Management of the Term Breech

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UCSF

Financial Disclosures

The speaker has no financial disclosures relating to the content of this seminar.

ACOG Committee Opinion

Number 265 (2001)

"As a result of the findings of the study (Hannah; 2000), planned vaginal delivery of a singleton breech may no longer be appropriate. In those instances in which breech vaginal deliveries are pursued, great caution should be exercised. Patients with a persistent breech presentation at term in a singleton gestation should undergo a planned cesarean delivery."

Introduction

Incidence

• 3 to 5 percent at term

Classification

Anatomic

Frank 65%
Incomplete 28%
Complete 3%
Other 4%

Etiologic Factors in Breech Presentation

<table>
<thead>
<tr>
<th>Etiologic Factor</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prematurely</td>
<td>798</td>
<td>20.6</td>
</tr>
<tr>
<td>Multiple gestation</td>
<td>496</td>
<td>13.1</td>
</tr>
<tr>
<td>Grand multiparity</td>
<td>169</td>
<td>4.4</td>
</tr>
<tr>
<td>Contracted pelvis</td>
<td>60</td>
<td>1.5</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>33</td>
<td>0.8</td>
</tr>
<tr>
<td>Placenta previa</td>
<td>32</td>
<td>0.8</td>
</tr>
<tr>
<td>Uterine anomalies</td>
<td>26</td>
<td>0.6</td>
</tr>
<tr>
<td>Myomas</td>
<td>25</td>
<td>0.6</td>
</tr>
<tr>
<td>Other pelvic tumors</td>
<td>3</td>
<td>0.1</td>
</tr>
<tr>
<td>Unknown</td>
<td>2,224</td>
<td>57.5</td>
</tr>
</tbody>
</table>

Breech Incidence By Birth Weight

<table>
<thead>
<tr>
<th>Weight (gm)</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-999</td>
<td>109</td>
<td>40.5</td>
</tr>
<tr>
<td>1,000-1,499</td>
<td>87</td>
<td>28.8</td>
</tr>
<tr>
<td>1,500-1,999</td>
<td>76</td>
<td>15.3</td>
</tr>
<tr>
<td>2,000-2,499</td>
<td>187</td>
<td>10.6</td>
</tr>
<tr>
<td>2,500-2,999</td>
<td>346</td>
<td>5.1</td>
</tr>
<tr>
<td>3,000-3,499</td>
<td>225</td>
<td>2.2</td>
</tr>
<tr>
<td>4,000-4,499</td>
<td>63</td>
<td>2.2</td>
</tr>
<tr>
<td>4,500-4,999</td>
<td>10</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Congenital Anomalies
Breech 6.3% versus 2.4% In Non-Breech

- Central nervous system
  - Hydrocephalus
  - Anencephaly
  - Meningomyelocele
- Cardiovascular
- Urinary tract
  - Potter’s syndrome

Congenital Anomalies
Breech 6.3% versus 2.4% In Non-Breech

- Respiratory system
- Multiple anomalies
  - Trisomy 18 & 21
  - Fetal alcohol syndrome
  - Myotonic dystrophy
  - Prader-Willi syndrome
  - Werdnig-Hoffman syndrome

Version Scoring System

<table>
<thead>
<tr>
<th>Variable</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity</td>
<td>0</td>
<td>1</td>
<td>≥ 2</td>
</tr>
<tr>
<td>Dilation (cm)</td>
<td>≥ 3</td>
<td>1 -2</td>
<td>0</td>
</tr>
<tr>
<td>EFW (gms)</td>
<td>&gt; 3,500</td>
<td>2,500 - 3,500</td>
<td>&lt; 2,500</td>
</tr>
<tr>
<td>Placenta</td>
<td>Anterior</td>
<td>Posterior</td>
<td>Lateral</td>
</tr>
<tr>
<td>Station</td>
<td>≤ -1</td>
<td>-2</td>
<td>≤ -3</td>
</tr>
</tbody>
</table>

