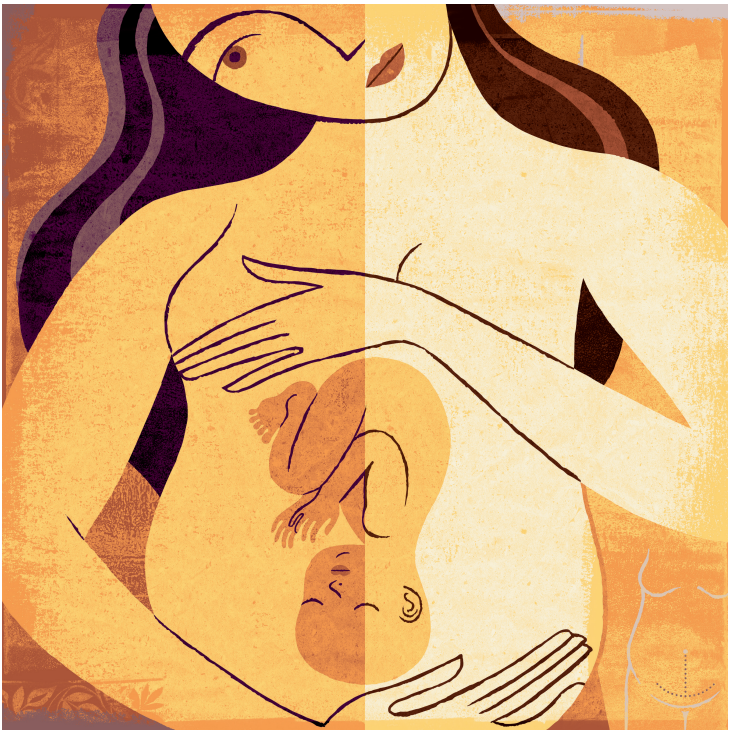
NIH State-of-the-Science Conference Statement on

Cesarean Delivery on Maternal Request



NIH Consensus and State-of-the-Science Statements

Volume 23, Number 1
March 27–29, 2006

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National Institutes of Health (NIH) consensus and state-of-the-science statements are prepared by independent panels of health professionals and public representatives on the basis of 1) the results of a systematic literature review prepared under contract with the Agency for Healthcare Research and Quality (AHRQ), 2) presentations by investigators working in areas relevant to the conference questions during a 2-day public session, 3) questions and statements from conference attendees during open discussion periods that are part of the public session, and 4) closed deliberations by the panel during the remainder of the second day and the morning of the third. This statement is an independent report of the panel and is not a policy statement of the NIH or the federal government.

The statement reflects the panel's assessment of medical knowledge available at the time the statement was written. Thus, it provides a "snapshot in time" of the state of knowledge on the conference topic. When reading the statement, keep in mind that new knowledge is inevitably accumulating through medical research, and that the information provided is not a substitute for professional medical care or advice.

Reference Information

For making bibliographic reference to this statement, it is recommended that the following format be used, with or without source abbreviations, but without authorship attribution:

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The Evidence Report prepared for this conference by the Agency for Healthcare Research and Quality is available on the Web via ***http://www.ahrq.gov/clinic/tp/cesarreqtp.htm***. Printed copies may be ordered from the AHRQ Publications Clearinghouse by calling 1-800-358-9295. Requestors should ask for AHRQ Publication No. 06-E009.

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Disclosure Statement

All of the panelists who participated in this conference and contributed to the writing of this statement were identified as having no financial or scientific conflict of interest, and all signed forms attesting to this fact. Unlike the expert speakers who present scientific data at the conference, the individuals invited to participate on NIH Consensus and State-of-the-Science panels are reviewed prior to selection to assure that they are not proponents of an advocacy position with regard to the topic and are not identified with research that could be used to answer the conference questions.

For more information about conference procedures, please see ***http://consensus.nih.gov/aboutcdp.htm***.

