Previous Cesarean Delivery

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Summary of Recommendations

- **One prior low transverse CD** (documented or suspected based on OB history) and no contraindication to TOLAC
  - Patients should be counseled about VBAC using the VBAC calculator and offered TOLAC antenatally
  - Use of oxytocin for induction and augmentation of labor can be offered, when indicated, regardless of history of prior vaginal delivery.
  - Membrane sweeping can be offered starting at 38 weeks or the visit prior to scheduled induction of labor (whichever is first) to promote spontaneous labor and reduce the need for induction of labor.[3,4]

- **Two prior low transverse CDs** (documented or suspected based on obstetric history) in which **no more than 1 was for a recurring indication** (i.e. failed induction of labor, arrest of active phase, arrest of descent)
  - Patients should be counseled about VBAC using the VBAC calculator and offered TOLAC antenatally
  - Use of oxytocin for augmentation of labor may be offered, when indicated and at the discretion of the provider, regardless of history of prior vaginal delivery.
  - Induction of labor is not recommended due to the associated higher rate of uterine rupture and therefore should not be offered. For patients with 2 prior CDs AND a prior vaginal delivery, however, induction of labor may be considered with shared decision making.
  - Membrane sweeping may be offered starting at 38 weeks, or the visit prior to scheduled induction of labor (whichever is first), to promote spontaneous labor and reduce the need for induction of labor.[3,4]
  - In the absence of spontaneous labor, ERCD should be scheduled. It is reasonable to delay ERCD up to 41 weeks for those people still desiring TOLAC and not yet in spontaneous labor.

- **Two prior low transverse CDs from recurring indications** (i.e., failed induction of labor, arrest of active phase, arrest of descent)
  - Patients should **not be offered** TOLAC antenatally due to their low likelihood of a successful VBAC.
  - Management may be individualized for people who present in advanced labor or preterm labor.
  - If delivery appears imminent and/or it is felt that TOLAC may be associated with fewer risks than urgent/emergent repeat CD, TOLAC may be considered after weighing the risks and benefits as well as the likelihood of successful VBAC.

- **Three or more prior CDs**
  - Patients should **not be offered** TOLAC antenatally due to the limited data regarding risks.
  - Management may be individualized for people who present in advanced labor or preterm labor. If delivery appears imminent and/or it is felt that TOLAC may be associated with fewer risks than urgent/emergent repeat CD, TOLAC may be considered after weighing the risks and benefits as well as the likelihood of successful VBAC.

- **Labor management**
  - Labor progress, maternal symptoms, and fetal status should be assessed and documented in each intrapartum progress note. Labor should only be allowed to continue if all the following criteria are met:
    - The FHR has moderate variability and/or accelerations – **AND**-
    - There are no more than 2 variable decelerations exceeding 60 seconds in duration and decreasing greater than 60 bpm from the baseline or to less than 60 bpm (regardless of baseline) within the previous 30 minutes. -**AND**-
    - The patient has made documented cervical change over the past 2 hours in active phase and with adequate contractions OR the latent phase is <18 hours.
    - There are no clinical signs of uterine rupture (e.g., pain, loss of fetal station, sudden fetal heart rate changes)
  - Arrest of active phase labor with adequate contractions for 2 hours in a person with one or more prior cesareans is an indication for repeat cesarean delivery.
    - Waiting for 4 hours may be considered with shared decision making and documentation of patient counseling.

- **Amnioinfusion should not be utilized in people undergoing TOLAC**. Rather, significant variable decelerations and fetal bradycardia should be interpreted as possible signs of uterine rupture.

- For people planning to deliver at Ben Taub Hospital, antenatal mode of delivery counseling may be performed in any Harris Health clinic or Federally Qualified Health Center by an OB/Gyn physician.
  - Reasonable attempts to obtain the operative reports should be made PRIOR to the consult visit so that they can be reviewed and discussed with the patient at the time of consult.