External Version Success
Newman

Score
### Issue Of Parity

Rovinsky (1973) - 1,720 Vaginal Breeches

- **Mortality**
  - Primagravidas: 4.7 per 1,000
  - Multigravidas: 4.6 per 1,000

- **Morbidity**
  - Primagravidas: 11.0 per 1,000
  - Multigravidas: 15.0 per 1,000

- **Asphyxial Morbidity**
  - Primagravidas: 3.5 per 1,000
  - Multigravidas: 11.5 per 1,000

### Review Of Literature

**Term Breech**

- Rosen (1985) - 140 cases
  - No difference in outcome relating to route of delivery in follow-up of ≥ 2 years

- Cibils (1994) - 843 cases
  - Do difference in perinatal mortality

### Review Of Literature

**Prospective Randomized Study**

- Collea (1980) - 208 term breeches
  - Random assignment to route of delivery
  - No difference in perinatal mortality
  - 2 cases of brachial plexus injury in vaginal group
  - 49.3% febrile morbidity in C/S group

### Term Breech - Single Institution

National Maternity Hospital Dublin

- Term, singleton breeches from 1997-2002
- External version offered at 37 weeks’
**Criteria For Trial Of Labor**

- EFW 2,500 to 3,800 grams
- Deepest vertical amniotic fluid pocket ≥ 3 cm
- Normal fetal anatomy and placentation
- No hyperextension of head
- No induction or augmentation
- Normal active phase of labor
- Descent to pelvic floor within 1 hour of being complete
- Delivery after pushing for 1 hour if nullipara and 1/2 hour if multiparas
- Only breech assist deliveries allowed

Alarab et al. (2004)

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**Outcomes**

Route of Delivery

Nulliparas - 375 cases

- Elective C/S - 216 (58%)
- Trial of labor - 158 (42%)
  - Vaginal delivery - 58 (37%)
  - Intrapartum C/S - 100 (64%)

Alarab et al. (2004)

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**Review Of Literature**

**Meta-analyses**

- Cheng & Hannah (1993)
  - Neonatal mortality OR 3.86 CI(2.22-6.69)
  - Traumatic morbidity OR 3.96 CI(2.76-5.67)
- Gifford (1995)
  - Pooled risk for injury was 1.00% for vaginal delivery versus 0.09% after C/S
  - Pooled risk for injury or death was 1.23% for vaginal delivery versus 0.09 for C/S
  - Both differences differ from 1.0

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**Review Of Literature**

**Multi-Institutional Data**

- Goffinet (2006) - 8,105 cases cases
  - Selection criteria
    - normal pelvimetry
    - no hyperextension of neck
    - EFW 2,000 to 3,800 gms
    - frank breech
    - continuous FHR monitoring
    - informed consent
Review Of Literature

Outcomes

Total Cases 8,105
Planned Vaginal delivery 5,579 (68.8%)
   Delivered by C/S 732 (29.0%)
Planned C/S 2,526 (31.2%)
   Delivered vaginally 31 (0.6)%

Goffinet; 2006

Review Of Literature

Outcomes

• Combined neonatal mortality and morbidity low in both groups
  - Odds ratio 1.10  95% CI (0.75-1.61)
  • Statistical significant increases in :
    - 5-minute Apgar score < 7
    - Total injuries

Goffinet; 2006

Review Of Literature

Multi-Institutional Data

• Gilbert (2003) - 100,667 cases
  - CA birth/death certificate data base
  - 3% of all deliveries
  - ≥ 37 weeks
  - Birth weight 2,500 through 3,800 grams
  - Footling and incomplete breech excluded

Gilbert; 2003

Review Of Literature

Breech Cases 100,667

Vaginal Breech
4,952
4.9%

Cesarean Section
95,715
95.1%

Labor
35,297
36.9%

No Labor
60,418
63.1%
**Review Of Literature**

**Neonatal Mortality**

<table>
<thead>
<tr>
<th>Parity</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparous</td>
<td>9.2</td>
<td>3.5-25.6</td>
</tr>
<tr>
<td>Multiparous</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

