Anesthetic Implications of VBAC and TOLAC

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VBAC = Vaginal Birth after Cesarean Delivery

vs

TOLAC = Trial of Labor After Cesarean Delivery
Overview: Anesthetic Implications

1) Rates of Cesarean Delivery: VBAC
2) Changes in Practice Guidelines
   i. ACOG
   ii. ASA
3) Anesthesia Coverage for TOLAC
4) Adverse Maternal / Perinatal Outcomes: TOLAC
5) Uterine Rupture and Obstetric Anesthesia
“Once a Cesarean...

.....Always a Cesarean”

Craigin EB. NY Med J 1916; 104:1-3
The Rising Rates of Cesarean delivery

National Center for Health Statistics.
Why are Cesarean rates increasing?

- Increases in primary cesarean deliveries
- Changing maternal demographics
- Obstetric practices
- Medico-legal pressure on Obstetricians
- Decrease in VBAC rate (circa 1997)
# Wind of Change: TOLAC vs Elective CS?

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Morbidity*</td>
<td>Trial of Labor (N = 3249)</td>
<td>Elective Second Cesarean Section (N = 2889)</td>
</tr>
<tr>
<td>Total complications</td>
<td>257 (7.9)</td>
<td>243 (8.4)</td>
</tr>
<tr>
<td>Major complications</td>
<td>53 (1.6)</td>
<td>24 (0.8)</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>5 (0.2)</td>
<td>6 (0.2)</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>10 (0.3)</td>
<td>1 (0.0)</td>
</tr>
<tr>
<td>Operative injury</td>
<td>41 (1.3)</td>
<td>18 (0.6)</td>
</tr>
<tr>
<td>Minor complications</td>
<td>204 (6.3)</td>
<td>219 (7.6)</td>
</tr>
<tr>
<td>Puerperal fever</td>
<td>171 (5.3)</td>
<td>185 (6.4)</td>
</tr>
<tr>
<td>Transfusion</td>
<td>36 (1.1)</td>
<td>39 (1.3)</td>
</tr>
<tr>
<td>Abdominal-wound infection</td>
<td>43 (1.3)</td>
<td>63 (2.2)</td>
</tr>
</tbody>
</table>

ACOG guidelines: VBAC

• VBAC: “encouraged” → “offered”
• A physician capable of performing a cesarean is “immediately” available

Most Recent VBAC Reports & Guidelines (2010)


National Institutes of Health Consensus Development Conference Statement
Vaginal Birth After Cesarean: New Insights
March 8-10, 2010

Vaginal Birth After Previous Cesarean Delivery

Trial of labor after previous cesarean delivery (TOLAC)* provides women who desire a vaginal delivery with the possibility of achieving that goal—a vaginal birth after cesarean delivery (VBAC). In addition to fulfilling a patient’s preference for vaginal delivery, at an individual level VBAC is associated with decreased maternal morbidity and a decreased risk of complications in future pregnancies. At a population level, VBAC also is associated with a decrease in the overall cesarean delivery rate (1, 2). Although TOLAC is appropriate for many women with a history of a cesarean delivery, several factors increase the likelihood of a failed trial of labor, which compared with VBAC, is associated with increased maternal and perinatal morbidity (3–5). Assessment of individual risks and the likelihood of VBAC is, therefore, important in determining who are appropriate candidates for TOLAC. The purpose of this document is to review the risks and benefits of TOLAC in various clinical situations and provide practical guidelines for managing and counseling patients who will give birth after a previous cesarean delivery.

Background

Between 1970 and 2007, the cesarean delivery rate in the United States increased dramatically from 5% to more than 31% (6, 7). This increase was a result of several changes in the practice environment, including the introduction of electronic fetal monitoring and the decrease in use of vaginal breech deliveries and forceps deliveries (8–10). The increase in cesarean delivery rates was partly perpetuated by the dictum “once a cesarean always a cesarean” (11). In the 1970s, however, some began to reconsider this paradigm, and accumulated data have since supported TOLAC as a reasonable approach in selected pregnancies (4, 5, 12–14).

This change in approach and recommendations favoring TOLAC was reflected in increased VBAC rates (VBAC per 100 women with a prior cesarean delivery) from just more than 5% in 1985 to 28.3% by 1996. The overall cesarean delivery rate decreased to approximately 20% by 1996 (15). Yet, as the number of women pursuing TOLAC increased, so did the number of reports of uterine rupture and other complications during TOLAC (16–18). In part, these reports, and the professional liability pressures they engendered, have resulted in a reversal of VBAC and cesarean delivery trends. By 2006, the VBAC rate had decreased to 8.5% and the overall cesarean delivery rate had increased to 31.1% (15, 19, 20). In some hospitals, TOLAC is no longer offered.

