Lowering NTSV CSR: Lessons from the West Coast 2020

David Lagrew MD
Medical Director
Women's and Children’s Institute Providence St. Joseph Health-Southern California
Clinical Professor
UC Irvine, Dept. OBGYN
Disclosure

The presenter has no financial disclosures to report
Lesson 1: NTSV CSRs Vary by Hospital but Success is Possible
Lawyers versus CS per Capita

But you need to check your zip code!

Transforming Maternity Care
A Toolkit to Support Vaginal Birth and Reduce Primary Cesareans
The California Journey
Main et al SMFM 2019, 46 hospitals met inclusion criteria with a mix of hospital types: university, community, and integrated health system; and high, medium and small delivery volume. They included an annual average of 115,000 births (of which 35% were NTSV).

Transforming Maternity Care
A Toolkit to Support Vaginal Birth and Reduce Primary Cesareans
Lesson 2: Individual Providers have as much variation as individual hospitals
Lowering the cesarean section rate in a private hospital: comparison of individual physicians' rates, risk factors, and outcomes.

STUDY DESIGN:
We retrospectively reviewed detailed computerized delivery records (n = 16,230) collected from May 16, 1988, to July 30, 1995. We excluded physicians who had <100 deliveries at our institution during the study period. The physicians were divided into two groups depending on whether their individual cesarean section rates were greater than (control group) or less than 15% (target group). Various cesarean section rates, risk factors for abdominal delivery, labor management techniques, and neonatal outcome parameters were calculated for each group. The cesarean section rates of the two groups were analyzed by year to assess changes.

RESULTS:
As expected by study design, the overall cesarean section rate was markedly different between the two groups (13.8% vs 23.8%). In addition, the primary, repeat, primigravid, and multiparous cesarean section rates were all lower for the target group. The rates of cesarean section for fetal distress (1.5% vs 3.3%) and cephalopelvic disproportion (5.3% vs 8.5%) were also significantly less in the target group. The rates of breech presentation, third trimester bleeding, and active herpes cesarean sections were not lower. The control group had more postterm (8.6% vs 14.7%) and >4000 gm infants (12.0% vs 13.7%) but similar numbers of low birth weight, multiple gestation, and preterm infants. The target group used more epidural anesthesia, oxytocin induction, and trial vaginal births after cesarean delivery and more successful trial vaginal births after cesarean sections. Over the study period the cesarean section rate in the target group remained unchanged, whereas it steadily declined in the control group.

CONCLUSIONS:
Individual physician's lower cesarean sections are primarily obtained by labor management and attempting vaginal birth after cesarean delivery. These practice patterns did not appear to lead to any increase in perinatal morbidity or mortality.

To the point: “Individual physician's lower cesarean sections are primarily obtained by labor management and attempting vaginal birth after cesarean delivery. These practice patterns did not appear to lead to any increase in perinatal morbidity or mortality.”

Physicians Variation is Also Present
Breaking Down Hospital Rates by Physician Rates

Individual Provider Rate

Hosp Rate

11 Hospitals, 1st 7 months of 2019
How Do They Get Lower Rates?

---

**More Likely to:**
- Choose Inductions Wisely and Carefully
- Lower number of failed inductions
- Less Latent Phase Admission
- More present during labor and pushing
- Perform manual OP to OA
- Aggressively ripen cervix

**LOW RATES**

---

**More Likely to:**
- More inductions
- Higher number of failed inductions
- More Latent Phase Admissions
- Have more primary elective cesareans
- Shorter Second Stages/higher CSR in 2nd stage

**HIGH RATES**

---

11 Hospitals, 1st 7 months of 2019
Lesson 3: Following Guidelines Helps: Why reinvent when others have had success
The CMQCC Toolkit

- Comprehensive, evidence-based “How-to Guide” to reduce primary cesarean delivery in the NTSV population
- Will be the resource foundation for the CA QI collaborative project
- The principles are generalizable to all women giving birth
- Released on the CMQCC website April 28, 2016
- Has a companion Implementation Guide
National Cesarean Reduction Bundle