Archived Conference Webcast

The NIH State-of-the-Science Conference on Cesarean Delivery on Maternal Request was webcast live March 27–29, 2006. The webcast is archived and available for viewing free of charge at ***http://consensus.nih.gov/previousstatements.htm***.

Abstract

Objective

To provide health care providers, patients, and the general public with a responsible assessment of currently available data on cesarean delivery on maternal request.

Participants

A non-DHHS, nonadvocate 18-member panel representing the fields of obstetrics and gynecology, preventive medicine, biometrics, family planning and reproductive physiology, nurse midwifery, anesthesiology, patient safety, epidemiology, pediatrics, perinatal medicine, urology, urogynecology, general nursing, inner city public health sciences, law, psychiatry, and health services research. In addition, 18 experts from pertinent fields presented data to the panel and conference audience.

Evidence

Presentations by experts and a systematic review of the literature prepared by the RTI International–University of North Carolina Evidence-based Practice Center, through the Agency for Healthcare Research and Quality. Scientific evidence was given precedence over anecdotal experience.

Conference Process

The panel drafted its statement based on scientific evidence presented in open forum and on published scientific literature. The draft statement was presented on the final day of the conference and circulated to the audience for comment. The panel released a revised statement later that day at ***http://consensus.nih.gov***. This statement is an independent report of the panel and is not a policy statement of the NIH or the Federal Government.

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.

Introduction

Since the late 1970s, the United States cesarean delivery rate has received considerable attention. Primary and repeat cesarean delivery rates for all women have now reached their highest levels. 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. Cesarean delivery on maternal request is a subset of elective cesarean delivery. Elective cesarean delivery includes a planned cesarean delivery for a wide range of maternal and fetal indications and is generally distinguished from emergency cesarean delivery and "labored" cesarean delivery after planned vaginal delivery. In 2004, 1.2 million or 29.1 percent of live births in the United States were by cesarean delivery. Internationally and domestically, estimates of cesarean delivery on maternal request range from 4 to 18 percent of all cesarean deliveries; however, there is little confidence in the validity of this estimate. Limited evidence suggests that cesarean delivery on maternal request is increasing, but it is unclear why. Cesarean delivery on maternal request should be guided by the best possible information regarding potential health outcomes for both mother and baby. Toward that end, the National Institute of Child Health and Human Development (NICHD) and the Office of Medical Applications of Research (OMAR) of the National Institutes of Health (NIH) convened a State-of-the-Science Conference from March 27 to 29, 2006, to assess the available scientific evidence relevant to the following questions:

- What are the trends 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?

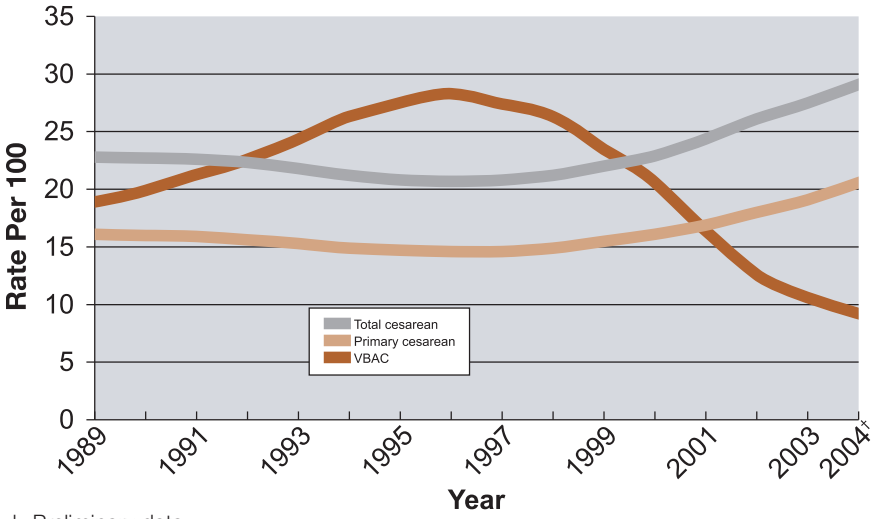
- What factors influence benefits and harms?
- What future research directions need to be considered to get evidence for making appropriate decisions regarding cesarean delivery on request or attempted vaginal delivery?