- At Ben Taub Hospital, the OB service should always be consulted by the Certified Nurse Midwife (CNM) and Family Medicine (FM) services for any patients they admit that desire TOLAC.
  - CNM and FM patients who desire TOLAC can be managed intrapartum by their respective service if the following criteria are met:
    i. The person has had a prior vaginal delivery (either before her CD or a successful VBAC) **–AND-**
    ii. The person has had no more than 1 prior CD **–AND-**
    iii. If induction of labor is required, the person has a favorable cervix (i.e., does not require cervical ripening) **-OR-**
    iv. The person has no prior vaginal deliveries and only 1 prior CD for a nonrecurring indication (i.e., malpresentation, abnormal fetal heart rate), and she presents in active labor (cervix dilated 6 cm or more)
  - An OB consult should be requested for all FM and CNM patients admitted to L&D for TOLAC. The PGY 4 OB resident will be the involved resident and should discuss the patient with the L&D attending.

Introduction

In a 2010 consensus conference, the National Institutes of Health (NIH) examined the safety and outcome of trial of labor after cesarean delivery (TOLAC) and vaginal birth after previous cesarean delivery (VBAC) and factors associated with decreasing rates. The NIH panel recognized that TOLAC was a reasonable option for many people with a prior cesarean delivery (CD) and called on organizations to facilitate access to TOLAC.[7] Some of the changes included offering TOLAC to people with a twin gestation, people with one previous cesarean delivery with an unknown type of uterine incision, and people with 2 previous low-transverse cesarean incisions, even without a prior vaginal delivery.[1,8] ACOG still maintains that a TOLAC should be undertaken at facilities capable of emergency deliveries because the risks of TOLAC, in particular, uterine rupture, may be unpredictable.[1]

Candidates for TOLAC

Candidacy for TOLAC is largely based on the number of prior Cesarean deliveries and whether the patient has any contraindications.

Prior surgical history

- *1 prior Cesarean:* most people with one previous cesarean delivery (CD) with a low transverse uterine incision are candidates for and should be counseled about VBAC and offered TOLAC[1,8]
- *2 prior Cesareans:* based on data from 2 large studies[9,10], ACOG states that it is reasonable to consider people with 2 previous low transverse CDs to be candidates for TOLAC. The chance of achieving VBAC appears to be similar for people with 1 or more than 1 CD.[1,8]
- *3 or more prior Cesareans:* data regarding the risk for people undergoing TOLAC with more than 2 previous CDs are limited[1,11], so it should not be routinely offered at Ben Taub Hospital or the Pavilion for Women

Contraindications

TOLAC is not recommended in patients at high risk for complications, which includes those with[1]:

- Previous classical or T-shaped incision or extensive trans-fundal uterine surgery (i.e. extensive myomectomy).
- Previous uterine rupture
- Medical or obstetric complication that precludes vaginal delivery

Risks and Benefits of TOLAC/VBAC and ERCD

Both elective repeat cesarean delivery (ERCD) and (TOLAC) are associated with maternal and neonatal risk.[1] Most maternal morbidity that occurs during TOLAC occurs when repeat CD becomes necessary. Thus, when compared to ERCD, VBAC is associated with fewer complications, and a failed TOLAC is associated with more complications. Consequently, risk for maternal morbidity is integrally related to a person's probability of achieving VBAC.[1] Uterine rupture associated with TOLAC results in the most significant increase in the likelihood of additional maternal and neonatal morbidity.[1] Although serious maternal morbidity increases with increasing number of prior CDs, outcomes are good in most people undergoing these procedures. This risk is attributable to the risks associated with placenta accreta spectrum and/or the need for hysterectomy. There does not appear to be an absolute threshold number of CD beyond which patients should be unequivocally counseled to forgo future pregnancies.[12]

Risk of uterine rupture

The risk of uterine rupture in spontaneous labor is 0.4%.[1,13] This is in comparison to 0.9% for augmented labor, 1.1% for labor induced with oxytocin alone, and 0.9% for labor induced with mechanical dilation with or without oxytocin. In patients with multiple prior CDs, studies regarding the risk of uterine rupture compared to those with one prior CD are mixed, with some studies suggesting the risk was similar[9] and some concluding the risk was higher.[10] Risks factors for uterine rupture in this population included induction of labor and oxytocin augmentation. Conversely, a prior vaginal delivery and/or VBAC was protective.