Gilbert; 2003

**Review Of Literature**

**Neonatal Morbidity**

<table>
<thead>
<tr>
<th>Parity</th>
<th>Odds ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphyxia</td>
<td>5.7</td>
<td>4.5-7.3</td>
</tr>
<tr>
<td>Brachial plexus injury</td>
<td>33.9</td>
<td>15.2-76.1</td>
</tr>
<tr>
<td>Birth trauma</td>
<td>5.8</td>
<td>4.7-7.1</td>
</tr>
<tr>
<td>Multiparous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphyxia</td>
<td>3.9</td>
<td>3.0-5.1</td>
</tr>
<tr>
<td>Brachial plexus injury</td>
<td>22.4</td>
<td>9.9-50.5</td>
</tr>
<tr>
<td>Birth trauma</td>
<td>4.2</td>
<td>3.4-50.5</td>
</tr>
</tbody>
</table>

Gilbert; 2004

**UCSF Approach To Choosing Candidates For Vaginal Breech Delivery**

- Big Pelvis
- Small Baby
- Normal Attitude
- Normal Labor
- Controlled Delivery
  - Epidural anesthesia
  - Uterine relaxation promptly when needed
  - Episiotomy when needed
- Parity and type of breech not an issue
Materials And Methods

Labor Protocol

• Patient discussion of risk, benefits and alternatives
• CT pelvimetry
  - Transverse inlet 12 cm
  - AP inlet 11 cm
  - Interspinous 10 cm
• EFW by ultrasound \( \leq 3,850 \) gms

Oxytocin

Allowed

– Induction of labor
– Augmentation of active phase arrest due to hypotonic uterine activity as documented by IUPC

UCSF Breech Experience 1976-2000

<table>
<thead>
<tr>
<th>No Version Attempted</th>
<th>Term Breech 1,435</th>
</tr>
</thead>
<tbody>
<tr>
<td>682</td>
<td>48%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version Attempted</th>
<th>Successful Version Breech 344 46%</th>
</tr>
</thead>
<tbody>
<tr>
<td>753</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unsuccessful Version Breech 409 54%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Version Vertex 344 46%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breach Evaluated For Trial of Labor 1,091</th>
</tr>
</thead>
</table>

Results

Cases With Successful Versions

• A surprise finding
  - High incidence of cesarean delivery in those pregnancies that had been successfully converted to vertex presentations.
  - 25% as compared to 16% for the rest of term, singleton pregnancies.
• Chan et al (2004) and Vezinia et al. (2004) have reported similar findings.
Outcomes in Latest UCSF Series

Hopkins et al. - 2003

- 1980 to 2001
- 697 were considered for trial of labor

Reasons For Planned C/S

- Breech 460
- Previous C/S 41
- CPD not in labor 4
- Other 6

Reasons For Failed Vaginal Delivery

- Malpresentation 28
- Failed progress of labor 27
- Cord prolapse 9
- Fetal distress 4
- Fetal intolerance of labor 4
- Active bleeding 3
- Failed induction 1

Cases Excluded
- Fetal anomalies
- IUFD before labor
- Maternal factors 70
## Results

### Significant Differences in Demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Planned C/S (N=511)</th>
<th>Planned Vaginal (N=214)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean maternal age (y)</td>
<td>30.1</td>
<td>28.6</td>
<td>0.002</td>
</tr>
<tr>
<td>Mean birth weight (g)</td>
<td>3,355</td>
<td>3,223</td>
<td>0.001</td>
</tr>
<tr>
<td>≥ 4,000</td>
<td>56/511 (11.0%)</td>
<td>9/214 (4.2%)</td>
<td>0.004</td>
</tr>
<tr>
<td>&lt; 4,000</td>
<td>56/511 (89.0%)</td>
<td>205/214 (95.8%)</td>
<td></td>
</tr>
</tbody>
</table>