Safe Reduction of Primary Cesarean Births

**Safe Reduction of Primary Cesarean Births: Supporting Intended Vaginal Births**

**READINESS**
- Every Patient, Provider and Facility
  - Build a provider and maternity unit culture that values, promotes, and supports spontaneous onset and progress of labor and vaginal birth and understands the risks for current and future pregnancies of cesarean birth without medical indication.
  - Optimize patient and family engagement in education, informed consent, and shared decision making about normal healthy labor and birth throughout the maternity care cycle.
  - Adopt provider education and training techniques that develop knowledge and skills on approaches which maximize the likelihood of vaginal birth, including assessment of labor, methods to promote labor progress, labor support, pain management (both pharmacologic and non-pharmacologic), and shared decision making.

**RECOGNITION AND PREVENTION**
- Every patient
  - Implement standardized admission criteria, triage management, education, and support for women presenting in spontaneous labor.
  - Offer standardized techniques of pain management and comfort measures that promote labor progress and prevent dysfunctional labor.
  - Use standardized methods in the assessment of the fetal heart rate status, including interpretation, documentation using NICHD terminology, and encourage methods that promote freedom of movement.
  - Adopt protocols for timely identification of specific problems, such as herpes and breech presentation, for patients who can benefit from proactive intervention before labor to reduce the risk for cesarean birth.

**RESPONSE**
- To every labor challenge
  - Have available an in-house maternity care provider or alternative coverage which guarantees timely and effective responses to labor problems.
  - Uphold standardized induction scheduling to ensure proper selection and preparation of women undergoing induction.
  - Utilize standardized evidence-based labor algorithms, policies, and techniques, which allow for prompt recognition and treatment of dystocia.
  - Adopt policies that outline standard responses to abnormal fetal heart rate patterns and uterine activity.
  - Make available special expertise and techniques to lessen the need for abdominal delivery, such as breech version, instrumented delivery, and skin delivery protocols.

**REPORTING/SYSTEMS LEARNING**
- Every birth facility
  - Track and report labor and cesarean rates in sufficient detail to: 1) compare to similar institutions, 2) conduct case review and system analysis to drive care improvement, and 3) assess individual provider performance.
  - Track appropriate metrics and balancing measures, which assess maternal and newborn outcomes resulting from changes in labor management strategies to ensure safety.

*Used as model for the CMQCC toolkit*
Which are “a walk in the park”, “rolling hills” or “climbing mountains”?
Walk in the Park

- Adopt provider education
- Standardized pain management
- Track outcomes and balancing measures (for many on electronic systems)
Rolling Hills

- Provider and unit culture which values and promotes vaginal birth
- Optimizing patient and family engagement in education, informed consent and shared decision making
- Standardized response to FHR abnormalities
- Timely identifications of specific problems such as herpes, breech, etc.
- Available in-house maternity care
- Special expertise for special conditions, e.g. breech version
- Track and report labor and cesarean in specific detail, assess individual performance
Mountains to Climb

- Implement standard admission criteria, triage management for spontaneous labor
- Uphold standardized induction scheduling, proper selection and preparation
- Utilize evidence-based labor and induction algorithms
- Adopt policies standard responses to FHR patterns
- Reducing elective cesareans
Fallouts from weekly review discussed one-on-one with surgeon.
Review weekly NTSV CSR by all senior leaders/ELT.
Monthly MEC updates from Quality Council.
Monthly meetings with Regional WC team to review/revise action planning.
CE/CMO Hallway conversations with fallout physicians.
OB Director daily walk through discussion with staff.
CNO weekly walkthrough/touch base with labor and delivery staff.
Making LAIP goals.
Begin planning for Natural Labor Program.
Opinion Leaders vs. Audit/Feedback

- 76 physicians in 16 community hospitals
- Looked at trial of labor
- After 24 months no difference between control and groups in audit and feedback group
- Opinion leader groups were 85% higher than controls and 46% higher than audit groups
- No adverse outcome differences

