Management of the Second Stage: The Truth About Laboring Down

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Disclosures

• No financial

• Vice-Chair of Committee for OB Practice for ACOG,
  Editor for Gabbe, Oral board examiner for ABOG

Objectives

• Definitions
• The context
• Data
  – Trials
  – Observations
• OMSS trial
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Second Stage

Definition
- Begins at complete cervical dilation
- Ends with the delivery of the infant

Second Stage Management
- Delayed pushing (laboring down)

Context
- Epidural anesthesia
- Nullipara

Are epidurals bad?

The Risk of Cesarean Delivery with Neuraxial Analgesia Given Early versus Late in Labor
- Randomized trial of term nullips at < 4cm
- Early epidural vs. systemic anesthesia early in labor
- Findings:
  - No difference in rate of cesarean
  - Shorter time-to-delivery in epidural group
  - Better pain control in epidural group

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ACOG

“Labor causes pain for many women. There is no other circumstance where it is considered acceptable for an individual to experience untreated severe pain, amendable to safe intervention, while under a physician’s care. In the absence of a medical contraindication, maternal request is a sufficient medical indication for pain relief during labor”.

Committee Opinion 339, June 2006

Epidurals

• Here to stay
• Effective for pain reduction
• Associated with longer second stage

Should women delay pushing when complete?

Laboring Down Trials
Hansen et al
• Nullips + multips, term, regional anesthesia
• Induced or spontaneous
• 312 randomized (252 analyzed)
• Delay: 120 min (nullips), 60 min (multips)
  – Or, head at introitus (evaluated q 30 min)
• Compared to immediate

Hansen SL et al. Obstet & Gynecol, 2002;99:29-34

Hansen et al
• Delay:
  – Longer second stage
  – Reduce time pushing
  – Reduce fatigue (nullips only)
• No Difference:
  – pH or Apgars
  – Injury, operative delivery, endomyometritis

Hansen SL et al. Obstet & Gynecol, 2002;99:29-34

Plunkett et al
• Nulliparous, regional anesthesia
• Induced or spontaneous
• 202 randomized
• Delay: 90 min
  – Or, strong urge to push (evaluated q 30 min)
• Compared to immediate

Plunkett et al

- Delay:
  - Longer second stage
- No Difference:
  - Time pushing
  - Cesarean
  - SVD
  - pH, Apgars
  - Fever, hemorrhage

Gillesby et al

- Nulliparous, regional anesthesia, ≥ 36 weeks
- Induced or spontaneous
- Excluded: women ≥ 275 pounds
- 77 randomized
- Delay: 120 min
  - Evaluated q 30 min
- Compared to immediate (within 15 minutes)

<table>
<thead>
<tr>
<th></th>
<th>Delay (n=37)</th>
<th>Immediate (n=36)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Pushing (min)</td>
<td>68.2</td>
<td>95.8</td>
<td>0.04</td>
</tr>
<tr>
<td>Length of 2nd Stage (min)</td>
<td>166.3</td>
<td>107.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Spontaneous VD (%)</td>
<td>83%</td>
<td>75%</td>
<td>0.82</td>
</tr>
<tr>
<td>5-minute Apgar</td>
<td>9.0</td>
<td>8.9</td>
<td>0.88</td>
</tr>
<tr>
<td>Energy</td>
<td>59.4</td>
<td>45.8</td>
<td>0.22</td>
</tr>
<tr>
<td>Tiredness</td>
<td>57.9</td>
<td>53.5</td>
<td>0.10</td>
</tr>
<tr>
<td>Overall Satisfaction</td>
<td>90.1</td>
<td>90.5</td>
<td>0.95</td>
</tr>
</tbody>
</table>
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Fitzpatrick et al

- Nulliparous, term, regional anesthesia
- Induced or spontaneous
- 178 randomized
- Delay: 60 min
- Compared to immediate
- Pushing for all groups: limited to 60 min (local standard)

Fitzpatrick M et al. BJOG, 2002;109:1359-1365

Fitzpatrick et al

- Delay: Longer second stage
- No Difference: Time pushing, SVD, Augmentation need, Neonatal or maternal morbidities, Patient satisfaction

Fitzpatrick M et al. BJOG, 2002;109:1359-1365

Frasier et al: PEOPLE Trial

- Multicenter
- Nulliparous, term, regional anesthesia
- Induced or spontaneous
- 1,862 randomized, stratified by oxytocin aug.
- Delay: 120 min
  - or irresistible urge
  - or head at introitus (examined q 15 minutes)
- Compared to immediate