There is an increased risk with use of prostaglandins (i.e., misoprostol) for third trimester cervical ripening or induction in patients with prior CD or major uterine surgery, therefore it should not be used.[1]

No clear threshold for rupture associated with dose of oxytocin, so an upper limit for oxytocin dosing with TOLAC has not been established.[1]

When uterine rupture occurs, it carries with it an associated 6.2% risk (95% CI, 1.8-10.6) of hypoxic-ischemic encephalopathy (HIE) (8).

Comparisons of risk by mode of delivery

TOLAC vs. ERCD

Compared to ERCD, TOLAC is associated with an increased risk of uterine rupture, uterine dehiscence, transfusion, and endometritis. These risks are encountered primarily in people with a failed TOLAC.[1,12]

Failed TOLAC vs. successful VBAC

Compared to successful VBAC, failed TOLAC is associated with an increased risk of uterine rupture, uterine dehiscence, hysterectomy, transfusion, and endometritis.[1,13]

Maternal morbidity associated with multiple repeat CDs without labor

With increasing number of CDs, there is an increased risk of:[12]

- Placenta accreta
- Hysterectomy
- Transfusion of ≥4 units PRBCs
- Cystotomy

- Bowel injury
- Ureteral injury
- Placenta previa
- Ileus
- Post-operative ventilation
- ICU admission
- Endometritis
- Prolonged operative time

Figure 1. Maternal risk based on number of prior Cesarean deliveries

Risk	1st CD	2nd CD	3rd CD	4th CD	5th CD	≥6 CD
Placenta accreta	0.24	0.31	0.57	2.13	2.33	6.74
Hysterectomy	0.65	0.42	0.90	2.41	3.49	8.99
≥4 units PBRCs	1.05	0.48	0.77	1.59	2.33	10.11
Cystotomy	0.13	0.09	0.28	1.17	1.94	4.49
Bowel injury	0.11	0.06	0.13	0.34	0	1.12
Ureteral injury	0.03	0.01	0.02	0.07	0.39	1.12
Placenta previa	6.42	1.33	1.14	2.27	2.33	3.37
Ileus	0.66	0.45	0.68	0.90	1.55	3.37
Post-op vent	1.0	0.21	0.24	0.69	0.78	1.12
ICU admission	1.85	0.57	0.54	1.58	1.94	5.62
Endometritis	5.98	2.56	2.81	2.96	1.55	6.74
Accreta when previa present	**3.3**	**11**	**40**	**61**	**67**	**67**

Data are presented as %.

Benefits of TOLAC vs. ERCD

Successful VBAC avoids major abdominal surgery and results in lower rates of hemorrhage, thromboembolism, and infection as well as a shorter recovery period. Additionally, it may avoid potential future maternal consequences of multiple CDs.[1,13]

Mode of Delivery Counseling

People with prior CD(s) should be counseled **early** in pregnancy to allow time to consider their options.[1] Reasonable attempts should be made to obtain medical record(s) of the previous uterine incision(s). Intended family size and risk of additional CDs should be considered in counseling. Counseling should be individualized for the patient and should include a discussion on the risks and benefits of TOLAC/VBAC, failed TOLAC, ERCD, and multiple repeat CDs. It should also include a discussion regarding factors associated with an increased or decreased likelihood for successful VBAC and uterine rupture.

Factors associated with DECREASED likelihood for successful VBAC

- First prenatal visit
  - Increased maternal age
  - Maternal obesity
  - Short inter-delivery interval (less than 19 months)
  - Recurrent indication for initial CD (i.e., arrest of active phase, arrest of descent)
- Throughout pregnancy[1,14]
  - Need for induction of labor
  - Birth weight > 4000 grams
  - > 40 weeks gestational age
  - Preeclampsia
  - Maternal obesity

Factors associated with INCREASED likelihood for successful VBAC

- First prenatal visit
  - A prior history of vaginal delivery, either before or after a prior CD[5,7*]
- Throughout pregnancy[1,14]
  - Spontaneous labor

Counseling should be done during pregnancy and should include use of a VBAC calculator and the counseling as well as management plan should be documented in the medical record.[1]

- Pavilion for Women: mode of delivery counseling should be performed in clinic for all people who are candidates for TOLAC. An electronic or paper consent form (PFW TOLAC Consent Form) for people with prior CD(s) should be reviewed and signed. The paper form should be scanned into the medical record. A progress note can also be entered. Examples of documentation can be found in the Appendix, Epic Smart Phrases for MOD counseling.
- Ben Taub: mode of delivery counseling should be performed in clinic for all people who are candidates for TOLAC and documented using Epic smart phrases antenatally. Examples of documentation can be found in the Appendix, Epic Smart Phrases for MOD counseling.

