Cesarean Delivery on Maternal Request – An Evidence Based Discussion

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Maternal Request Cesarean – Tracing the Origins –

"Prophylactic Cesarean at Term?"
- Infant suffered severe brain damage following intrapartum abruption despite emergency cesarean

“In the light of all these considerations, is it tenable for us to continue to fail to inform patients explicitly of the very real risks associated with the passive anticipation of vaginal delivery after fetal maturity has been reached? If an informed patient opts for prophylactic cesarean section at term, can it be denied? If a patient considers the procedure and decides against it, must she then be required to sign a consent form for the attempt at vaginal delivery? Has something important been overlooked?”

Feldman, G.B. et al NEJM 1985

What is the Scope of the Discussion?

Maternal Request Cesarean – How Common Is It?

(International Data)
- 4-18% of all cesareans
- 14-22% of elective cesareans

Maternal Request Cesarean – How Common is it?

Year Request cesareans in 16 states Percent of total deliveries
1999 29,257 1.56
2000 32,950 1.77
2001 34,792 1.88
2002 40,693 2.21
2003 49,823 2.55

www.healthgrades.com (June 2004)

The Patient Perspective – Why Do They Ask?

- 1999-2000 survey of 3283 women at 583 prenatal clinics in Sweden
- 92/1284 (7.2%) primiparas preferred cesarean
- Only significant predictor: fear of childbirth (tocophobia) OR 5.4 (3.5-8.3)
Maternal Request Cesarean – Obstetricians Weigh In

- 7-30% prefer cesarean for self/partner
- 57-84.5% willing to provide request cesarean

<table>
<thead>
<tr>
<th>Study</th>
<th>Subjects</th>
<th>Chose Vaginal Delivery After Counseling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryding 1993</td>
<td>33</td>
<td>14 (42.4%)</td>
</tr>
<tr>
<td>Sjogren 1997</td>
<td>68</td>
<td>38 (55.8%)</td>
</tr>
<tr>
<td>Saisto 2001</td>
<td>176</td>
<td>130 (73.9%)</td>
</tr>
<tr>
<td>Overall</td>
<td>277</td>
<td>182 (65.7%)</td>
</tr>
</tbody>
</table>

Obstetricians’ Reasons for Preferring Cesarean

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of perineal injury</td>
<td>69-93</td>
</tr>
<tr>
<td>Fear of incontinence: Anal</td>
<td>80-83</td>
</tr>
<tr>
<td>Urinary</td>
<td>80-81</td>
</tr>
<tr>
<td>Sexual function</td>
<td>80-81</td>
</tr>
<tr>
<td>Tocophobia</td>
<td>58-60</td>
</tr>
<tr>
<td>Convenience</td>
<td>17-39</td>
</tr>
<tr>
<td>Control</td>
<td>39</td>
</tr>
<tr>
<td>Pain</td>
<td>7</td>
</tr>
<tr>
<td>Fear of fetal injury</td>
<td>24-40</td>
</tr>
</tbody>
</table>

Maternal Request Cesarean – Is It Ethical?

- Autonomy – permissibility of cesarean with informed consent, including exploration of patients concerns for vaginal delivery
- Justice – resource allocation: unclear as to whether cesarean increases or decreases delivery resources. Need comprehensive cost analysis. Patient should bear costs of autonomy-based decision
- Beneficence and nonmaleficence – only offer treatment that promotes health and welfare of patient. Limited scientific data (lack of long term follow up, psychosocial effects)

Ethics of Maternal Request Cesarean

- Absent data on risks/benefits of cesarean, burden of proof falls on those advocating replacement of natural process with major surgery
- Given lack of data, it is not ethically necessary to initiate discussion regarding risks/benefits of cesarean vs. vaginal delivery with each patient
- If physician believes cesarean promotes health more than vaginal – ethically justified
- If not, ethically obliged to refrain from cesarean and consider referral
- Response to request begins with physician having a good understanding of scientific evidence for & against requested procedure, counsel patient within ethical framework, explore patients concerns

Ethics of Maternal Request Cesarean – FIGO Committee Report

- “At present there is no hard evidence on the relative risks and benefits of term cesarean delivery for non-medical reasons, as compared to vaginal delivery”.
- “Physicians have the responsibility to inform and counsel women in this matter. At present, because hard evidence of net benefit does not exist, performing cesarean for non-medical reasons is ethically not justified.”
Maternal Outcomes by Delivery Route – Mortality

<table>
<thead>
<tr>
<th>Study</th>
<th>Site</th>
<th>Cesarean (per 100,000)</th>
<th>Vaginal (per 100,000)</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lilford 1990</td>
<td>Cape Town 1975-90</td>
<td>23</td>
<td>6</td>
<td>3.8</td>
</tr>
<tr>
<td>Sachs 1998</td>
<td>MA 1954-85</td>
<td>5.8</td>
<td>10.8</td>
<td>0.54</td>
</tr>
<tr>
<td>Lydon Rochelle</td>
<td>WA 1987-96</td>
<td>6.8</td>
<td>8.2</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Maternal Short Term Morbidity by Planned Delivery Route