An impartial, independent panel was charged with reviewing the available published literature in advance of the conference, including a systematic literature review commissioned through the Agency for Healthcare Research and Quality (AHRQ). The first day and a half of the conference consisted of presentations by expert researchers and practitioners as well as open public discussions. The panel held a press conference to address questions from the media. The draft statement was published online.

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

After rapid increases in the 1970s and early 1980s, total cesarean delivery rates in the United States declined in the late 1980s through to 1996, after which they again increased. In 2004, the rate of cesarean delivery was 29.1 percent, the highest ever reported. One of the major drivers of the overall increase in cesarean delivery has been that, after a first cesarean delivery, the likelihood of cesarean delivery increases in subsequent pregnancies. The increase in primary cesarean delivery parallels the total cesarean delivery rate, which cannot, therefore, be explained by the decreasing use of vaginal birth after cesarean (VBAC) (Figure 1).

Figure 1. Total and primary cesarean rate and vaginal birth after previous cesarean (VBAC): United States, 1989–2004, Centers for Disease Control



† Preliminary data
1 Number of vaginal births after previous cesarean per 100 live births to women with a previous cesarean delivery.
2 Percentage of all live births by cesarean delivery.
3 Number of primary cesarean deliveries per 100 live births to women who have not had a previous cesarean.

Note: Due to changes in data collection from implementation of the 2003 revision of the U.S. Standard Certificates of Live Birth, there may be small discontinuities in rates of primary cesarean delivery and VBAC in 2003 and 2004.

Primary cesarean delivery is increasing in all ethnic and age groups. In the absence of any increase in known clinical risk factors for primary cesarean delivery, it is plausible that some of the primary cesarean delivery increase is because of cesarean delivery on maternal request. However, cesarean delivery on maternal request is not readily identifiable in any existing studies or U.S. national databases, either currently or historically. It has been estimated, in the United States and internationally, that approximately 4 to 18 percent of all cesarean deliveries are on maternal request, but there is little confidence in the validity of these estimates. One published study of

primary cesarean delivery with "no indicated risk," using national U.S. birth certificate data from 1991 to 2001, showed overall increases from 3.3 to 5.5 percent of all live births, with higher rates in older primiparous women (increases in primiparous women age 40 and older from 18.2 to 25.7 percent). However, birth certificates do not indicate "maternal request," so these reports cannot be used to confidently infer cesarean delivery on maternal request. It is also suggested, using statistical algorithms to identify women requesting cesarean delivery, that cesarean delivery without labor or some medical indication has increased from 1.9 percent of all deliveries in 2001 to 2.6 percent in 2003, but this too requires confirmation.

Other countries report cesarean delivery rates increasing over recent time but generally at lower levels than found in the United States. For example, in Canada, the overall cesarean delivery rate increased from 18.0 percent in 1994–1995 to 22.1 percent in 2000–2001. Similarly, most countries do not collect information specifically about patient choice, and information that is reported comes from special surveys. One hospital in Italy reported that maternal request rose from 4.5 percent of all cesarean deliveries in 1996 to 9 percent in 2000. A Swedish hospital reported increases from 8.9 percent in 1994 to 15.8 percent in 1999, and in Norway, in 1998–1999, a national survey found 7.6 percent of all cesarean deliveries performed were by maternal request. Taiwan has a national database that codes for cesarean deliveries performed at maternal request. The rate of deliveries so coded increased from 2 percent (of all women without a clinical indication for cesarean delivery) in 1997 to 3.5 percent in 2001, with higher increases in women 35 and older (respectively, 3.6 percent increased to 6.6 percent). Because in Taiwan cesarean delivery on maternal request is only reimbursed at the cost of vaginal deliveries, these rates may be spuriously low.