### Significant Differences in Neonatal Outcomes

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Planned C/S (N=511)</th>
<th>Planned Vaginal (N=214)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission to ICN</td>
<td>12/506 (2.4%)</td>
<td>11/213 (5.2%)</td>
<td>0.047</td>
</tr>
<tr>
<td>Ventilator days</td>
<td>≥ 11/491 (0.2%)</td>
<td>4/200 (2.0%)</td>
<td>0.027</td>
</tr>
<tr>
<td>Mean UA pH</td>
<td>7.24</td>
<td>7.19</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&lt; 7.00</td>
<td>4/407 (0.9%)</td>
<td>12/173 (6.9%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean UA BE</td>
<td>-3</td>
<td>-5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≤ -15</td>
<td>2/396 (0.5%)</td>
<td>5/164 (3.1%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

### Significant Differences in Maternal Outcomes

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Planned C/S (N=511)</th>
<th>Planned Vaginal (N=214)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound infection</td>
<td>14/511 (2.7%)</td>
<td>11/213 (0.5%)</td>
<td>0.037</td>
</tr>
<tr>
<td>Endomyometritis</td>
<td>40/511 (7.8%)</td>
<td>5/214 (2.3%)</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>Other morbidity</td>
<td>233/510 (45.7%)</td>
<td>66/214 (30.8%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean blood loss</td>
<td>824 ml</td>
<td>552 ml</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

### Maternal Demographics

**No Differences**

- Parity
- Ethnicity
- Mean gestational age at delivery
**Perinatal Mortality**

No Difference

C/S Delivery: Late neonatal death from coagulopathy secondary to congenital fibrosis of the liver

Vaginal delivery: Infant with polycythemia experienced air embolism during exchange transfusion

**Maternal Morbidity**

No Difference

1-day fever

DVT

Wound hematoma

Blood transfusion

**Perinatal Morbidity**

No Differences

5-minute Apgar score <4

Neonatal seizures

Facial nerve injury

Brachial plexus injury

RDS

Cephalohematoma

Neonatal fracture

**Hannah Study - 2000**

Material and Methods

- 121 centers in 26 countries
- 2,088 women with frank or complete breech
- Patients excluded
  - Lost to follow-up 5
  - Lethal congenital anomalies 5
- Analysis by intention to treat
- Primary outcomes were neonatal or perinatal mortality
**Hannah Study - 2000**

### Delivery
- Planned C/S - 1,041
  - 941 (90.4%) by C/S
- Planned Vaginal Trial - 1,042
  - 451 (43.3%) by C/S

### Perinatal Morbidity and Mortality
- 1,039 cases
  - 17 (1.6%) C/S vs 52 (5.0%) Vaginal Trial
  - Relative Risk 0.33
  - 95% CI 0.19-0.56; p < 0.001

### Maternal Morbidity and Mortality
- No significant differences between groups

### Detail Of Stillbirths And Neonatal Deaths
- 16 events occurred with 3 in the C/S group and 13 in the trial of labor group
- 1 in the C/S group and 6 in the vaginal trial don’t seem to be related to the planned method of delivery
Causes Of Perinatal Deaths

Planned Vaginal Delivery

• Baby discharged home well and died during sleep. Age at death not given.
• Baby discharged home well and died of severe diarrhea. Age at death not given.
• Two cases of neonatal death because of “respiratory distress”. Birth weights 2,700 and 2,500 g.

Causes Of Perinatal Deaths

Planned Cesarean Section

• Neonatal death of meningomyelocele that ruptured during delivery by C/S

Causes Of Perinatal Deaths

Planned Vaginal Delivery

• IUFD death of a twin probably before randomization FHR lost during 2nd stage of labor.
• IUFD of 3,650 g cephalic presentation prior to labor.