Those patients desiring a TOLAC should be counseled again at the time of admission for delivery.

In those people who still desire a TOLAC after counseling, a progress note from a the PGY4 at Ben Taub and the covering resident and/or attending at PFW should be entered into the medical record that the risks and benefits have been reviewed and the patient still desires an attempt to achieve a vaginal delivery. The attending physician responsible for coverage of the patient (at PFW) or Labor and Delivery (at Ben Taub) should be notified and approve the TOLAC.

VBAC Calculator

A VBAC calculator may be used to provide more specific information about the chance of VBAC.[1] The Maternal-Fetal Medicine Units Network derived and published an accurate model (available at https://mfmunetwork.bsc.gwu.edu/web/mfmunetwork/vaginal-birth-after-cesarean-calculator), which does not include race or ethnicity, for the estimation of the probability of VBAC, both for early pregnancy[2] and at the delivery admission.[5] The authors conclude that the removal of race and ethnicity from the model should serve to reinforce the importance of continually rethinking past approaches to care and striving to achieve equity, without which there would be no person-centeredness or quality. In that regard, it is important to note that there continue to be disparities in the cesarean delivery rate among individuals who are in labor, with those who identify as Black or Hispanic having higher rates than those who identify as non-Hispanic White, and it is of crucial importance to target the social determinants that underlie those differences and eliminate the disparity and related morbidity that result from to it.[2] For example, personalized counseling that accounts for social circumstances such as transportation, support systems, distance from the hospital, time off from work, and arranging childcare may more accurately represent a woman's decision and ability to undergo a trial of labor.[6]

Labor management

Induction of labor

Previous studies have compared induction of labor in people undergoing TOLAC to spontaneous labor, however the clinically relevant comparison is induction to expectant management.[1] **Induction of labor for maternal or fetal indications remains an option for people undergoing TOLAC**.[1,8]

- *Compared to expectant management,* the VBAC rate has been shown to be higher among people with a singleton gestation and 1 prior CD undergoing induction of labor at 39-40 weeks as compared to expectant management.[15,16] In one study, the risk of uterine rupture was also higher with induction at 39 weeks vs

* The chance of VBAC is 63% with no prior vaginal delivery, 83% with prior vaginal delivery before CD, and 94% with prior VBAC.

expectant management (1.4% vs 0.5%, P=.006, respectively); there was no difference in neonatal outcomes.[15]

- *In people with 1 prior CD*, most studies indicate there is no increased risk of uterine rupture with induction of labor if the person has had a prior vaginal delivery. While a vaginal delivery is significantly more likely when labor induction is initiated with a favorable cervix vs an unfavorable cervix, regardless of prior obstetric history, a uterine rupture is no more likely to occur when labor is induced with an unfavorable cervix as compared to a favorable cervix.[17]

- *In people with 2 prior CDs*, one study showed that labor induction outcomes were similar regardless of whether a person had 1 or 2 prior CDs. People in this study with 2 prior CDs undergoing induction of labor were significantly more likely to have had a prior VBAC. After 2 CDs, undergoing induction of labor carried similar maternal and neonatal risks as having ERCD.[18]

Labor Management

No data suggests that intrauterine pressure catheters (IUPCs) or fetal scalp electrodes are superior to external forms of monitoring, and there is evidence that the use of IUPCs does not assist in the diagnosis of uterine rupture.[1,19,20] Therefore, IUPC use should be reserved for routine obstetric indications.

Amnioinfusion should not be utilized in people undergoing TOLAC. Rather, significant variable decelerations and fetal bradycardia should be interpreted as possible signs of uterine rupture.