Some authors have proposed an "ideal rate" of all cesarean deliveries (such as 15 percent) 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.

Indications for cesarean delivery represent a continuum ranging from clear medical need, such as placenta previa, to women with no risk factors who declare a preference for cesarean delivery well before labor. Many women have multiple indications for cesarean delivery in the same pregnancy. This makes it problematic in many cases to determine whether or not a specific cesarean delivery is due to maternal request. Hence, the collection of precise statistics on prevalence of cesarean delivery by indication is difficult.

2. 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?

Framework of the Evidence Analysis

The plan for the evidence review was to assess the state of the science regarding outcome differences in women who elect planned cesarean delivery versus planned vaginal delivery. The planned cesarean delivery group is assumed to consist of women who elect cesarean delivery by 39–40 weeks of gestation including those who had experienced onset of spontaneous labor prior to their scheduled cesarean delivery dates. The planned vaginal delivery group is heterogeneous because it consists of women electing vaginal delivery who will have spontaneous or assisted vaginal delivery or indicated cesarean delivery after labor or spontaneous rupture of membranes up to 42 weeks of gestation.

Good quality evidence directly assessing differences in outcomes between planned cesarean delivery and planned vaginal delivery is sparse; thus, the analysis frequently relies on proxy definitions such as “scheduled cesarean” for “planned cesarean” and “vaginal births plus emergency

cesareans" for "planned vaginal delivery." A number of potential outcomes were not assessed due to a lack of data availability or clarity. Among these were hospital readmissions, adhesions, and chronic abdominal and pelvic pain syndrome.

The panel considered data summarized in the Evidence-based Practice Center (EPC) Report, additional evidence identified separately from cohort and case-control studies, and input from the invited speakers and audience participants at the NIH State-of-the-Science Conference.

Quality and Relevance of the Evidence

For the evidence obtained from the EPC report, the panel utilized an evidence quality grading scale provided within the document: Level I—strong, Level II—moderate, Level III—weak, and Level IV—absent. No Level I evidence was found, three outcomes had Level II evidence, and the remaining outcomes were Level III or IV. Interpretation of many outcome variables was confounded by a lack of appropriate comparison groups, a lack of consistency in outcome definitions, and the frequent use of composite outcomes.

Maternal Outcomes with Moderate-quality Evidence

Two 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 does. 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.

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

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 quantitation 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 peripartal 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.

Maternal Outcomes with Weak-quality Evidence That Favor Neither Delivery Route

Inconsistent assessments and variable definitions prevented judgment regarding risks by delivery route for the following outcomes: anorectal function, postpartum pain, postpartum depression, sexual function, pelvic pain, and fistula. For thromboembolism, there was conflicting evidence. The following outcomes warrant further discussion.

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.

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.

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 morbidity.

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.

3. What factors influence benefits and harms?

For most women, vaginal birth is the norm. Indications for cesarean delivery vary widely and present as a spectrum. Fear of labor and its potential complications as well as desire for control stand at one end of the spectrum and may be influenced by a woman's personal experiences. 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. Although the potential benefits and harms favor neither planned vaginal delivery nor cesarean delivery on maternal request, there are patient-specific, cultural, and societal factors; health care provider issues; professional resources; and ethical issues that could influence the benefits and harms of cesarean delivery on maternal request.

Patient-specific Factors

Age is an important and independent risk factor for cesarean delivery. As women age, subfertility is more common, as is the use of reproductive technologies to achieve pregnancy. Complications in labor may be associated with increasing maternal age and with the use of reproductive technologies. Given that an increasing number of women are choosing to delay having their first child, the relative benefits of cesarean delivery on maternal request may outweigh the risks.

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. Therefore, planned vaginal delivery provides an improved benefit/risk ratio for women who desire several children.