Lomas et al, JAMA 1991;265:2202
Sharing in decision making

The SHARE Model

S
Seek

H
Help

A
Assess

R
Reach

E
Evaluate

Seek the patient’s participation

Help her explore each option and the corresponding risks and benefits

Assess what matters most to her

Reach a decision together and arrange for a follow up conversation

Evaluate her decision (revisit the decision and assess whether it has been implemented as planned)

Readiness
Birth Preferences Worksheet

- Collaborate with healthcare provider to determine birth preferences
- Tailor choices to what is available at each facility

My Preferences for Labor and Birth: A Plan to Guide Decision Making and Inform My Care Team

While low-risk women will need very little intervention, women with certain medical conditions may need procedures, such as continuous monitoring or induction of labor, to improve safety and ensure a healthy delivery. Your provider can talk about the benefits, risks, and alternatives of the decisions you may face during labor and birth. This is an opportunity to share your values and preferences and make informed decisions together based on your specific needs. This form should go with you to the hospital to be shared with your care team and reviewed as labor progresses.

Environment:

- Which试探es might be the most comfortable? (check all that apply)
  - I would like to see the number of guests in my room while I am in labor (by having a sign posted on the door to my labor and delivery room)
  - I would like to have the lights dimmed during labor
  - I want to bring in music from home (my own MP3 player, CD player, etc.)
  - I want to bring in a essential oils/ aromatherapy (no flames, please)
  - I want to bring in a "blessing" from home

Preferences for Food and Fluids:

- I prefer to have my meals by walking by drinking fluids. I would like to avoid intravenous fluids unless it is medically necessary
- I do not mind receiving intravenous hydration during labor
- If it is safe for me to do so, I would like to eat lightly during labor

Labor Preferences:

- I want to do all I can to labor at home during the early phase of labor and be admitted to the hospital when I am in active labor
- I would like to have freedom of movement while I am in labor (walking, standing, sitting, kneeling, using the birthing ball, etc.), if safe and possible
- I prefer to move around and change positions to improve my labor progress before going to the hospital to increase my labor progress

Some of your decisions before and during childbirth may affect your risk of cesarean. These decisions are best made in collaboration with your provider during prenatal care visits, well in advance of the time of birth. Here are some common decision points:

- Whether to visit the hospital or begin on own (induction of labor may increase your risk of cesarean)
- Whether to be admitted to the hospital in early labor or to start until active labor (being admitted to active labor improves your chances of having a vaginal birth)
- How to monitor your baby’s labor heart rate (low-risk women who are continuously monitored may become likely to have a cesarean)
- Whether to have continuous labor support by a trained caregiver like a doula (continuous labor support improves your chances of having a vaginal birth)
- How to help manage labor pain and labor progress

Your Name and Date of Birth:

Your Due Date:

Physician/Midwife:

Pediatrician/Family Doctor:

Your Labor Support Team (please include partner, doula, friends, relatives, or children who will be present):

- [ ] yes
- [ ] no
Key Strategies for Using Data to Reduce Cesareans

- Make data compelling to Providers
- Assist organizations to understand data associated with their hospital
- Assist providers to understand their CS rates
- Engage women, employers, and the general public in the improvement process
5 months Pre/Post 2/1/2020

What Drives Our Nulliparous Term Singleton Vertex (NTSV) CS Rate of 20.0%?

The NTSV CS rate is comprised of 3 major, mutually exclusive sub-populations (Spontaneous labor resulting in CS, Induced Labor Resulting in CS, and CS with no Labor). This breakdown of the NTSV CS rate should help determine where QI efforts can best be applied. The most common issue among most hospitals is a high rate of CS during NTSV spontaneous labor. Some hospitals may also have a high rate during induced labor.

What Drives Our Nulliparous Term Singleton Vertex (NTSV) CS Rate of 32.3%?