Causes Of Perinatal Morbidity

Planned Cesarean Delivery

14 Cases

• Hypotonia - 2 case
• Abnormal level of consciousness - 6 cases
• Pediatricians not blinded to delivery route
Causes Of Serious Perinatal Morbidity

Planned Vaginal Delivery

39 Cases

- Hypotonia - 18 cases
  - Already gone in 2 hours in 7 of these babies
- Abnormal level of consciousness - 13 cases
  - Pediatricians not blinded to delivery route

Presentation at 2004 SMFM

Secondary Analysis of Hannah’s Data

At four years of age there was no significant difference in the developmental or neurological status of infants in the two groups.

Differences in UCSF and Hannah Study

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>UCSF (%)</th>
<th>Hannah (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvimetry</td>
<td>74%</td>
<td>9%</td>
</tr>
<tr>
<td>Ultrasound for EFW</td>
<td>96%</td>
<td>59%</td>
</tr>
<tr>
<td>Ultrasound for fetal attitude</td>
<td>95%</td>
<td>66%</td>
</tr>
<tr>
<td>Conduction anesthesia</td>
<td>72%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Obstetric Conundrums

The Term Breech Trial is an example of a randomized trial that was impeccable as regards its methodological design, but was questionable as regards its clinical design. Thus, more attention was paid to aspects of power calculation, randomization and interim analysis, and less to clinical outcomes such as reasons for perinatal death and definition of serious neonatal morbidity.
Obstetric Conundrums
As regards the infant, the main concern of vaginal breech delivery is trauma and birth asphyxia due to mechanical difficulties in the second stage of labor; the main concern of elective cesarean section is respiratory distress. These should have been the primary outcomes of the trial, defined by unequivocal criteria with which every obstetrician and pediatrician would agree. If these criteria had been adopted, doubts about the Term Breech Trial would disappear.

John M. Grant, Editor-In-Chief

Maternal Death Related to Cesarean Delivery
Appears To Be Rising

Three Interesting Articles in Birth 38:2 June 2011
• Routine Cesarean Section for Breech: Unmeasured Cost (Kotaska Birth 38:162, 2011)
• The Freezing Aftermath of a Hot Randomized Controlled Trial (Keirse Birth 38:165, 2011

Maternal Death Related to Cesarean Delivery
• 29 year-old G 4, P 3 at Term
• 3 prior term deliveries without complications
• Arrives in active labor with frank breech and fully dilated
• Extension of uterine incision and atony.
• Postpartum hemorrhage from atony.
• Laparotomy & hysterectomy
• Cardiac arrest and maternal death.

How Can We Ever Get Adequate Experience
At cesarean sections
Manikin Models
How Can We Keep Up Our Skills

This isn’t about technical skills, it’s about choosing patients properly.

How Do We Accomplish Change?

- Pressure by women’s groups
- ACOG must support vaginal breech delivery
- The skills in managing term breech delivery must be mandatory part of resident training
- ABOG must test these skills in written and oral examinations

Using this approach has allowed UCSF to provide safe vaginal deliveries for women with a term breech who prefer a trial of labor without any increase in neonatal mortality or significant neonatal morbidity.

rkltiburon@mac.com
Question 1
Which of the following factors is most related to a fetus being in the breech presentation?

1. Multiple gestation
2. Polyhydramnios
3. Prematurity
4. Uterine anomaly
5. Grand multiparity

Question 2
When a term fetus is discovered to be in the breech presentation, what is the increased risk of and it having anomaly?

1. none
2. 1.5 fold
3. 2.5 fold (2.4% to 6.3%)
4. 3.5 fold
5. 4.5 fold

Question 3
Which of the following clinical findings are required to allow a trial of labor in a term breech?

1. Adequate pelvic size
2. Fetus that is not excessively large
3. Normal labor
4. Absence of an extended neck
5. All of the above