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. Uncertainty regarding gestational dating is not uncommon and can lead to estimated dates that are inaccurate by 2 or 3 weeks. Elective cesarean delivery at presumed 39 weeks of gestation has the potential to result in neonatal respiratory morbidity. Therefore, adherence to established guidelines to increase the accuracy of gestational age is imperative when making the decision to provide cesarean delivery on maternal request.

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. Such experiences or illnesses can cause ambivalence regarding the pregnancy, or even an overwhelming fear of labor and delivery. Satisfaction with birth and quality of postpartum life are important outcomes of the delivery process, few data are available to facilitate an understanding of these factors. Anxiety about delivery and feelings of inadequacy regarding labor can complicate the decisionmaking process. Given the potential of such potent psychological factors, the line between what constitutes an acceptable "medical indication" and what is not medically indicated becomes less clear.

Cultural and Societal Issues

Cultural beliefs and practices influence perceptions and desires regarding labor and delivery. Some cultures have developed rituals and customs associated with vaginal birth. Active participation in the process of labor and birth are important experiences with significant psychological benefits. Other women may attribute less importance to the specifics of delivery and value the control of the process afforded by cesarean delivery as a benefit. In any discussion of the relative benefits and risks of

cesarean delivery on maternal request versus planned vaginal delivery, the cultural and personal importance of labor and delivery should be valued.

A consequence of the increasing rates of cesarean delivery is that this mode of delivery may be perceived as the norm. The perception that the risks of cesarean delivery are similar or lower than attempted VBAC and the shift away from vaginal breech deliveries may further contribute to societal acceptance of cesarean births. Media coverage may further increase concerns about the potential morbidity of planned vaginal delivery. Such a shift in acceptance by patients and providers may lead to an increase in cesarean delivery on maternal request.

Health Care Provider Type and Professional Resources

Obstetric health care providers in the United States include midwives, family practice physicians, obstetricians, and maternal–fetal medicine specialists. Factors that influence health care provider attitude contribute to the complexity of the issues surrounding cesarean delivery on maternal request. A health care provider's view of cesarean delivery on maternal request may be influenced by his or her training, practice environment and experience, personal philosophy regarding birth, and medical–legal experiences.

Most births in the United States are managed in a hospital setting. The geographical location and the level of perinatal services in the hospital may be a consideration, especially in the management of a birth that may result in cesarean delivery. A woman may make a decision regarding delivery site based on the level of care or technology she perceives necessary or desirable. Such consideration may include the availability of anesthesiologists or operating room staff for cesarean delivery, and may extend to the issue of time of day that such services are available. The availability of resources also may influence a provider's recommendation regarding cesarean delivery. Hospital resources such as operating rooms and staff may be factors that influence the decision to schedule a cesarean delivery.

The unpredictability of the timing and length of labor for a health care provider's lifestyle and fatigue level presents challenges to patient safety. Economic considerations, such as insurance coverage, payment, and scheduling conflicts, may also impact a health care provider's decision to perform an elective cesarean delivery. Because of the complexity of these situations and the potential for biased recommendations, women should be fully informed about these issues and actively participate in the decisionmaking process.

Ethical Issues

The foundation of the ethical relationship between a woman and her healthcare providers is based on a respectful partnership that requires the exchange of accurate information and effective communication. In the context of childbirth, this process includes discussions of the relative risks and benefits of planned vaginal delivery, including a realistic assessment of the potential complications and outcomes. If a woman requests information on cesarean delivery in the absence of medical indication, her health care provider should engage in nondirective counseling that incorporates the woman's values and cultural context with sensitivity to the patient's concerns. For example, if the woman has a fear of the pain during labor, pain management strategies should be addressed. If her concern is about future pelvic floor disorders, her health care provider should discuss labor and delivery management to minimize these risks as well as a summary of the relevant scientific data. In every case, discussions should maximize her understanding of the issues and should be specific to her personal needs, such as future reproductive plans, medical risk factors, psychologic needs, social and family situation, and other factors. Risks and benefits of cesarean delivery on maternal request versus planned vaginal delivery must be individualized and based on a shared decisionmaking process. After thorough discussion and review, cesarean delivery on maternal request may be a reasonable alternative to

planned vaginal delivery. When a health care provider cannot support this request, it is appropriate to refer the woman to another health care provider.