The NTSV CS rate is comprised of 3 major, mutually exclusive sub-populations (Spontaneous labor resulting in CS, Induced Labor Resulting in CS, and CS with no Labor). This breakdown of the NTSV CS rate should help determine where QI efforts can best be applied. The most common issue among most hospitals is a high rate of CS during NTSV spontaneous labor. Some hospitals may also have a high rate during induced labor.
### Weekly NTSV CSR Review (sent to all Ministry Leaders)

#### SJQ NTSV Executive Summary by week

**July 2020**

<table>
<thead>
<tr>
<th>Week:</th>
<th>N: # NTSV fallouts</th>
<th>D: # of cases</th>
<th>% for week</th>
<th>Documented c/s reason</th>
<th>Attending</th>
<th>Decision making MD/Nurse</th>
<th>notes</th>
<th>Recom menda tion</th>
<th>ACOG Criteria met</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 3-9</td>
<td>2</td>
<td>20</td>
<td>10%</td>
<td>Non-Reassuring FHR</td>
<td></td>
<td></td>
<td>38.3 weeks decels in office; attempted ind. multiple prolonged decels</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Failed Induction</td>
<td></td>
<td></td>
<td>40.1 weeks sent from MFT for ind.</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>July 10-16</td>
<td>5</td>
<td>25</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Non-Reassuring FHR</td>
<td></td>
<td></td>
<td>40 weeks labor (lates, temp, mec)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Non-Reassuring FHR</td>
<td></td>
<td></td>
<td>39.2 weeks admitted for decels</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Maternal Request</td>
<td></td>
<td></td>
<td>37.2ind for elevated BP’s. 2+ day labor and patient requested for maternal exhaustion an 8cm for 5 hrs</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>2nd Stage Labor Dystocia</td>
<td></td>
<td></td>
<td>40.5 ind.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>2nd Stage Labor Dystocia</td>
<td></td>
<td></td>
<td>40.4 ind</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>July 17-23</td>
<td>6</td>
<td>36</td>
<td>16.7%</td>
<td></td>
<td></td>
<td></td>
<td>39 weeks admitted for Dec. FM</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Non-Reassuring FHR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CMQCC Labor Dystocia Checklist (ACOG/SMFM Criteria)

1. **Diagnosis of Dystocia/Arrest Disorder (all 3 should be present)**
   - □ Cervix 6 cm or greater
   - □ Membranes ruptured, then
   - □ No cervical change after at least 4 hours of adequate uterine activity (e.g. strong to palpation or MUUs > 200), or at least 6 hours of oxytocin administration with inadequate uterine activity

2. **Diagnosis of Second Stage Arrest (only one needed)**
   - **No descent or rotation for:**
     - □ At least 4 hours of pushing in nulliparous woman with epidural
     - □ At least 3 hours of pushing in nulliparous woman without epidural
     - □ At least 3 hours of pushing in multiparous woman with epidural
     - □ At least 2 hour of pushing in multiparous woman without epidural

3. **Diagnosis of Failed Induction (both needed)**
   - □ Bishop score ≥ 6 for multiparous women and ≥ 8 for nulliparous women, before the start of induction (for non-medically indicated/elective induction of labor only)
   - □ Oxytocin administered for at least 12-18 hours after membrane rupture, without achieving cervical change and regular contractions. *Note: At least 24 hours of oxytocin administration after membrane rupture is preferable if maternal and fetal statuses permit
Most Important?