- Favors planned vaginal
  - infection (cystitis, endometritis)
  - length of stay
  - Re-hospitalization
- Favors planned cesarean
  - hemorrhage
  - perineal injury

Peripartum Maternal Morbidity by Planned Delivery Route

<table>
<thead>
<tr>
<th>Study Reference</th>
<th>Event</th>
<th>Planned Cesarean</th>
<th>Planned Vaginal</th>
<th>Odds Ratio (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective Vertex (n=1)</td>
<td>51/721</td>
<td>18/17,114</td>
<td>4.62</td>
<td>1.1</td>
</tr>
<tr>
<td>Retrospective Preterm Cystitis (n=3)</td>
<td>20/1130</td>
<td>166/1079</td>
<td>1.43</td>
<td>1.0</td>
</tr>
<tr>
<td>No cystitis (n=4)</td>
<td>112/1257</td>
<td>148/1527</td>
<td>0.74</td>
<td>1.0</td>
</tr>
<tr>
<td>Randomized Breach (n=5)</td>
<td>106/1169</td>
<td>89/1227</td>
<td>1.15</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Delivery Route and Implications for Future Reproduction – Abnormal Placentation

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Cesarean (n=19,875)</th>
<th>Vaginal (n=75,755)</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abruption</td>
<td>13.7/1000</td>
<td>10.9/1000</td>
<td>1.3 (1.1-1.5)</td>
</tr>
<tr>
<td>Previa</td>
<td>6.9/1000</td>
<td>4.7/1000</td>
<td>1.4 (1.1-6.6)</td>
</tr>
</tbody>
</table>

Future Reproductive Implications – Previa and Accreta –

- Nationwide case-matched control study Finland 1987-8
- 2nd pregnancy 1987-1993
Future Reproductive Implications

- Fetal Mortality

Scottish case-control study 1980-1998 of >120,000 second births
Linked pregnancy, morbidity, stillbirth records
Prior cesarean associated with 2.23-fold increased risk of unexplained stillbirth after 34 weeks, 1.1/1000 vs. 0.5/1000 at 39 weeks

Smith et al. Supplements 2003

Future Reproductive Implications

- Fetal Mortality

U.S. perinatal mortality data 1995-7
Singletons ≥ 37 weeks
Fetal death rates
- No prior CS 0.8/1000
- One prior CS 0.7/1000
(RR 0.90; 95% CI 0.76-1.06)

Bahloul 2006

Birth Experience and Mental Health

- No difference by route of delivery/perineal status
  - depression
  - dyspareunia
  - sexual functioning
  - satisfaction

Hannah JAMA 2003
Morot Obstet Gynecol 2003
Botros 2006
Baylink J Prenat Perinatal Obstet Gynecol 1998

Birth Experience and Mental Health

- Increased post-traumatic stress
  - emergent cesarean
  - emergent operative vaginal birth

Sjogren Acta Obstet Gynecol 1998
Schindl Acta Obstet Gynecol 2003

Pelvic Floor and Continence

Handa et al. Obstet Gynecol 1996

Pelvic Floor and Continence

Handa et al. Obstet Gynecol 1996
Pelvic Floor and Continence

Studies on Incontinence – Shortcomings –

- Underpowered
- Bias
  - selection (self)
  - ascertainment (incomplete)
  - recall
  - response
- Short-term followup
- Lack of baseline data
  - pre-pregnancy
  - antepartum


Changes in Continence

Measures by Delivery Route

Pregnancy, Delivery, and the Pelvic Floor – Anal Incontinence

Type of Incontinence by Delivery Route

Handa et al OG 1996
Risk Factors for Anal Incontinence

- Sphincter tears
- Instrumental delivery
- Episiotomy
- Birthweight > 4000g
- Pre-existing defecatory symptoms
- Future childbirth
- Age
- Menopause

Role of Sphincter Laceration in Incontinence

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overt</td>
<td>2.4-13%</td>
<td>41-50%</td>
</tr>
<tr>
<td>Occult</td>
<td>12-35% SVD</td>
<td>20%</td>
</tr>
<tr>
<td>71-75% OVD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Risk Factors for Urinary Incontinence

- Prior urinary incontinence
- Urinary incontinence in pregnancy
- Voiding frequency
- Increasing maternal age
- Increasing parity
- Body mass index
- Smoking
- Vaginal delivery
- Episiotomy
- Operative vaginal delivery

AI – Cesarean vs. Vaginal Delivery

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Incontinent (n)</th>
<th>Risk (95% CI)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannah 2004</td>
<td>RCT</td>
<td>8/611</td>
<td>1.10 (0.47-2.95)</td>
<td>1.14 (0.80-1.66)</td>
</tr>
<tr>
<td>Eason 2002</td>
<td>cohort</td>
<td>2/114</td>
<td>0.5 (0.01-2.23)</td>
<td></td>
</tr>
<tr>
<td>Macdonald 2000</td>
<td>survey</td>
<td>4/100</td>
<td>0.88 (0.3-2.0)</td>
<td>0.86 (0.33-2.0)</td>
</tr>
<tr>
<td>Fornell 2004</td>
<td>survey</td>
<td>9/100</td>
<td>0.61 (0.3-1.4)</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Fenner D. Anal Incontinence. NIH-SOS 2006

