-397.
5. Landon MB, Hauth JC, Leveno KJ, Spong CY, Leindecker S, Varner MW, et al. Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery. *N Engl J Med.* 2004 Dec 2004 Dec 16; 351 (25): 2581-9.
6. American Society of Anesthesiologists. Optimal goals for anesthesia care in obstetrics. *Obstetrical Anesthesia Committee.* 2008.
7. Tran CK. Jehovah’s Witness: Ethical and anesthetic-related issues. In: Suresh MS, Segal BS, Preston R, Fernando R, Mason CL, eds. *Shnider and Levinson’s Anesthesia for Obstetrics*, 5<sup>th</sup> ed. Philadelphia: Lippincott Williams Wilkins, 2012: 699-710.
8. Births: Preliminary Data for 2007. National Center for Health Statistics.
- 9.

# ANESTHESIOLOGY™ 2014

OCTOBER 11-15 | NEW ORLEANS, LA

Rothenberg DM: The approach to the Jehovah's Witness patient. *Anesth Clin North Am* 8: 589-607, 1990.

10.

Hospital Information Services for Jehovah's Witnesses International Office. Watch Tower Bible and Tract Society of Pennsylvania. 2012

11.

Schweitzer M, Fahy B, Leib M, Rosenquist R, Merrick S. The perioperative surgical home model. *ASA Newsletter* 2013; 77 (6): 58-9.

12.

Bready LL, Dillman D, Noorily SH. Decision making in anesthesiology – an algorithmic approach, 4<sup>th</sup> Edition. Philadelphia: Elsevier Health Sciences. 2007.

13.

Mason CL, Tran CK, Suresh MS. Use of ANH and blood cell salvage in a Jehovah's Witness undergoing repeat cesarean delivery. 2011 SOAP Annual Meeting Abstract.

14.

Estella NM, Berry DL, Baker BW, et al. Normovolemic hemodilution before cesarean hysterectomy for placenta percreta. *Obstet Gynecol* 1997 Oct; 90 (4 Pt 2): 669-70.

15.

Nagy CJ, Wheeler AS, Archer TL. Acute normovolemic hemodilution, intraoperative salvage and PulseCO hemodynamic monitoring in a Jehovah's Witness with placenta percreta. *Int J Obstet Anesth*. 2008 Apr; 17 (2): 159-63.

16.

Waters JH, Biscotti C, Potter PS, Phillipson E. Amniotic fluid removal during cell salvage in the cesarean section patient. *Anesthesiology* 2000; 92: 1531-6.

17.

Wong, CA, Scavone BM, Peaceman AM, et al. The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. *N Engl J Med* 2005; 352:655-665.

18.

Cahill AG, Odibo AO, Allsworth JE, Macones GA. Frequent epidural dosing as a marker for impending uterine rupture in patients who attempt vaginal birth after cesarean delivery. *Am J Obstet Gynecol*. 2010 Apr; 202 (4): 355. e1, 355.e5.