These patients have labor patterns similar to those who have not had a prior CD.[1] In a person with no prior vaginal deliveries, her labor pattern will mirror a nulliparous person; people with a prior CD and a prior vaginal delivery have labor patterns that follow the same trend as multiparous people.[21,22] People who undergo induction of labor after CD may have a longer latent labor phase.[21,23*]

- Oxytocin augmentation may be used and should be managed as per the respective hospital policy (refer to BCM OB/Gyn Perinatal Guideline on "The Use of Oxytocin at Ben Taub Hospital and Pavilion for Women").
- Once adequate uterine activity has been achieved, **lack of progress in active labor after 2 hours should result in delivery by repeat cesarean.** The study that assessed a labor-management protocol that mandated at least 4 hours of oxytocin augmentation before CD for active-phase labor arrest excluded people with a previous CD[24]; therefore, the safety of this approach in people undergoing TOLAC has not been established. Awaiting 4 hours may be considered with shared decision making and patient counseling.

Predictors and signs of uterine rupture

The most common sign associated with uterine rupture is fetal heart rate abnormality, which has been associated with up to 70% of cases of uterine rupture.[1,7,25,26,OBJ][1,7,25,26,OBJ] Review of uterine rupture cases at Ben Taub Hospital has noted an association between the sudden onset of deep/prolonged variable decelerations, not precipitated by recent membrane rupture or rapid dilation/descent, and a final diagnosis of uterine rupture. **Significant variable decelerations and fetal bradycardia should be interpreted as possible signs of uterine rupture rather than routine labor progress and amnioinfusion should not be used.**

Additional signs include loss of fetal station and severe abdominal pain. Onset of severe abdominal pain despite spinal or epidural anesthesia should be interpreted as possible uterine rupture rather than inadequate neuraxial blockade.

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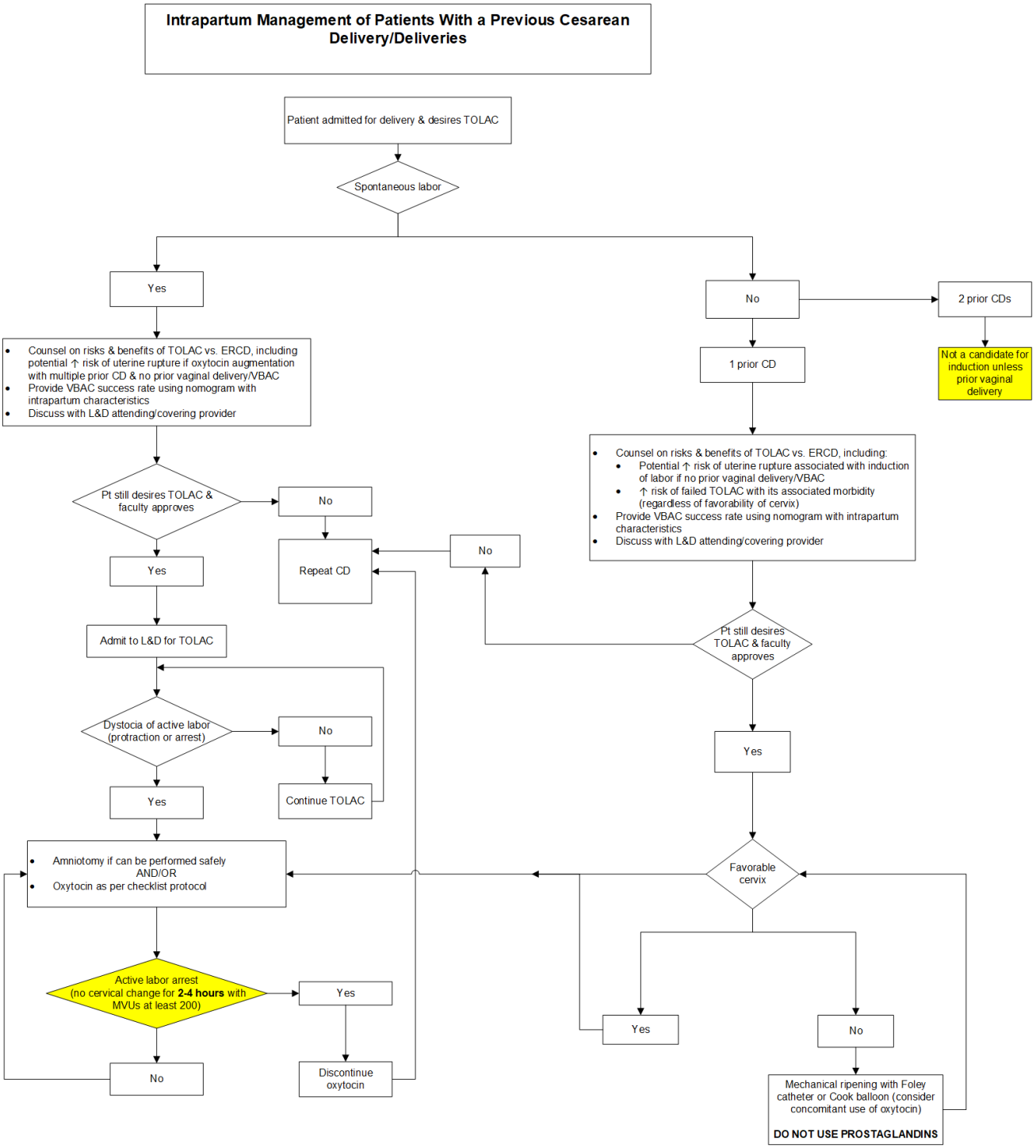
* One study showed no difference, as compared to spontaneous labor, once 7 cm dilation was reached.[23] Another study reported that labor duration for TOLAC vs nulliparous people from 4-10 cm was 1.5 (4.6) hours longer (p<.001).[21]