New Urinary Incontinence in Primiparous Pregnancy

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Incontinence (%)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>Moderate/Severe</td>
<td></td>
</tr>
<tr>
<td>Nulliparous</td>
<td>10.1%</td>
<td>3.7%</td>
</tr>
<tr>
<td>CS Only</td>
<td>15.9%</td>
<td>6.2%</td>
</tr>
<tr>
<td>SVD Only</td>
<td>21.0% OR 2.3 (2.0-2.6)</td>
<td>8.7%</td>
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Postpartum Urinary Incontinence – Long-Term Issues –

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<tr>
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<th>Incontinence (%)</th>
<th>Notes</th>
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<td>Moderate/Severe</td>
<td></td>
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Postpartum Urinary Incontinence – Long-Term Issues

<table>
<thead>
<tr>
<th></th>
<th>Any Incontinence</th>
<th>Moderate/Severe Incontinence</th>
<th>SUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparous</td>
<td>15.2%</td>
<td>5.3%</td>
<td>9.6%</td>
</tr>
<tr>
<td>CS Only</td>
<td>28.6%</td>
<td>14.3%</td>
<td>12.2%</td>
</tr>
<tr>
<td>SVD Only</td>
<td>30.0%</td>
<td>14.2%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

Rottveil NEJM 2003

Postpartum Urinary Incontinence – Nulliparous Women and Parous Sisters

- 143 pairs nulliparous/parous postmenopausal sisters
- 101 pairs completed questionnaire + clinical evaluation
  - cough stress test
  - prolapse
  - bladder scan for PVR
  - urethral mobility
- No difference in type or severity of urinary incontinence
- High concordance (63%) between sisters (p=0.002)

Buchbbaum GM et al Obstet Gynecol 2003

Urinary Incontinence – Northwestern Twins Study

- Survey of 271 identical twin pairs
- SUI associated with:
  - BMI >30 OR 3.14 1.50, 6.56
  - Delivery mode (vaginal vs any cs) OR 2.28 1.14, 4.55
- "Bothersome" SUI 2.28 P=0.44

Goldberg RP et al AJOG 2005

Financial Costs of Elective Cesarean

- Short term cost analyses cover mix of elective and non-elective CS
- No studies evaluate long-term costs
- Costs vary by country, care system, CS rate

Henderson BJOG 2001
Brost AJOG 2003
Allen AJOG 2005
Declerq OG 2007

Risk of Fetal Mortality ≥ 39 Weeks Gestation

<table>
<thead>
<tr>
<th>Study</th>
<th>Site</th>
<th>Risk (per 1000 births)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feldman 1992</td>
<td>NYC 1987-9</td>
<td>2</td>
</tr>
<tr>
<td>Ingemarsson 1997</td>
<td>Sweden 1982-93</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Primiparous patients

- Demonstrates increasing loss rate with gestational age
- Does not advocate or show advantage of one delivery method over another.

Foley et al AJOG 2005
Is Cesarean Protective Against Fetal Neurologic Injury/Cerebral Palsy?

- Estimated incidence of injury: 2-3/1000 births
- Injuries attribute to intrapartum event: 10%
- Potentially avoidable neurologic injuries: 0.2-0.3/1000

Birth Injury by Route of Delivery

- Nulliparous women delivering 1992-4; 2500-4000g
- CA linked records covering 98% of deliveries
- Frequency/10,000 infants

Birth Injury by Route of Delivery

<table>
<thead>
<tr>
<th>Injury</th>
<th>Cesarean (per 1000)</th>
<th>Vaginal (per 1000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>3.3-4.9</td>
<td>2.6-7.7</td>
</tr>
<tr>
<td>Permanent</td>
<td></td>
<td>0.4-4.0</td>
</tr>
<tr>
<td>Fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>2.1</td>
<td>1.1-1.9</td>
</tr>
<tr>
<td>Clavicle</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Humerus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laceration</td>
<td></td>
<td>74-31.2</td>
</tr>
</tbody>
</table>

Effect of Labor and Vaginal Delivery on Perinatal Lung

- Increased clearance of lung fluid
- More rapid neonatal lung volume development
Neonatal Respiratory Morbidity by Route of Delivery

Summary

- Contribution of CDMR to U.S. CD rate is unclear
- Insufficient evidence to fully evaluate risk/benefit of CDMR vs. PVD
- Professional organizations remain divided on ethics of CDMR
- Decision to perform CDMR should follow ethical principles, individualized discussion and education

Future Research

- Establish true extent of CDMR and attitudes toward CDMR
- Establish “best practices” for PVD
- Large prospective cohort studies of CDMR and PVD maternal/child outcomes
- Large databases for rare but critical outcomes
- Randomized trial PCD vs. PVD
- Evaluate CDMR costs

Resources

- “What Every Pregnant Woman Needs to Know About Cesarean Section 2004”
  www.maternitywise.org
- National Institutes of Health State of the Science Conference Statement
  3/27-9/06 consensus.nih.gov
- Seminars in Perinatology, October 2006