SOUNDING BOARD

Elective Primary Cesarean Delivery

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In 1985, the *Journal* published an article advocating elective cesarean delivery.[1] Although it was provocative, the article had little effect on obstetrical standards. At that time, most efforts within the discipline were focused on arresting the escalation of the rate of cesarean deliveries,[2] which had increased sharply during the preceding decade. Thus, despite that article, the rate of cesarean deliveries peaked a few years after the article appeared and then declined slightly.

Two decades later, the discussion of elective cesarean delivery has been revitalized. The benefit–risk calculus associated with surgery has evolved, as techniques for surgery, anesthesia, infection control, and blood banking have improved and as new data have been published highlighting the potential risks associated with labor and vaginal delivery. Women live longer and have fewer children, making quality-of-life issues such as the long-term risk of incontinence associated with vaginal delivery more prominent and the risks associated with having multiple subsequent repeated procedures less prominent. Maternal autonomy as a central tenet of obstetrical decision making has been reinforced in both law and ethics.[3]

Elective cesarean delivery is no longer a marginal idea. Recent surveys of obstetricians reveal that a substantial minority of physicians would choose that mode of delivery for themselves or their spouses and that an even higher percentage would honor patients' requests for an elective cesarean delivery.[4,5] Perhaps even more striking has been an emerging consensus, even among obstetricians who are not yet convinced of its value, that all women who request elective operative delivery be offered an opportunity to discuss the risks and benefits.[6,7] For example, although the International Federation of Gynecology and Obstetrics concludes in its ethics statement that "performing cesarean deliveries for non-medical reasons is ethically unjustified," the organization also maintains that "physicians have the responsibility to inform and counsel women in the matter."[6] In this article, we will describe what we believe are the relevant components of a response to requests for cesarean delivery, anticipating that obstetricians in the coming years will be asked to counsel women about the risks and benefits of elective cesarean delivery.

BENEFITS OF ELECTIVE CESAREAN DELIVERY

BENEFITS TO THE MOTHER

The most important long-term maternal benefit of cesarean delivery is potential protection of the pelvic floor, reducing the incidence of incontinence of stool, flatus, and urine, as well as pelvic-organ prolapse. The lifetime risk of undergoing at least one operation for pelvic-organ prolapse and urinary incontinence is 11.1 percent overall.[8] A randomized trial comparing elective cesarean delivery with vaginal delivery for a fetus with breech presentation documented an increased risk of urinary incontinence at three months after delivery in the vaginal-delivery group[9]; however, another study that also demonstrated an immediate protective effect of cesarean delivery reported that those benefits had dissipated by three months, suggesting that most postpartum urinary incontinence is transient in nature.[10] A recent large, population-based survey in South Australia showed that disorders of the pelvic floor are strongly associated with aging, pregnancy, and instrument-assisted delivery; cesarean delivery was not associated with a significant reduction in pelvic-floor disorders over the long term as compared with spontaneous vaginal delivery.[11] However, most observational studies support the protective effect of cesarean delivery. Some suggest that the benefit is maximized when cesarean delivery is performed before the onset of labor.[12,13]

In this issue of the *Journal*, Rortveit et al.[14] provide further evidence that the risk of urinary incontinence is increased after vaginal delivery. Their analysis suggests that a prophylactic cesarean delivery

might reduce a woman's risk of moderate or severe urinary incontinence from 10 percent to 5 percent. However, the applicability of their findings (in a population with a relatively low rate of cesarean delivery) to a U.S. population is unclear.

Another potential maternal benefit of elective cesarean delivery is the avoidance of emergency cesarean section, which is associated with substantial increases in morbidity and mortality.[15] Avoiding emergency cesarean delivery has also been shown to enhance the pregnant woman's involvement in and satisfaction with the process of childbirth.[16]

BENEFITS TO THE FETUS

Several types of adverse neonatal outcomes would be less common if elective cesarean deliveries were performed at 39 weeks of gestation, but the frequency of these events, even without elective cesarean delivery, is quite low. For example, it has been estimated that the rate of antepartum or intrapartum death from 39 weeks of gestation onward is about 2 in 1000.[17] It is reasonable to assume that some of these deaths, as well as some neonatal deaths, could be prevented with scheduled cesarean delivery. Although some stillbirths and neonatal deaths are attributable to congenital malformations and could not be prevented by earlier delivery, most deaths occur in normally formed infants.[18] The rates of other adverse outcomes, such as aspiration of meconium and the associated need for neonatal intubation, have also been reported to increase after 39 weeks of gestation, and they might also decrease if elective deliveries were scheduled at that point.[19]

There can be mother-to-child transmission of various infectious agents such as the human immunodeficiency virus (HIV), hepatitis B virus, hepatitis C virus (HCV), and human papillomavirus (HPV) even if the mother is asymptomatic, and there is evidence that the rate of infectious diseases in neonates might be reduced with the use of elective cesarean delivery. However, the frequency of these events is low, given the current standard of care, and in the case of HCV and HPV, the consequences for the infected child are uncertain.

