Cesarean Delivery on Maternal Request

Cesarean Delivery on Maternal Request: Wise use of Finite Resources?

A view from the trenches

Cesarean Delivery on Maternal Request

Cesarean section rates are rising in the U.S.A. and were at an all time high of 29% in 2004 (Census Bureau 2004).

“Perfect Storm” of medical, legal and personal choice issues” and “Lack of an opposing view”

Flamm OB-GYN News December 15, 2005

Cesarean Delivery on Maternal Request

Cesarean delivery on maternal request is defined as a cesarean delivery for a singleton pregnancy on maternal request at term in the absence of any medical or obstetric indications.

National Institute of Health State-of-the-Science Conference Statement

Cesarean Delivery on Maternal Request

March 27-29, 2006

Bethesda, Maryland
What is the trend and incidence of cesarean delivery over time in the United States and other countries (when possible, separate by intent)?

What are the short-term (under 1 year) and long-term benefits and harms to mother and baby associated with cesarean delivery by request versus attempted vaginal delivery?

- What factors influence benefits and harms?
- What future research directions need to be considered to get evidence for making appropriate decisions regarding cesarean delivery on request or attempted vaginal delivery?

What are the trends and incidence of cesarean delivery over time in the United States and other countries (when possible, separate by intent)?

It has been estimated, in the United States and internationally, that approximately 4–18% of all cesarean deliveries are on maternal request, but there is little confidence in the validity of these estimates.

![Figure 1. Total and primary cesarean rate and vaginal birth after previous cesarean (VBAC): United States, 1989–2004, Centers for Disease Control](image)
Maternal Outcomes with Moderate-Quality Evidence

- Some authors have proposed an “ideal rate” of all cesarean deliveries (such as 15%) for a population.
- There is no consistency in this ideal rate, and artificial declarations of an ideal rate should be discouraged.
- Goals for achieving an optimal cesarean delivery rate should be based on maximizing the best possible maternal and neonatal outcomes, taking into account available medical and health resources and maternal preferences. Thus, optimal cesarean delivery rates will vary over time and across different populations according to individual and societal circumstances.

Maternal Outcomes with Weak-Quality Evidence Which Favor Planned Vaginal Delivery

- What are the short-term (less than 1 year) and long-term benefits and harms to mother and baby associated with cesarean delivery by request versus attempted vaginal delivery?
- Level I—strong
- Level II—moderate
- Level III—weak
- Level IV—absent

- Some outcome variables had moderate-quality evidence. Both were short-term maternal variables.
- **Hemorrhage.** The frequency of postpartum hemorrhage associated with planned cesarean delivery is less than that reported with the combination of planned vaginal delivery and unplanned cesarean delivery.
- **Maternal length of hospital stay.** Cesarean delivery, planned or otherwise, requires a longer hospital stay than vaginal delivery. However, these analyses are affected by comparing planned and unplanned cesarean deliveries to all vaginal deliveries. Numerous factors may also influence length of hospital stay, including obstetric complications, insurance coverage, regional practice patterns, health care provider and patient preference, and neonatal hospital stay.

- Infection - The rate of infection is lower for all vaginal deliveries than for all cesarean deliveries. Planned cesarean deliveries have lower infection rates than unplanned cesarean deliveries but higher rates than vaginal deliveries.
**Anesthetic Complications**

- Conflicting studies generally show a lower rate of anesthetic complications with planned vaginal delivery than with planned cesarean delivery. However, the surveyed literature has a higher prevalence of general anesthesia and a decreased utilization of regional anesthesia for unscheduled cesarean deliveries than in contemporary practice, which may mitigate the possible advantage for planned vaginal delivery.

- A potential advantage of planned cesarean delivery is the avoidance of emergency induction of anesthesia.

- While in-hospital post-cesarean analgesia practices have improved markedly, less attention has been focused on quantification and management of perineal pain. Reliable information is lacking regarding short-term post-discharge pain.

**Subsequent Placenta Previa**

- The risk of this complication increases with the number of prior cesarean deliveries, advancing maternal age, and parity. A meta-analysis indicates a doubling of risk in women who have had cesarean deliveries compared to women who have had vaginal deliveries.

**Breastfeeding**

- Early and sustained breastfeeding is an important practice promoting infant and child health.

- A meta-analysis found that women who had cesarean delivery (planned and unplanned combined) were more likely to bottle feed than women who had vaginal deliveries.

- However, social practices and medical factors (early bonding or infant isolation from mother who had cesarean delivery, medical complications, neonatal intensive care unit [NICU] admissions and specifics of surgical recovery) may delay the initiation of breastfeeding.

- Limited data from randomized controlled trials indicate no difference in the duration of breastfeeding when planned cesarean delivery and vaginal deliveries were compared within the first year.