*The term trial of labor refers to a trial of labor in women who have had a previous cesarean delivery, regardless of the outcome.

**The term vaginal birth after cesarean delivery is used to denote a vaginal delivery after a trial of labor.

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the Committee on Practice Bulletins—Obstetrics with the assistance of William Grobman, MD, and Jeffrey Ecker, MD. The information is designed to aid practitioners in making decisions about appropriate obstetric and gynecologic care. These guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.
Who are Candidates for TOLAC?

- 1 previous CS (Low Transverse Incision)
- Low Risk Patients
- Clinical Discretion:
  - 2 or more prior CS
  - Twins
  - Macrosomia
  - Post-dates
  - Low vertical uterine incision
ACOG Recommendations

‘Trial of labor after previous cesarean delivery should be undertaken at facilities capable of emergency deliveries’
ACOG Recommendations

‘If staff are unavailable’:

1. Timely staff communication
2. Plan for managing uterine rupture
3. Training (drills) recommended
Non Medical factors: TOLAC Practice

"Dr. Simpkins drew the short straw at the pre-inspection meeting."

- "All his fault!"
- "It was him!"
- "His fault!"
• Non medical factors → practice and utilization for TOLAC
  – Practice guidelines
  – Professional liability
  – Informed decision making
  – Birth setting
  – Health insurance / Reimbursement
  – Patient / provider preferences
TOLAC & ANESTHESIA COVERAGE
Optimal Goal = ‘**Immediate** availability of obstetric anesthesia’

Definition of Immediate Availability = ‘….. remains a **local decision** based on each institution’s available resources and geographic location.’
Optimal Goals: Anesthesia 2010

• Immediate availability is (still) optimal…

Additional TEXT

• For ‘no immediate availability of resources’
• Discuss:
  – Increase in risk
  – Alternative management options
  – Establish local consensus on availability of resources / geographical location

What do we know about Obstetric Anesthesia Coverage?
“Immediately Available” Anesthesia Coverage

• Anesthesia coverage varies depending on:
  – Type of Institution
  – Anesthesia personnel
  – Annual number of deliveries

• 39% of US hospitals have <500 deliveries / year

1. Birnbach DJ et al. Semin Perinatol 2010; 34: 318-24
Obstetric Anesthesia Workforce & VBAC

<table>
<thead>
<tr>
<th></th>
<th>&gt; 1500 births</th>
<th>500 – 1499 births</th>
<th>100 – 500 births</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAC permitted</td>
<td>98%</td>
<td>92%</td>
<td>48%</td>
</tr>
<tr>
<td>No longer performed (after 1999)</td>
<td>4%</td>
<td>7%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>In House Anesthesia Provider</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VBAC with regional Anesthesia</td>
<td>94%</td>
<td>81%</td>
<td>63%</td>
</tr>
<tr>
<td>VBAC with no regional anesthesia</td>
<td>86%</td>
<td>45%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Perinatal Outcomes relevant to Obstetric Anesthesiologists
Practice of VBAC: US

• TOLAC rate = 58% (28% - 70%)
  – Rate ↓ since 1996

• Incidence of VBAC = 74\%^1

Predicting VBAC success

<table>
<thead>
<tr>
<th>Factors associated with VBAC (↑, favorable factors; ↓, unfavorable factors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑↑ Previous VBAC, previous vaginal deliveries</td>
</tr>
<tr>
<td>↑ Indication of prior cesarean as nonrecurring (eg, breech, fetal intolerance of labor)</td>
</tr>
<tr>
<td>↓ Hispanic compared with white; African American compared with white</td>
</tr>
<tr>
<td>Increase in maternal age</td>
</tr>
<tr>
<td>Increased maternal BMI</td>
</tr>
<tr>
<td>Preexisting maternal medical disease</td>
</tr>
<tr>
<td>Short interdelivery interval (&lt;18 mo)</td>
</tr>
<tr>
<td>Prolonged gestation &gt;41 wk</td>
</tr>
<tr>
<td>↓↓ Indication of prior cesarean as recurring (eg, failure to progress, labor dystocia, or arrest of descent)</td>
</tr>
<tr>
<td>Macrosomia (birthweight &gt;4000 g)</td>
</tr>
</tbody>
</table>

_Abbreviation: BMI, body mass index._

### Table 2
Maternal outcomes associated with TOLAC versus ERCD

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Favors TOLAC</th>
<th>Favors ERCD</th>
<th>No Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal death</td>
<td>✔️</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>—</td>
<td>✔️</td>
<td>—</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>—</td>
<td>—</td>
<td>✔️</td>
</tr>
<tr>
<td>Hemorrhage and transfusion</td>
<td>—</td>
<td>—</td>
<td>✔️</td>
</tr>
<tr>
<td>Infection</td>
<td>—</td>
<td>—</td>
<td>✔️</td>
</tr>
<tr>
<td>Surgical injury</td>
<td>—</td>
<td>—</td>
<td>✔️</td>
</tr>
</tbody>
</table>