Figure 2. Management Algorithm for TOLAC



APPENDIX

PFW TOLAC Consent Form

INFORMED CONSENT - TRIAL OF LABOR AFTER CESAREAN DELIVERY PAVILION FOR WOMEN

INITIAL

_____ 1. I understand that the decision to attempt a “trial of labor after Cesarean” (TOLAC) is entirely my own and the option of an elective repeat Cesarean Delivery (Cesarean) has been discussed with me.

____ 2. I understand that approximately 60-80% of women who undergo a TOLAC will successfully deliver vaginally.

_____ 3. I understand that the risk of a uterine rupture during a TOLAC in someone such as myself, who has had a prior incision in the non-contracting part of my uterus is approximately 1%, but can occur.

_____ 4. I understand that in all labors, emergency complications may occur that may not prevent the death of or injury to my baby. This risk can occur not only in TOLAC trials but also in normal vaginal deliveries and Cesarean deliveries.

_____ 5. I understand that a successful TOLAC carries a lower risk to me than does a cesarean delivery.

_____ 6. I understand that if I choose a TOLAC and ultimately have a Cesarean during labor, I have a greater risk of complications than if I had had an elective repeat Cesarean.

_____ 7. I understand that if I deliver vaginally, I most likely will have fewer problems after delivery and a shorter hospital stay than if I have a Cesarean delivery.

_____ 8. In the event that the TOLAC is unsuccessful, Cesarean delivery may result in increased blood loss that requires a blood transfusion. In rare cases, the removal of my uterus (hysterectomy) may be necessary.

_____ 9. I understand there is a risk to me or my infant of brain damage or death.

_____ 10. I understand that uterine rupture is life threatening for the infant.

_____ 11. I understand that Cesarean delivery is a major surgery. There are risks of a repeat Cesarean. The maternal and infant risks include:

Maternal:

- Longer recovery time
- Infection
- Bleeding/transfusion
- Injury to the bladder or other internal organs
- Blood clots in legs or lungs
- Brain damage or death
- Increased likelihood of needing cesarean delivery for future pregnancies, each with an increased risk of complications (increased surgical risk, increased risk of abnormal placenta implantation)

Fetal (infant):

- Increased risk of breathing problems
- Laceration

_____ 12. I understand that I have the right to change my mind regarding TOLAC at any time prior to delivery.

This form has been fully explained to me, and I have read and inquired about any risks or benefits of a vaginal birth after Cesarean section and all questions have been adequately answered by my physician and the staff.
Please initial choice: _____ I want to attempt a TOLAC. _____ I want a repeat Cesarean section.