**Maternal Outcomes with Weak-Quality Evidence That Favor Cesarean Delivery on Maternal Request**

- **Urinary incontinence** - Studies indicate that the rate of stress urinary incontinence (SUI) after elective cesarean delivery is lower than for vaginal delivery, but the duration of this effect is not clear, particularly in older populations and in women who had multiple deliveries.

- There is evidence that the risk of SUI may be increased when forceps are used to assist vaginal delivery.

- Urinary incontinence is multifactorial, and reduction in SUI associated with cesarean delivery on maternal request may be partially offset by other processes including advancing age and increases in body-mass index (BMI).
Surgical and Traumatic Complications

- The evidence consistently indicates a lower risk of surgical complications in elective cesarean than in unplanned cesarean delivery resulting from attempted vaginal delivery.
- Among planned vaginal delivery, which includes assisted deliveries and in-labor cesareans, there is a significantly higher rate of obstetric trauma than among planned cesarean delivery.
- The net direction of the evidence thus favors planned cesarean delivery.
- However, the frequency of obstetric trauma, such as third and fourth degree perineal lacerations, can be reduced by labor management practices such as reducing the use of midline episiotomy and limiting the use of forceps delivery whenever possible.

Maternal Outcomes With Weak-Quality Evidence That Are Sensitive to Parity and Planned Family Size

Subsequent Uterine Rupture

- Uterine rupture is a concern in subsequent pregnancies. Meta-analyses provide consistent evidence that the incidence of uterine rupture during attempted VBAC is significantly higher than with elective repeat cesarean delivery.

Hysterectomy

- Existing evidence from weak-quality studies has shown no difference in the risk of peripartum hysterectomy among those with first planned vaginal delivery or planned cesarean delivery, although these studies generally lacked adequate power to examine these outcomes.
- However, there is convincing evidence of increased risk of hemorrhage and hysterectomy in patients with multiple cesarean deliveries; decisions regarding route of delivery should be influenced by the number of pregnancies expected or planned.
- The risk of hysterectomy for placenta previa and placenta accreta increases sharply with increasing numbers of cesarean deliveries.
- For the women with one prior cesarean delivery, a decision-analysis indicated that cesarean delivery likely will result in fewer hysterectomies because of the decreased incidence of uterine rupture. However, in women with multiple cesarean deliveries, the likelihood of hysterectomy is elevated because of the increased frequency of placenta accreta.
**Subsequent Fertility**

- Cohort studies have demonstrated a reduction in subsequent pregnancies in women with cesarean delivery compared to those who delivered vaginally. This effect may be due to voluntary limitation of family size.

**Sexual Function**

- Any differences in sexual function based on route of delivery were no longer evident by 6 months postpartum.

- Factors that affect sexual functioning, such as changing family roles, relationship satisfaction, physical recovery or continuing morbidities, mood, and lack of sleep, have not been adequately studied.

**Maternal Outcomes with Weak-Quality Evidence That Favor Neither Delivery Route**

**Anorectal function**

- Several case-control studies supply weak-quality evidence for reduced risk of anal incontinence in planned cesarean delivery compared with unplanned cesarean deliveries or instrumental vaginal deliveries.

- The data demonstrate an association between anal sphincter disruption and fecal incontinence.

- Use of midline episiotomy and use of forceps are associated with sphincter disruption.

- Limiting these practices can reduce the frequency of this injury.

**Pelvic Organ Prolapse**

- While evidence regarding different modes of delivery is weak, reliable data indicate an association between pelvic organ prolapse and parturition: relative risk increasing with parity.

- Other data suggest an association between some vaginal deliveries and levator muscle, connective tissue, and pelvic nerve injury that may be the cause of pelvic organ prolapse or stress incontinence.

- However, the precise relationship with these conditions, as well as possible modifiers of labor management to avoid such injuries, remains to be delineated.
Subsequent Stillbirth

- There were inadequate data to judge a difference between delivery routes for this outcome.
- Although a recent retrospective cohort study suggested higher stillbirth risk in subsequent pregnancies in women who had a previous cesarean delivery, the lack of documentation of the indication for the prior cesarean delivery limits interpretation of this outcome.

Maternal Mortality

- Existing studies were inadequately powered to evaluate maternal mortality.

Neonatal Outcome with Moderate-Quality Evidence that Favors Planned Vaginal Delivery

Respiratory Morbidity

- Evidence indicates that respiratory morbidity, which is sensitive to gestational age, is higher for cesarean deliveries than for vaginal deliveries.
- Studies consistently report increasing respiratory morbidity with elective cesarean delivery compared to planned vaginal delivery with gestational ages earlier than 39–40 weeks of gestation.
- Most of the respiratory problems that accompany cesarean delivery result from delays in neonatal transition, such as transient tachypnea of the newborn and mild respiratory distress syndrome (RDS).
- Infrequently, infants can develop severe respiratory failure and pulmonary hypertension.

