Cervical Ripening
who, why, how?

Pregnancy Care ECHO Conference
February 22, 2109

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Maternal-Fetal Medicine
Background

• 20% of pregnant women undergo induction of labor (IOL)
• Overall rate of IOL has doubled in 20 years
• 800,000 IOL annually
• Utah: 50,000 births
  • 10,000 women IOL
  • Likely will increase with recent results of the ARRIVE study (NEJM August 2018)
Leaders in Obstetric Care Respond to the Published Results of the ARRIVE Trial

August 8, 2018

ACOG
The American College of Obstetricians and Gynecologists

Society for Maternal-Fetal Medicine
High-risk pregnancy experts
Arrive Trial: Conclusions

Induction of labor at 39 weeks in a low risk nulliparous woman 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

NEJM 2018
Background

- IOL associated with long labor:
  - chorioamnionitis
  - endometritis
  - postpartum hemorrhage

- GOAL:
  - Decrease the time from IOL to delivery
  - Decrease failed inductions
Who?

- Unfavorable cervix
- Bishop score < 6
  - < 4?
  - < 2?

Table 1. Bishop Scoring System

<table>
<thead>
<tr>
<th>Score</th>
<th>Dilation (cm)</th>
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*Station reflects a -3 to +3 scale.
Why?

- Physiologic changes
  - cervical remodeling
  - collagen breakdown
  - increased cytokines

- Expedite labor
How?

- Prostaglandin E1
  - misoprostol
- Prostaglandin E2
  - dinoprostone gel
  - dinoprostone vaginal insert
- Oxytocin
- Mechanical cervical dilators
  - single balloon device (Foley catheter)
  - double balloon device
Prostaglandin E2

Vaginal Insert

Intracervical Gel

**DESIGNED FOR CERVICAL RIPENING**

Easy to insert and remove:

CERVODIL is a thin, flat, polymeric strip which is rectangular in shape with rounded corners contained within the pouch of an off-white knitted polyester retrieval system.

Dinoprostone-infused insert is placed in the posterior fornix of the vagina.

Long tape retrieval system allows CERVODIL to be easily removed anytime.

Controlled release of dinoprostone from insert lasts for up to 12 hours.
Single balloon catheter

Double balloon catheter

Uterine Wall
Amniotic Sac
Balloon
Cervix
Vagina

Catheter

Increasing effacement & dilation
Single vs Double Balloon Catheter

- No difference in the rate of c/s or vaginal delivery in 24 h
- No difference in time from catheter insertion to delivery.
- Cost significantly favors the use of single balloon devices.
  - $41 vs. $3
  - $65 vs. $2.80

Fang et al. *Journal of Obstetric and Gynaecology Research*  
December 2017
Transcervical Foley: 80cc vs 30cc?

- Overall labor shortened by 2 hours
  - No change in c/s rate
  - Similar time to vaginal delivery
  - No difference in maternal complications
  - No difference in fetal complications

Schoen et al Acta Obstet Gynecol Scand 2018
## Cervical Ripening: Combination Therapy

<table>
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<th>Agent</th>
<th>Time to delivery (hours)</th>
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<tr>
<td>Misoprostol</td>
<td>17.6</td>
</tr>
<tr>
<td>Foley</td>
<td>17.7</td>
</tr>
<tr>
<td>Misoprostol AND Foley</td>
<td>13.1</td>
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<td>Oxytocin AND Foley</td>
<td>14.5 (P &lt; 0.001)</td>
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Levine et al *Obstet Gynecol* December 2016
Transcervical Balloon and PROM


201 patients enrolled, > 34 weeks, PROM
Oxytocin vs Foley AND Oxytocin

CONCLUSION: Time to delivery similar (13.9 vs 14.4 hours)
Choriamnioitis increased 8\% vs 0\% in balloon group.
Prior Cesarean Section

• Risk of uterine rupture [OR] 3.01, 95% CI 1.66-5.46
  – Spontaneous labor 4/1,000
  – Oxytocin alone: 11 /1,000
  – Mechanical +/- oxytocin 9/1,000
  – Prostaglandins +/- oxytocin 14/1,000

Landon et al NEJM 2004
Uterine Rupture with Protruded Legs in a Large Amniocele
Prior Cesarean Section

- Mechanical ripening
  - 2016 meta-analysis 1447 women
  - 18/1447 uterine rupture (1.2%)
    - 9 of 18 rupture in active labor

- Maternal and fetal safety
  - No hyperstimulation / tachysystole / FHR change
  - Endorsed by ACOG and SOGC
Prior Cesarean Section

- Prostaglandins
  - Misoprostol vs Pitocin
  - RCT
    - 2/17 misoprostol – uterine rupture

- RCT ended early

Wing et al Obstet Gynecol 1998
Outpatient Cervical Ripening

• 1988: Explored prostaglandin E₂
• 2000: Misoprostol
• 2001: Transcervical Foley catheter for preinduction cervical ripening in an outpatient versus inpatient setting
  – Sciscione et al Obstet Gynecol Nov 2001
VALUE OF OUTPATIENT CERVICAL RIPENING DEBATED
Questions

- Is there a time limit?
  - misoprostol
  - oxytocin
  - balloon
- Can multiple agents be used?
- Multiparous patients?
Figure 1: Risks of cervical changes and of competing events (uterine contractions and fetal complications) during cervical ripening with misoprostol.
Summary

• Shortens time from induction to delivery
• No obvious superior agent
• Combination therapy most effective
Summary

• Single balloon = double balloon
  • Significantly less expensive
• TOLAC: avoid prostaglandins
• Outpatient treatment: Clear protocols
  • Safe
  • Likely more widely implemented
Case

- 18 yo G1 at 36 weeks
  - IOL for preeclampsia with severe features
  - Cervix closed/ long/ firm / posterior/ -3

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Case

- 42 yo G3 P1011 39 weeks
  - Elective induction
  - Cervix 1/25/ medium/ midposition/ -2

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CASE

- 37 yo G3P2002 41 weeks
- BMI 50
- Previous c/s
- Closed/ 50/ mid /firm / -2