A Culture that values vaginal delivery
LESSON 5: Nursing has a Critical Role

- Refresh labor techniques training/Spinning Baby/2nd Stage
- Strip review at shift change
- Review oxytocin policies and procedures for timely advancement of oxytocin and restarting after tachysystole/decelerations.
- Work with medical leadership to invoke hard stop labor admissions before 4 cm without medical indications.
- Scripted discussions from labor evaluation area
Peanut Ball

- Decrease length of labor
- Decreasing CS rate in patients with epidurals

LESSON 6: Elective Cesarean Reduction – Just enough to prevent success

- Signed consent by patient acknowledging the unique risks and benefits to future health and pregnancies.
  - Attendance at Free Elective Cesarean Section Class prior to case being scheduled. (Tarzana Class is available until course created at Burbank). Registration Link
    - [https://psjhcrmwebsites.microsoftcrmportals.com/home?region=CALA&ministry=%7BB2583C4A-9DA6-479C-8FA8-D2FBD5A0F849%7D](https://psjhcrmwebsites.microsoftcrmportals.com/home?region=CALA&ministry=%7BB2583C4A-9DA6-479C-8FA8-D2FBD5A0F849%7D)

- Mandatory second opinion by MFM prior to case being scheduled.
- Approval for CS Macrosomia only if meets ACOG criteria, otherwise consider elective.
Informed Consent prior to Scheduling

The Elective Cesarean Option

INFORMATION REGARDING COVID-19:
This class has transitioned to a virtual live conference platform until further notice as we continue to evaluate and manage the health and safety of our patients and visitors.

What You’ll Learn

Are you a healthy mom-to-be considering an elective cesarean birth? This free class provides the facts you need to make an informed choice. If you’re an expectant mother having a cesarean birth for medical reasons, you may attend the Cesarean Birth class instead.

During this free class, we’ll discuss:
- Pros and cons of cesarean birth
- Birth and recovery processes for both vaginal and cesarean birth

Transforming Maternity Care
A Toolkit to Support Vaginal Birth and Reduce Primary Cesareans
LESSON 7: Rates of Fetal Intolerance to Labor/Failure to Progress/Descent Account for a Large Amount of Variability

- Mandatory raining on NICHD categories/5 Tier FHR Analysis with management planning.
- Strip review by hospitalists and nursing on all changes of shift.
- All FIL cesareans have medical director review for appropriateness.
- Cord gases for FIL cesareans.
- Hard stop for labor admissions prior to 4 cm unless medical indication.
- Timely augmentation following appropriate policy procedure review.
- Avoidance of laboring down and varying pushing techniques.
- Operative Vaginal Delivery training.
- Manual Rotation of Occiput Posterior/Transverse (define hospitalist role).
Spontaneous Labor: 5 months Pre/Post 2/1/2020

Proportion of the NTSV Spontaneous Labor population that had a CS for the specific indication

<table>
<thead>
<tr>
<th>Category</th>
<th>Providence Saint Joseph</th>
<th>CA MDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP / CPD</td>
<td>5.1%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Fetal Concern</td>
<td>4%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Other</td>
<td>0.6%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Proportion of the NTSV Spontaneous Labor population that had a CS for the specific indication

<table>
<thead>
<tr>
<th>Category</th>
<th>Providence Saint Joseph</th>
<th>CA MDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP / CPD</td>
<td>9.8%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Fetal Concern</td>
<td>6.1%</td>
<td>7.6%</td>
</tr>
<tr>
<td>Other</td>
<td>0.8%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>
Cervix Data: 5 months Before and After 2/1/2020
(Note more admissions prior to 4 cm and more CS done before 6 cm)
Example Algorithm: Management of Intrapartum FHR Tracings
Active Labor Partogram

ACTIVE LABOR PARTOGRAM
Term ≥ 37 Weeks Gestation

NORMAL LABOR PROGRESS  CONSIDER INTERVENTIONS  ≥ 95TH PERCENTILE MAKE DELIVERY PLAN

LESSON 7: It’s How You Conduct Induction of Labor

- Hard stop for oxytocin or ROM prior to achieving ripe cervix.
- Outpatient cervical ripening unless medically indicated.
- Follow standard recommendations for medical inductions.
- Combination cervical ripening for all inpatients.
- Allowing elective inductions at 39 0/7ths weeks for patients with ripe cervices and physicians who have nulliparous CSR after induction of <25%.
- Elective induction with aggressive cervical ripening at 40 3/7th for all other patients and physicians.
- Induction progress reports at all hand off huddles.
Labor Induction versus Expectant Management in Low-Risk Nulliparous Women

ABSTRACT

BACKGROUND

The perinatal and maternal consequences of induction of labor at 39 weeks among low-risk nulliparous women are uncertain.