Neonatal Outcomes with Weak-Quality Evidence That Favor Planned Vaginal Delivery

Iatrogenic Prematurity

- No studies directly addressed unexpected prematurity and allowed comparisons by type of cesarean delivery with intended or actual vaginal delivery.
- However, there is an approximate doubling of the rates of respiratory symptoms and other problems of neonatal adaptation (e.g., hypothermia, hypoglycemia) and NICU admissions for infants delivered by cesarean delivery for each week below 39–40 weeks of gestation.
Therefore, cesarean delivery on maternal request may be associated with a number of neonatal morbidities.

These effects can be minimized if gestational age is accurately known, lung maturity is documented, and elective cesarean delivery is not performed before 39 weeks of gestation.

Neonatal Length of Hospital Stay

- Evidence indicates that neonatal length of hospital stay is longer for elective cesarean delivery than for vaginal delivery.
- Length of stay may be increased when delivery is complicated.

Neonatal Outcomes with Weak-Quality Evidence That Favor Cesarean Delivery on Maternal Request

Fetal Mortality

- Based on epidemiologic modeling, there is an increased risk of stillbirth in the planned vaginal delivery group, because planned cesarean delivery would result in delivery by 40 weeks of gestation, and planned vaginal delivery could occur up to 42 weeks of gestation.

Intracranial Hemorrhage, Neonatal Asphyxia and Encephalopathy

- Consistently higher rates of intracranial hemorrhage are observed in operative vaginal delivery and cesarean delivery in labor, suggesting cesarean delivery on maternal request should be associated with lower risk of intracranial hemorrhage than the aggregate of spontaneous and assisted vaginal deliveries that comprise planned vaginal delivery.
- Evidence indicates a lower risk of neonatal asphyxia and encephalopathy with elective cesarean delivery compared to operative and spontaneous vaginal deliveries plus emergency or labored cesareans, which comprise planned vaginal delivery.
Birth Injury and Laceration

- The incidence of brachial plexus injury is significantly lower in cesarean delivery than in spontaneous vaginal delivery and significantly lower than in assisted vaginal delivery.

- There is an increased rate of fetal lacerations among emergency and labored cesarean deliveries than among elective cesarean delivery, suggesting that cesarean delivery on maternal request poses no additional risk for fetal lacerations beyond those associated with planned vaginal delivery.

Neonatal Infection

- Infants born by planned vaginal delivery have more evaluations for infection than do infants delivered by planned cesarean delivery. The incidence is also increased.

Neonatal Outcome that Favors Neither Planned Delivery Route

- Studies of neonatal mortality lacked statistical power. Poor data quality limited interpretation of studies on long-term neonatal outcomes.

Summary

- With the exception of three outcome variables with moderate-quality evidence (maternal hemorrhage, maternal length of stay, and neonatal respiratory morbidity), all remaining outcome assessments considered by the panel were based on weak evidence. This significantly limits the reliability of judgments regarding whether an outcome measure favors either cesarean delivery on maternal request or planned vaginal delivery.
At the other end of the spectrum are absolute medical indications, such as placenta previa. It may be difficult to identify the precise point along this continuum at which the request for cesarean delivery is not medically indicated.

**Patient Specific Factors**

- Age is an important and independent risk factor for cesarean delivery.
- Childbearing plans influence harms and benefits of cesarean delivery on maternal request. Morbidity and serious complications increase substantially in women with increasing numbers of pregnancies.

**What Factors Influence Benefits and Harms?**

- Obesity is a known risk factor for cesarean delivery and for postoperative surgical morbidity such as infectious complications and venous thromboembolism.
- Obesity is also a risk factor for urinary incontinence and pelvic floor disorders. Additionally, obesity significantly increases the risks associated with an emergent cesarean delivery during labor. Current evidence does not provide a clear estimate of the risks and benefits of cesarean delivery on maternal request in obese women.
Accuracy of estimated gestational age and the calculated estimated date of confinement (due date) can substantially affect the risk/benefit ratio of cesarean delivery on maternal request because neonatal respiratory morbidity decreases with increasing gestational age.

Psychological factors may influence maternal decisions regarding mode of delivery. Personality factors, such as a need to be in control of the birth process, may be paramount for some women. Life-altering experiences, such as interpersonal violence, traumatic delivery, or infant death, can lead to symptoms of posttraumatic stress disorder, depression, or feelings of guilt that influence a woman’s decision.

Cultural and Social Issues

Health Care Provider Type and Professional Resources
What do Professional Organizations say?