A woman who chooses to undergo labor faces the risk of dystocia, and some data suggest that the failure of labor to progress may be associated with intrapartum intracranial injuries. A study of pregnancies complicated by the failure of labor to progress found that failed vacuum-assisted or forceps-assisted deliveries were associated with the highest risk of intrapartum intracranial injury.[20]

However, although cesarean delivery after failed labor carries a lower risk than failed instrument-assisted delivery, it still carries a higher risk than cesarean delivery without labor. Cerebral palsy also sometimes results from intrapartum events and might therefore be preventable in some instances through the avoidance of labor. For example, the rate of intrapartum fever, which is associated with an increased risk of cerebral palsy among term infants, might be reduced.[21] However, cerebral palsy is quite uncommon among term infants, and the percentage of cases attributable to intrapartum events is low.

The rates of birth injuries such as fractures and nerve injuries are reduced by more than 50 percent among neonates delivered by cesarean.[22] However, the rates of such injuries among the neonates of women who are at low risk (women without diabetes who have neonates without macrosomia) are extremely low even with vaginal delivery. Decision analyses have suggested that even among women whose infants have macrosomia, more than 400 cesarean deliveries would need to be performed to prevent a single case of permanent injury of the brachial plexus.[23]

A final potential advantage of scheduled cesarean delivery is greater ease of balancing staffing levels with clinical volume. Substantial data suggest that inadequate levels of staffing, as well as fatigue in health care providers, can contribute to morbidity, in general, and to neonatal morbidity, in particular.[24] Overall, it appears that elective cesarean deliveries would spare a few neonates adverse events, but with assiduous adherence to current standards (e.g., intrapartum monitoring and antepartum HIV testing), those events are very uncommon even without elective cesarean deliveries.

RISKS ASSOCIATED WITH ELECTIVE CESAREAN DELIVERY

RISKS TO THE MOTHER

Maternal death, though increasingly rare in developed countries, remains the weightiest risk of all. Obstetricians have long believed that cesarean delivery substantially increases the risk of maternal death, and there are extensive data to support that belief; the risk of death with cesarean delivery has been estimated to be several times that associated with vaginal delivery.[15,25,26] As important as these data are, it remains very difficult to interpret them. First, elective cesarean delivery is often not clearly

differentiated in the data from nonelective cesarean delivery.[25,26] Second, since maternal death is now quite rare, data sets used to look for trends frequently stretch back over many years — often sufficiently far back to include women whose care was provided according to an outmoded standard.[15,27]

In addition, in developed countries, the risks associated with surgery have diminished over time, and this appears to be true particularly for elective cesarean delivery. Data from Great Britain illustrate the decreasing risk. From 1988 to 1990, women undergoing an elective cesarean delivery were more than eight times as likely to die than women having a vaginal delivery; from 1994 to 1996, they were approximately three times as likely to die; and by 1997 to 1999, the relative risk of death had decreased to slightly more than 2.[28] Moreover, some deaths that were attributed to cesarean deliveries might have been avoided if complicated labors had not preceded the operation or if acute obstetrical emergencies had been prevented by earlier delivery.

In the most recent British survey, a new classification of cesarean delivery[29] permitted an assessment of the risks for women undergoing scheduled cesarean deliveries. Such women actually had lower mortality than did those having a vaginal delivery, with only one death occurring among 78,000 women who had a scheduled cesarean delivery. Similarly, data from Israel demonstrated that mortality associated with elective cesarean delivery was lower than that associated with vaginal delivery.[30] Furthermore, all these analyses may understate the risks associated with not undergoing an elective cesarean delivery, since a woman who elects a trial of labor cannot be guaranteed a vaginal delivery. If a woman eventually requires an emergency cesarean delivery, she will face a risk of death several times as high as that faced by women who have a scheduled cesarean delivery.