Signature of Patient/Other Legally Responsible Person Relationship	Date	Time AM/PM
Signature of Physician	Date	
Signature of Witness	Date	
Signature of Translator/Reader	Date	

NOTES:

Epic Smart Phrases for MOD counseling

For people with 1 prior CD (smart phrase: CMDMOD1)

The patient has a history of 1 prior CD for **(indication).** The prior operative report **is/is not available for review** and documents a low transverse uterine incision. I had an extensive discussion with the patient regarding the risks and benefits of TOLAC/VBAC, elective repeat CD, and failed TOLAC. She expressed a desire to have **X (number) of additional pregnancies/no additional pregnancies**.

I counseled her that the benefits of a successful VBAC include avoidance of major abdominal surgery, lower rates of hemorrhage, thromboembolism, and infection, and a shorter recovery period. Additionally, it may avoid potential future maternal consequences of multiple CDs. I explained that uterine rupture associated with TOLAC results in the most significant increase in the likelihood of maternal and neonatal morbidity. I explained to her the risk of uterine rupture of ~1%: as low as 0.4% in the setting of spontaneous labor and as high as 1.1% with induction/augmentation after 1 previous CD. We discussed the risks of elective repeat CD, including, but not limited to, operative injury, need for blood transfusion, hysterectomy, maternal death. I also reviewed the risks of multiple repeat CDs, including, but not limited to, increased risk of operative injury, blood transfusion, abnormal placental adherence, and need for hysterectomy. We discussed the risks of TOLAC, including, but not limited to, uterine rupture, need for blood transfusion, hysterectomy, maternal/fetal/neonatal death. She understands that a uterine rupture would warrant emergent CD with increased risk for operative morbidity and risk of fetal death or HIE. We discussed that the worst outcome for the maternal/fetal pair is when a repeat CD is indicated during a TOLAC (failed TOLAC).

After this discussion, she reported that she would like **TOLAC/elective repeat CD.** She understands that she may change her decision at any time and that factors that develop as her pregnancy progresses may alter her likelihood of success. She understands that she will be counseled again at the time of admission for delivery.

For people with 2 prior CDs (smart phrase: CMDMOD2)

The patient has a history of 2 prior CDs. The first was for **(indication)** and the second was for **(indication).** The prior operative reports **are/are not available for review** and document a low transverse uterine incision in both. I had an extensive discussion with the patient regarding the risks and benefits of TOLAC/VBAC, elective repeat CD, and failed TOLAC. She expressed a desire to have **X (number) of additional pregnancies/no additional pregnancies**.

I counseled her that the benefits of a successful VBAC include avoidance of major abdominal surgery, lower rates of hemorrhage, thromboembolism, and infection, and a shorter recovery period. Additionally, it may avoid potential future maternal consequences of multiple CDs. I explained that uterine rupture associated with TOLAC results in the most significant increase in the likelihood of maternal and neonatal morbidity. I explained to her the risk of uterine rupture of 0.9-1.8% and that some studies have found it to be identical to people with only 1 prior CD. We discussed the risks of elective repeat CD, including, but not limited to, operative injury, need for blood transfusion, hysterectomy, maternal death. I also reviewed the risks of multiple repeat CDs, including, but not limited to, increased risk of operative injury, blood transfusion, abnormal placental adherence, and need for hysterectomy. We discussed the risks of TOLAC, including, but not limited to, uterine rupture, need for blood transfusion, hysterectomy, maternal/fetal/neonatal death. In people with multiple prior CDs, there is an increased risk of hysterectomy and blood transfusion. She understands that a uterine rupture would warrant emergent CD with increased risk for operative morbidity and risk of fetal death or HIE. We discussed that the worst outcome for the maternal/fetal pair is when a repeat CD is indicated during a TOLAC (failed TOLAC).

She understands that the risk of uterine rupture is increased with induction and augmentation of labor and that induction of labor may not be offered, especially in the absence of a prior vaginal delivery. I explained that we can offer membrane sweeping, beginning at 38 weeks, to promote spontaneous labor. She

understands that a repeat CD, no later than 41 weeks, may be recommended in the absence of spontaneous labor.

After this discussion, she reported that she would like **TOLAC/elective repeat CD.** She understands that she may change her decision at any time and that factors that develop as her pregnancy progresses may alter her likelihood of success. She understands that she will be counseled again at the time of admission for delivery.

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