METHODS

In this multicenter trial, we randomly assigned low-risk nulliparous women who were at 38 weeks 0 days to 39 weeks 6 days of gestation to labor induction at 39 weeks 0 days to 39 weeks 4 days or to expectant management. The primary outcome was a composite of perinatal death or severe neonatal complications; the principal secondary outcome was cesarean delivery.

RESULTS

A total of 3062 women were assigned to labor induction, and 3044 were assigned to expectant management. The primary outcome occurred in 4.3% of women in the induction group and in 5.4% in the expectant-management group (relative risk, 0.80; 95% confidence interval, 0.61 to 1.06). The frequency of cesarean delivery was significantly lower in the induction group than in the expectant-management group (18.6% vs. 22.2%; relative risk, 0.84; 95% CI, 0.76 to 0.91).

CONCLUSIONS

Induction of labor at 39 weeks in low-risk nulliparous women did not result in a significantly lower frequency of a composite adverse perinatal outcome, but it did result in a significantly lower frequency of cesarean delivery. (Funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development; ARRIVE ClinicalTrials.gov number, NCT01990612)

Can everyone universally adopt and get the same results?
Non-Randomized vs. Randomized Results

CSR Spontaneous Labor vs. CSR Induction Group

CSR Expectant vs. CSR Induction Group

Favors Induction

Transforming Maternity Care
A Toolkit to Support Vaginal Birth and Reduce Primary Cesareans
Mixed Response: Some Increased Induction/Some Not

Result: Increasing CSR in most

* Internal PSJH data
Summary of the ARRIVE trial

- This was a well executed randomized control trial
- Important findings: elective induction at 39 in nulliparous can reduce cesarean section rates by 3.6% and not harm mothers and babies
- Well chosen group of young patients (evidence strict protocol)
- Well chosen group of providers (evidence control group CSR)
- Standardized protocols for failed induction
- Average “cost” to labor units for additional 6 hours
The ARRIVE trial raised several questions:

- Are the results *generalizable* to local patient population and to our providers?
- What were the protocols for induction and labor management, and can we duplicate them in other settings?
- Given the impact on length of labor (+6 hours), could the typical US hospital achieve the same results without significantly over burdening their staffing and room constraints?
- Why were certain complications so frequent (preeclampsia and chorioamnionitis)?
- Is the main effect seen from letting patients go past 41 0/7, should the routine induction be adjusted?
NTSV: Hours in Labor and CSR

* Source internal PSJH data
Admission Dilation has Greatest Impact

Gestation Age and Centimeters on Admission vs. NTSV CSR*

* Source internal PSJH data
Critiquing a Failed Induction

- Induction in the face of unripe cervix (Bishop score < 8 primip and < 6 multip)
- Inadequate documentation of cervical ripening procedure and timing
- **Adequate trial defined by latent phase at least 12-18 hours of oxytocin and ruptured membranes**
Defining Failed Induction

- Nulliparous women remaining in the latent phase for 12 hours compared with women who had exited the latent phase had significantly increased rates of chorioamnionitis (12.1% compared with 4.1%) and endometritis (3.6% compared with 1.3%) and increased rates of neonatal intensive care unit admission (8.7% compared with 6.3%).

- Similar patterns were present for multiparous women at 15 hours.

- With ruptured membranes a latent phase (obtaining 6 cm) after initiation of oxytocin of at least 12 hours for nulliparous women and 15 hours in multiparous women is a reasonable criterion for diagnosing a failed induction.

Rationale of Outpatient Cervical Ripening

1. Mechanical methods as effective with respect to achieving ripeness and cesarean delivery rates in controlled studies
2. Balloon ripening can be used outpatient since tachysystole is not associated
3. Better experience comes from patients having less cramping and not spending the night in the hospital
4. Less cost since monitoring and nursing care not used for 8-12 hours while awaiting ripening of the cervix
What if outpatient?