Birth is inherently a natural process. Most women would like to achieve a spontaneous vaginal delivery and should be supported in their efforts to achieve that goal. The available evidence and data comparing risks and benefits of planned vaginal delivery and cesarean delivery on maternal request are sparse and provide few clear conclusions. There is no direct evidence comparing cesarean delivery on maternal request to planned vaginal delivery. Because most studies attempting to make a valid comparison fail to adjust for important confounders, inferences about factors that can influence the harms and benefits must be interpreted cautiously. Indirect evidence suggests relatively similar degrees of risk from both pathways in women intending to limit their childbearing to one or two children. Although the ratio of risks and benefits may be similar on a population level, it will vary from woman to woman. Health care providers should consider societal and cultural norms, the environment, and physical resources, as well as individual patient factors. Each woman deserves individualized counseling consistent with ethical principles and based on the available scientific data when discussing the risk/benefit ratio and the option of cesarean delivery on maternal request.

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

- Surveys of women (before and after birth), providers, insurers, and healthcare facilities regarding cesarean delivery on maternal request will provide a basis for assessing the current extent of cesarean delivery on maternal request and attitudes about it.

- Mechanisms should be created to identify cesarean delivery on maternal request, such as establishing Current Procedural Terminology (CPT) coding and improving the birth certificate. This will facilitate tracking and further research on short- and long-term risks and benefits for mothers and children.
- There should be increased research devoted to strategies to predict and influence the likelihood of successful vaginal birth, particularly in the first pregnancy.
- Large multi-center, multidisciplinary prospective cohort studies enrolling participants early in the first pregnancy and following mothers and children long-term are necessary to develop information about the relative benefits and risks of planned vaginal versus planned cesarean delivery.
- For rare but critical outcomes, very large databases will be the only immediately available realistic source of reliable prospective data. Such databases can be explored to assess incidence rates of a variety of outcomes. Well-designed case-control studies also may be helpful.
- The feasibility of randomized trials should be explored. It may be difficult to enroll an adequate number of women willing to be randomized to a planned cesarean delivery versus planned vaginal delivery.
- Future studies should determine whether there are modifiable factors in the management of labor that can decrease maternal and neonatal complications. Furthermore, an attempt should be made to identify subgroups of women at higher risk for complications who would benefit most from planned cesarean delivery on maternal request.
- Studies comparing cesarean delivery on maternal request and planned vaginal delivery should consider the following key outcomes:
  - Maternal
    - Maternal death

    - Placental abnormalities including previa and accreta
    - Pelvic floor disorders (identification of birth-induced injuries responsible for pelvic floor disorders later in life; effects of pregnancy, labor, and delivery on continence and support mechanisms while controlling for effects of aging on pelvic floor; identification of modifiable factors in the management of labor that would decrease risk of future pelvic floor disorders without having to perform cesarean delivery; identifying a population at high risk for development of pelvic floor disorders who would benefit most from cesarean delivery on maternal request)
    - Psychologic factors, including quality-of-life issues and satisfaction with birth experience
  - Neonatal
    - Neonatal death
    - Respiratory outcomes
    - Neonatal encephalopathy, cerebral palsy, and other neurodevelopmental outcomes
    - Brachial plexus injury and other birth injuries
- A thorough assessment of the costs of cesarean delivery on maternal request is warranted. These cannot be simply extrapolated from current costs associated with cesarean delivery overall, which includes expensive emergent procedures. Planned cesarean delivery on maternal request will have different cost implications that should be modeled explicitly.

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.

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