ACOG: Committee on Ethics’ surgical consent used CDMR as an example:
- **CDMR is justified** if OB believes overall health of patient and fetus greater with CDMR than with vaginal
- **CDMR is not justified** if OB does not believe CDMR is beneficial over vaginal

SOGC: “Vaginal birth remains preferred approach and safest option for most women, and carries with it less risk of complication in pregnancy and subsequent pregnancy.”

NICE/RCOG: "Maternal request is not on its own an indication for CS. An individual clinician has the right to decline a request for CS in the absence of an identifiable reason...she should be offered referral for second opinion."

FIGO (WHO): Absence of evidence of benefit; potential drain on resources. Not ethically justified.
NIH State-of-the-Science Conference:

- Insufficient evidence to recommend one mode of delivery over the other
- Decision for CDMR should be individualized, consistent with ethical principles
- More prospective research needed

SOGC—Society of Obstetricians and Gynaecologists of Canada
NICE—National Institute for Health and Clinical Excellence
RCOG—Royal College of Obstetricians and Gynaecologists
FIGO—International Federation of Gynecology and Obstetrics

What future research directions need to be considered to get evidence for making appropriate decisions regarding cesarean delivery on request or attempted vaginal delivery?

Conclusions

- The incidence of cesarean delivery without medical or obstetric indications is increasing in the United States, and a component of this increase is cesarean delivery on maternal request. Given the tools available, the magnitude of this component is difficult to quantify.

- There is insufficient evidence to evaluate fully the benefits and risks of cesarean delivery on maternal request as compared to planned vaginal delivery, and more research is needed.

- Until quality evidence becomes available, any decision to perform a cesarean delivery on maternal request should be carefully individualized and consistent with ethical principles.

- Given that the risks of placenta previa and accreta rise with each cesarean delivery, cesarean delivery on maternal request is not recommended for women desiring several children.

- Cesarean delivery on maternal request should not be performed prior to 39 weeks of gestation or without verification of lung maturity, because of the significant danger of neonatal respiratory complications.
- Maternal request for cesarean delivery should not be motivated by unavailability of effective pain management. Efforts must be made to assure availability of pain management services for all women.

- NIH or another appropriate Federal agency should establish and maintain a Web site to provide up-to-date information on the benefits and risks of all modes of delivery.

### Costs of Cesarean Section versus Trial of Labor

<table>
<thead>
<tr>
<th>Costs</th>
<th>Costs</th>
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<tbody>
<tr>
<td>Vaginal delivery without complications</td>
<td>$4490 (2245-6735)</td>
</tr>
<tr>
<td>Vaginal delivery with complications</td>
<td>$5560 (2780-8340)</td>
</tr>
<tr>
<td>C-Section without complications</td>
<td>$6946 (3473-10419)</td>
</tr>
<tr>
<td>C-Section with complications</td>
<td>$8553(4277-12,830)</td>
</tr>
</tbody>
</table>

References:
Other Associated Costs

- High Occupancy

Other Associated Costs

- OB Critical Care Transport Diversion
  - 2003
    - Occupancy 86.9%
    - Diversion n=78
  - 2004
    - Occupancy 85.5%
    - Diversion n=46
  - 2005
    - Occupancy 86%
    - Diversion n=46

Other Associated Costs

- Placenta accreta and resultant resource mobilization

“The incidence of placental accreta, associated with advancing maternal age, prior cesarean delivery, and previa, is increasing in conjunction with the rate of cesarean delivery.”

Abnormal placentation: Twenty-year analysis
Wu et al. AJOG 2005
Other Associated Costs

- Placenta Accreta
  - MRI
  - Interventional Radiology
  - Transfusion
  - Hysterectomy
  - ICU

Other Associated Costs

- Neonatal Impact

  “Infants born by scheduled cesarean delivery are more likely to require advanced nursery support than infants born to mothers attempting vaginal delivery.”

  Neonatal impact of elective repeat cesarean delivery at term: A comment on patient choice cesarean delivery
  Fogelson et al. AJOG 2005

Cesarean Section and Secondary Diagnosis of Postpartum Hemorrhage

Average Length of Stay (ALOS) - Days

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
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<tr>
<td>Days</td>
<td>4.8</td>
<td>5.08</td>
<td>6.47</td>
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LPCH Diagnosis Related Group (DRG)

Closing Thoughts

- An increased cesarean section rate carries an economic cost
- As of 2004 there were 45.8 million Americans without health insurance (Census Bureau 2004)

- On the basis of the principle of Autonomy, an individual woman’s right to undergo an elective cesarean section on request should be respected
  
  HOWEVER
Closing Thoughts

The promotion of primary cesarean section on request
✦ as standard of care
✦ or as a mandated part of patient counseling for delivery
will result in a highly questionable use of finite resources.