Fig. 2. Estimated time to delivery by study group. This figure displays the Kaplan-Meier survival curves for time to delivery for the four induction method groups, $P<.001$.
### Table 2. Adverse events during cervical ripening phase time frame with transcervical balloon catheter

<table>
<thead>
<tr>
<th>Adverse events</th>
<th>No. of studies reporting on adverse event (Total sample size)</th>
<th>Occurrence of AE in ripening period</th>
<th>Reference numbers of studies that report on occurrence of AE in ripening period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain, discomfort</td>
<td>17 (5754)**        ***</td>
<td>31**</td>
<td>10,14,17,22</td>
</tr>
<tr>
<td>Unintended amniotomy</td>
<td>12 (2989)</td>
<td>19</td>
<td>18,19</td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>18 (6560)*</td>
<td>18*</td>
<td>7,10,15,17,22,37</td>
</tr>
<tr>
<td>Balloon displacement</td>
<td>10 (2857)</td>
<td>12</td>
<td>8,9,20,27</td>
</tr>
<tr>
<td>Non-reassuring fetal heart rate</td>
<td>17 (5351)</td>
<td>15</td>
<td>5,18,19,23,24</td>
</tr>
<tr>
<td>Allergic reaction</td>
<td>16 (6882)</td>
<td>2</td>
<td>15,20</td>
</tr>
<tr>
<td>Vooing problems</td>
<td>10 (3922)*</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Balloon rupture</td>
<td>12 (3922)*</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Uterine hypertonus</td>
<td>14 (9707)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Uterine hyperstimulation</td>
<td>20 (4812)</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Decreased fetal movements</td>
<td>11 (4416)*</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Malpresentation</td>
<td>16 (6046)</td>
<td>4</td>
<td>24,25,33</td>
</tr>
<tr>
<td>Intrapartum infection</td>
<td>15 (5028)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Placental abruptation</td>
<td>16 (6154)*</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Uterine tachysystole</td>
<td>19 (4850)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>23 (7916)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Cord prolapse</td>
<td>21 (6960)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Fetal death</td>
<td>24 (8189)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Maternal death</td>
<td>22 (6878)</td>
<td>0</td>
<td>–</td>
</tr>
<tr>
<td>Genital laceration</td>
<td>13 (4420)</td>
<td>0</td>
<td>–</td>
</tr>
</tbody>
</table>

*AE, adverse event; DBC, double balloon catheter.

**Kruit et al.: only data for outpatient group on this adverse event.

***De Oliveira e Oliveira et al.: one women with vaginal bleeding, this woman was excluded from their analysis but included in this review. The sample size of the intention-to-treat was maintained.

****Salm et al.: only data for DBC group on this adverse event; one women with discomfort in the DBC group, this woman was excluded from their analysis but included in this review. The sample size of the intention-to-treat was maintained.

---

Keys for Induction Success

- Who you choose (parity and cervical ripeness)
- How you perform the induction
- How you define failed induction
- Follow your success rates!
Take-home Lessons from Our Experience

- Rates vary by hospital, but success is possible
- Rates vary by individuals, they practice differently
- Following guidelines help
- You need leadership at every level
- RNs have a critical role
- Elective CS cause small but important role
- FIL/FTP make up a significant amount of variability
- How you do inductions is the most important thing
- Oh, one more very, very important thing…
Avoid the Success Bump!

- Your initial efforts by using data transparency, fun new laboring techniques, heightened awareness, etc. often lead to success over 9-12 months. Then complacency sets in and you take your eye off the ball…
- Long term success and changing the culture likely to take 24 months or greater.
- Building in natural labor techniques, hard wired data feedback, etc. will be needed to cement the gains and maintain NTSV cesarean section rates under 23.9%.
Thank You!

Visit: CMQCC.org