### Table 1
Directionality of risk for neonatal outcomes associated with TOLAC

<table>
<thead>
<tr>
<th>Outcome</th>
<th>TOLAC Associated Risk&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td></td>
</tr>
<tr>
<td>Perinatal</td>
<td>↑</td>
</tr>
<tr>
<td>Neonatal</td>
<td>↑</td>
</tr>
<tr>
<td>Resuscitation</td>
<td></td>
</tr>
<tr>
<td>Mild/Moderate</td>
<td>↓</td>
</tr>
<tr>
<td>BMV</td>
<td>↑</td>
</tr>
<tr>
<td>Apgar, 5 minute</td>
<td>←</td>
</tr>
<tr>
<td>Neonatal admission</td>
<td>?</td>
</tr>
<tr>
<td>Respiratory conditions</td>
<td></td>
</tr>
<tr>
<td>Transient tachypnea</td>
<td>←</td>
</tr>
<tr>
<td>Hypoxic ischemic encephalopathy</td>
<td>?</td>
</tr>
</tbody>
</table>

<sup>a</sup> Abbreviations: BMV, bag-and-mask ventilation; TOLAC, trial of labor after cesarean. See text for details.
So what if the patient still wants a TOLAC?
The patient still wants a TOLAC...  

- Respect patient autonomy re TOLAC decision.
- Inform patients about all risks / management options
- Consider referral (if no TOLAC policy)

The patient still wants a TOLAC...

- Formulate hospital policy with OB and administrators
- If staff not ‘immediately available’:
  - Protocol for uterine rupture (drills, simulation)
  - Consider in house team for occasional patient
- Cost / Coverage: In-house anesthesia?
TOLAC: Uterine Rupture
Anesthetic Implications

## Maternal Morbidity: TOLAC vs Elective CS

<table>
<thead>
<tr>
<th></th>
<th>Uterine Rupture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial of Labor</td>
<td>0.78%</td>
</tr>
<tr>
<td>Elective Repeat CS</td>
<td>0.02%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Uterine Rupture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial of Labor</td>
<td>0.74%</td>
</tr>
<tr>
<td>Elective Repeat CS with labor</td>
<td>0.15%</td>
</tr>
<tr>
<td>Elective Repeat CS (no labor)</td>
<td>0%</td>
</tr>
<tr>
<td>Indicated Repeat CS with labor</td>
<td>0.28%</td>
</tr>
<tr>
<td>Indicated Repeat CS (no labor)</td>
<td>0.08%</td>
</tr>
</tbody>
</table>

*Agency for Healthcare Research and Quality. March 2010.*

Uterine Rupture: Diagnosis and Management

- Fetal Heart Rate Abnormalities
  - Prolonged deceleration or fetal bradycardia
- Uterine / Abdominal Pain
- Contraction pattern – altered?
- Presenting part: Loss of station
- Vaginal / Intra-abdominal bleeding

Uterine Rupture: Fetal Heart Rate Abnormalities

Uterine Rupture: Fetal Heart Rate Abnormalities

Anesthetic Management: Uterine Rupture

• Prepare for Urgent / Emergent CS
  – Call for help

• Mode of Anesthesia:
  – General
  – Neuraxial

• Major Obstetric Hemorrhage
Epidural Analgesia and Uterine Rupture

• Abdominal Pain:
  Not masked by epidural analgesia \(^{1,2}\)

• Epidural Top-ups:
  Surrogate for Impending Rupture \(^3\)

<table>
<thead>
<tr>
<th>Epidural Doses</th>
<th>Hazard Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2.8</td>
<td>1.4 – 5.7</td>
</tr>
<tr>
<td>2</td>
<td>3.1</td>
<td>2.2 – 6.2</td>
</tr>
<tr>
<td>3</td>
<td>6.7</td>
<td>3.8 – 12.1</td>
</tr>
<tr>
<td>≥4</td>
<td>8.1</td>
<td>5.4 – 18.2</td>
</tr>
</tbody>
</table>

1. Keiser Obstet Gynecol 2002
2. Ridgeway Obstet Gynecol 2004
3. Cahill Am J Obstet Gynecol 2010
TOLAC vs Elective Repeat Cesarean

Pendulum Swing

1 Extreme

3 Middle

5 Extreme
Rates of VBAC are decreasing (US)

Barriers: Limit TOLAC
- ‘Immediate’ availability: Anesthesiologist & OB

Maternal / Perinatal Morbidity: TOLAC vs Elective CD

Uterine Rupture
- Acute changes in Fetal trace
- Obstetric Emergency → Major Obstetric Hemorrhage
Thank You

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