On the other hand, most reports on maternal mortality discount the risk of death in subsequent pregnancies. Women who have had a previous cesarean delivery have increased risks of uterine rupture, placenta previa (in which the placenta covers all or part of the cervical os), placenta accreta (in which the placenta is abnormally attached to the uterine wall), placental abruption (premature separation of the placenta), and ectopic pregnancy.[31,32] A report on maternal deaths in the Netherlands noted that 2 of 10 deaths directly attributable to cesarean delivery occurred in a subsequent pregnancy as a consequence of the rupture of a uterine scar.[25]

Furthermore, as the rate of cesarean delivery has increased during the past 50 years, the frequency of placenta accreta has increased by a factor of 10.[33]

Operative complications including infections, hemorrhage, and visceral injury are important considerations. Infections have been noted to occur in up to 10 percent of patients after cesarean delivery, even when prophylactic antibiotics are used, although rates are lower among women who have cesarean deliveries that are not preceded by labor or the rupture of membranes. In a review of trials of planned cesarean deliveries for breech presentation at term, women in the planned-cesarean group had a somewhat increased rate of complications (relative risk as compared with women who underwent a trial of labor, 1.29; 95 percent confidence interval, 1.03 to 1.61), related primarily to higher rates of wound infection. Differences between the modes of delivery were probably underestimated, since 45 percent of the women assigned to vaginal breech delivery ultimately had a cesarean delivery.[34,35] Other authors have reported that rehospitalization after childbirth, most commonly for uterine infections or hemorrhage, is more common after cesarean deliveries than after vaginal deliveries, although the difference is less than 1 per 100 discharges.[36] The effect of adhesion formation after cesarean delivery on subsequent abdominal surgery and its potential for causing infertility need to be evaluated further.[37]

Cesarean delivery has also been associated with postpartum depression and negative feelings about the experience of childbirth,[38] but not specifically among women undergoing cesarean delivery by choice. In a randomized trial comparing elective cesarean delivery with a trial of labor for breech births, no difference was found in the rates of maternal depression or in views regarding childbirth at three months.[9] In summary, although complications remain more common after surgical deliveries, the rates of adverse events are declining, and evidence that women who choose labor over a scheduled cesarean delivery will have a substantially lower risk of death is increasingly tenuous.

RISKS TO THE FETUS

Neonatal pulmonary problems arising from cesarean deliveries performed either before 39 weeks of gestation or in cases in which the duration of gestation is uncertain are a matter of concern, as are complications of amniocentesis performed with the intention of reducing the risk of such prob-

lems.[39] This risk is greatly reduced if delivery occurs at 39 weeks of gestation in a pregnancy for which the dates are certain; at this time, the absolute risk of iatrogenic respiratory distress syndrome is 0.4 percent.[40] Fetal laceration at the time of cesarean delivery is also an uncommon event.[41] Maternal hypotension resulting from anesthesia may cause transient fetal respiratory acidosis.[42] Finally, although the rate of breast-feeding within a few hours after delivery was decreased among women who had an elective cesarean section, no adverse effect of cesarean delivery on breast-feeding and the mother–infant relationship was demonstrated.[9] Given appropriate precautions to prevent iatrogenic prematurity, fetal injury, and maternal hypotension, the risks faced by neonates delivered by elective cesarean section should be minimal.

CONCLUSIONS

For a woman who requests an elective cesarean delivery to be fully informed, substantial time must be set aside for sharing the aforementioned data. However, the obstetrician who counsels the woman must do more than recite a litany of risks and benefits. Although the available literature does not always allow precision in estimates of these risks and benefits, the clinician must try to provide a qualitative and quantitative assessment.

The clinician must also attempt to understand the genesis of the woman's request. Although physicians must recognize the expanding part played by maternal autonomy in advancing the argument in favor of elective cesarean delivery, they should also be aware that a woman's choice may reflect anxiety. With appropriate counseling, anxiety can be assuaged, and when it is, the request for cesarean delivery is often withdrawn.[43]

Of course, other critical factors warrant consideration in any discussion of elective cesarean delivery, including the ethics of proffering the choice and the public health and economic consequences of increasing rates of elective cesarean delivery. Although these are important issues worthy of a fully developed analysis, they are beyond the scope of this article. Pending those discussions, obstetricians, in their capacity as patients' advocates, must help to guide their patients through the labyrinth of detailed medical information toward a decision that respects both the patient's autonomy and the provider's obligation to optimize the health of both the mother and the fetus.

Since the issue of elective cesarean delivery first surfaced in 1985, accumulating data have suggested increasing potential benefits and decreased risks associated with its performance. Unfortunately, the interpretation of many of the relevant studies on the subject is limited by their designs and by conclusions that sometimes conflict. Although the evidence does not support the routine recommendation of elective cesarean delivery, we believe that it does support a physician's decision to accede to an informed patient's request for such a delivery.

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