Frasier WD et al. AJOG, 2000;182:1165-72
Frasier et al

- **Delay:**
  - Decreased ‘difficult delivery’
  - Increased maternal fever
  - Increased low neonatal pH
- **No difference:**
  - SVD
  - Cesarean
  - Patient Satisfaction

Frasier WD et al. AJOG, 2000;182:1165-72

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Delay (%)</th>
<th>Immediate (%)</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult Delivery</td>
<td>17.8%</td>
<td>22.5%</td>
<td>0.79 (0.66 – 0.95)</td>
</tr>
<tr>
<td>Mid-pelvic procedures</td>
<td>9.3%</td>
<td>13.0%</td>
<td>0.72 (0.55 – 0.93)</td>
</tr>
<tr>
<td>Low-pelvic procedures</td>
<td>3.5%</td>
<td>3.8%</td>
<td>0.93 (0.58 – 1.49)</td>
</tr>
<tr>
<td>Cesarean</td>
<td>5.0%</td>
<td>5.7%</td>
<td>0.88 (0.60 – 1.29)</td>
</tr>
<tr>
<td>Spontaneous VD</td>
<td>57.5%</td>
<td>52.7%</td>
<td>1.09 (0.98 – 1.18)</td>
</tr>
</tbody>
</table>

Frasier WD et al. AJOG, 2000;182:1165-72

Meta-Analysis
Management of the Second Stage: The Truth About Laboring Down

RCOG et al

- Delayed vs. Early Pushing
  - With epidural anesthesia
- Delay
  - Longer second stage
  - Reduced pushing time
- No difference: all others, except 2
  - Decreased mid-pelvic procedures
  - Increase fevers

RCOG BJOG, 2004;111:1333-340

Instrumental deliveries

<table>
<thead>
<tr>
<th>Study</th>
<th>n1</th>
<th>n2</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burton et al.</td>
<td>1622</td>
<td>719</td>
<td>1.97 (1.04 to 3.76)</td>
</tr>
<tr>
<td>Finlay et al.</td>
<td>3988</td>
<td>3590</td>
<td>1.14 (0.80 to 1.62)</td>
</tr>
<tr>
<td>Frost et al.</td>
<td>345936</td>
<td>373926</td>
<td>0.91 (0.81 to 1.03)</td>
</tr>
<tr>
<td>Goodfellow et al.</td>
<td>921</td>
<td>1216</td>
<td>0.57 (0.32 to 1.01)</td>
</tr>
<tr>
<td>Hansen et al. (multiples)</td>
<td>1482</td>
<td>1984</td>
<td>0.76 (0.42 to 1.38)</td>
</tr>
<tr>
<td>Hansen et al. (multiples)</td>
<td>245</td>
<td>705</td>
<td>0.24 (0.05 to 1.12)</td>
</tr>
<tr>
<td>Mayberry et al.</td>
<td>2041</td>
<td>2575</td>
<td>0.85 (0.55 to 1.32)</td>
</tr>
<tr>
<td>McQueen et al.</td>
<td>2449</td>
<td>2630</td>
<td>0.87 (0.60 to 1.27)</td>
</tr>
<tr>
<td>Phillips et al.</td>
<td>28117</td>
<td>1685</td>
<td>1.27 (0.74 to 2.20)</td>
</tr>
<tr>
<td>Vance et al.</td>
<td>2588</td>
<td>2867</td>
<td>0.88 (0.56 to 1.39)</td>
</tr>
</tbody>
</table>

Q = 14.6, 6 df, P = 0.01, I² = 38%

RCOG BJOG, 2004;111:1333-340

Second stage caesarean section

<table>
<thead>
<tr>
<th>Study</th>
<th>n1</th>
<th>n2</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burton et al.</td>
<td>22</td>
<td>139</td>
<td>0.29 (0.01 to 0.72)</td>
</tr>
<tr>
<td>Finlay et al.</td>
<td>388</td>
<td>590</td>
<td>0.61 (0.15 to 2.49)</td>
</tr>
<tr>
<td>Frost et al.</td>
<td>47836</td>
<td>53926</td>
<td>0.88 (0.60 to 1.29)</td>
</tr>
<tr>
<td>Hansen et al. (multiples)</td>
<td>0.84</td>
<td>888</td>
<td>0.16 (0.01 to 3.68)</td>
</tr>
<tr>
<td>Mayberry et al.</td>
<td>381</td>
<td>572</td>
<td>0.35 (0.13 to 0.99)</td>
</tr>
<tr>
<td>Phillips et al.</td>
<td>2137</td>
<td>245</td>
<td>0.00 (0.00 to 0.05)</td>
</tr>
<tr>
<td>Vance et al.</td>
<td>1484</td>
<td>207</td>
<td>0.25 (0.00 to 0.25)</td>
</tr>
</tbody>
</table>

Q = 5.6, 6 df, P = 0.48, I² = 0%

RCOG BJOG, 2004;111:1333-340
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Tuuli et al

- Delayed vs. Early Pushing
  - Quality

Tuuli O&G, 2012;120:660-8

Spontaneous Vaginal Delivery

Tuuli O&G, 2012;120:660-8

Length of the Second Stage

Tuuli O&G, 2012;120:660-8
Do we care about a longer 2nd stage?

Rouse et al
- Retrospective cohort (FOX trial)
- 4,126 women, ≥ 36 weeks
- Each hour increase duration of second stage
- Maternal and neonatal outcomes
  - Maternal: chorio, 3rd and 4th degree lacs, atony
  - Neonatal: NICU admission

Le Ray et al
- Retrospective cohort (PEOPLE trial)
- 1,862 nullips with epidurals
- Each hour increase duration of second stage
- Maternal and neonatal outcomes
  - Maternal: chorio, hemorrhage, cesarean
  - Neonatal: lower pH
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Le Ray et al: Probability of SVD without sign of asphyxia (pH > 7.10 and 5-minute Apgar score > 7)

Allen et al
- Population-based cohort
- 121,517 women, low-risk, term
- Duration of second stage
  - Nullips ≥ 3 hrs
  - Multips ≥ 2 hrs
- Maternal and neonatal outcomes
  - Maternal: chorio, trauma, hemorrhage
  - Neonatal: NICU, low Apgar, low pH

Laughon et al
- Retrospective cohort, MFM-U
- 43,810 nullips and 59,605 multips
- 'Prolonged' vs. 'Within guideline' duration
- Adverse maternal and neonatal outcomes
  - Maternal: chorio, severe laceration, hospital stay
  - Neonatal: NICU admission, sepsis, low Apgars
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Grobman et al

- Retrospective cohort study
- 53,285 women at term
- Primary outcomes: cesarean, nn composite
- Longer pushing in nullips and multips:
  - Increased cesarean
  - Increased nn morbidity

Grobman W et al. Obstet & Gynecol 2016; vol 127; 4

Table 4. Multivariable Analysis for the Association of Duration of Active Pushing With Maternal and Neonatal Outcomes in Nulliparous Women

<table>
<thead>
<tr>
<th>Duration of Active Pushing (min)</th>
<th>Cesarean Rate</th>
<th>NVD Rate</th>
<th>5 or More Degrees Laceration</th>
<th>5th or greater degree laceration</th>
<th>Instrumental Vaginal Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 70</td>
<td>29/15 (1.9)</td>
<td>62/17 (3.7)</td>
<td>16/17 (20.0)</td>
<td>147/137 (2.9)</td>
<td>147/137 (2.9)</td>
</tr>
<tr>
<td>70-120</td>
<td>17/14 (1.5)</td>
<td>58/14 (4.0)</td>
<td>16/17 (20.0)</td>
<td>25/17 (1.5)</td>
<td>25/17 (1.5)</td>
</tr>
<tr>
<td>121-180</td>
<td>13/13 (1.2)</td>
<td>51/13 (3.9)</td>
<td>15/16 (18.8)</td>
<td>20/16 (1.2)</td>
<td>20/16 (1.2)</td>
</tr>
<tr>
<td>≥ 181</td>
<td>12/12 (1.0)</td>
<td>49/12 (3.9)</td>
<td>9/10 (20.0)</td>
<td>15/10 (1.2)</td>
<td>15/10 (1.2)</td>
</tr>
</tbody>
</table>

Grobman W et al. Obstet & Gynecol 2016; vol 127; 4

All together …

- Delayed pushing
  - May or may not shorten pushing (in nullips)
  - Prolongs second stage
  - Not improved or worse outcomes
- Prolonged second stage
  - Worse maternal outcomes
  - Worse neonatal outcomes
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About Laboring Down

OMSS
- More than 12,000 nulliparous women were screened
- Neuraxial anesthesia
- 2,400+ randomized at complete dilation to
  - Immediate pushing vs. Delay pushing for 60 min
- Primary outcome: SVD
OMSS - Summary
- Delayed pushing in nullips
  - Does not increase the SVD rate
- Delayed pushing
  - Increase in:
    - Post-partum hemorrhage
    - Chorioamnionitis
    - Neonatal acidemia
    - Neonatal sepsis/suspected sepsis

Cahill AG et al. JAMA 2018;320:14; 1444-1454

Cesarean Prevention

- A specific maximum length of the second stage for all has not been identified
- Allow for the historical amount of time for pushing with epidural
- Longer durations may be appropriate on an individual basis
Second Stage – Questions Remain

- Many...
  - How pushing happens
  - Coached vs. not
  - Oxytocin use and dosing
  - Position
  - How long is too long?

Table 2. Duration of Labor in Hours by Parity in Spontaneous Onset of Labor

<table>
<thead>
<tr>
<th>Cervical Dilation (cm)</th>
<th>Parity 0 (n=23,640)</th>
<th>Parity 1 (n=18,751)</th>
<th>Parity 2+ (n=16,219)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>1.8 (8.1)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4-5</td>
<td>1.3 (6.4)</td>
<td>1.4 (7.3)</td>
<td>1.4 (7.0)</td>
</tr>
<tr>
<td>5-6</td>
<td>0.8 (3.2)</td>
<td>0.8 (3.4)</td>
<td>0.8 (3.4)</td>
</tr>
<tr>
<td>6-7</td>
<td>0.6 (2.2)</td>
<td>0.5 (1.9)</td>
<td>0.5 (1.8)</td>
</tr>
<tr>
<td>7-8</td>
<td>0.5 (1.6)</td>
<td>0.4 (1.3)</td>
<td>0.4 (1.2)</td>
</tr>
<tr>
<td>8-9</td>
<td>0.5 (1.4)</td>
<td>0.3 (1.0)</td>
<td>0.3 (0.9)</td>
</tr>
<tr>
<td>9-10</td>
<td>0.5 (1.8)</td>
<td>0.3 (0.9)</td>
<td>0.3 (0.8)</td>
</tr>
<tr>
<td>Second stage with epidural analgesia</td>
<td>1.1 (3.6)</td>
<td>0.4 (2.0)</td>
<td>0.3 (1.6)</td>
</tr>
<tr>
<td>Second stage without epidural analgesia</td>
<td>0.6 (2.8)</td>
<td>0.2 (1.3)</td>
<td>0.1 (1.1)</td>
</tr>
</tbody>
</table>

Data are median 95th percentiles.

Table 1. Median Station at a Given Cervical Dilation, Stratified by Parity

<table>
<thead>
<tr>
<th>Cervical Dilation (cm)</th>
<th>Nulliparas</th>
<th>Nulliparas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median Value % CI (n=1,593)</td>
<td>Median Value % CI (n=1,593)</td>
</tr>
<tr>
<td>0</td>
<td>87</td>
<td>3-13 (n=2)</td>
</tr>
<tr>
<td>1</td>
<td>200</td>
<td>3-13 (n=1)</td>
</tr>
<tr>
<td>2</td>
<td>375</td>
<td>3-13 (n=1)</td>
</tr>
<tr>
<td>3</td>
<td>572</td>
<td>3-13 (n=1)</td>
</tr>
<tr>
<td>4</td>
<td>769</td>
<td>1.0-15 (n=1)</td>
</tr>
<tr>
<td>5</td>
<td>953</td>
<td>0-25 (n=1)</td>
</tr>
<tr>
<td>6</td>
<td>1,394</td>
<td>0-25 (n=1)</td>
</tr>
<tr>
<td>7</td>
<td>1,671</td>
<td>0-15 (n=1)</td>
</tr>
<tr>
<td>8</td>
<td>1,807</td>
<td>2-30 (n=1)</td>
</tr>
<tr>
<td>9</td>
<td>1,962</td>
<td>2-30 (n=1)</td>
</tr>
</tbody>
</table>

CI confidence interval
Data are in median station 95% confidence interval unless otherwise specified.
Median values calculated on labor type, maternal body mass index, and birth weight greater than 4,000 g.
Thank you