

The Rising Cesarean Delivery Rate in America

What Are the Consequences?

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Cesarean delivery is now the most common operation in the United States, and it has increased dramatically from 5.8% in 1970 to 32.3% in 2008. This rise has not resulted in significant improvement in neonatal morbidity or maternal health. Three recent studies of elective repeat cesarean deliveries performed before 39 completed weeks of gestation have demonstrated increased respiratory and other adverse neonatal outcomes. Maternal mortality in the United States has increased from 10 per 100,000 to 14 per 100,000 from 1998 to 2004. Contributing to this is an increasing incidence of placenta accreta associated with multiple uterine scars requiring the need for emergency cesarean hysterectomy, blood transfusion, and maternal mortality due to obstetric hemorrhage. To reverse the trend of the rising cesarean delivery rate, obstetricians must reduce the primary rate and avoid the performance of a uterine incision unless absolutely necessary for fetal or maternal indications. For women with one previous low transverse cesarean delivery, obstetricians should promote a trial of labor after previous cesarean delivery in those women who desire three or more children.

(*Obstet Gynecol* 2011;118:687–90)

DOI: 10.1097/AOG.0b013e318227b8d9

Cesarean delivery is now the most common operation performed in women in the United States. In 1970, the cesarean delivery rate in the United States was 5.8%.¹ It has increased dramatically over the last 47 years to 32.3% in 2008.² Since 1996, the cesarean delivery rate has increased by 50%. This

dramatic rise has not resulted in significant improvement in neonatal morbidity and mortality, or maternal health. In 1998 when the cesarean delivery rate was 21.2% in the United States, the maternal mortality rate was 10 per 100,000.³ In 2004, with a cesarean delivery rate of 29.1%, the maternal mortality rate increased to 14 per 100,000.⁴

Between 1970 and 1988, the cesarean delivery rate in the United States increased from 5% to 25%, and from 1989 to 1996 there was a decrease in the rate to 20.7%. During this time the vaginal birth after cesarean delivery (VBAC) rate increased from 18.9% to 28.3%.⁵ The decline in the total cesarean delivery rate during this timeframe was attributable to an increase in trials of labor after previous cesarean delivery (TOLAC); initial reports supported the relative safety of “scar labor.” However, in the mid-1990s a number of case reports were published describing increased uterine rupture rates resulting in increased neonatal morbidity and mortality, and maternal morbidity. This dissuaded practicing obstetrician-gynecologists from recommending VBAC. These descriptive adverse outcomes, along with medical liability concerns prompted practicing obstetricians to forego counseling women with one previous cesarean delivery with a low transverse incision that they were candidates for VBAC as recommended in the American College of Obstetricians and Gynecologists Practice Bulletin Number 54, July 2004.⁶ Also contributing to this decline in VBAC was the Practice Bulletin’s recommendation that TOLAC should be undertaken in facilities with staff immediately available to perform cesarean delivery. Provider and patient choice for an elective repeat cesarean delivery also contributed to the dramatic fall in the VBAC rate from 28.3% in 1996 to 8% in 2005. A patient’s desire to schedule the date of delivery to accommodate herself, her partner, and family members was compelling. From the physician perspective, the ability to schedule an elective repeat

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Financial Disclosure

The author did not report any potential conflicts of interest.

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ISSN: 0029-7844/11



cesarean delivery before office hours without the inconvenience of having to remain in the hospital for countless hours conducting a TOLAC may have contributed to the trend to repeat cesarean delivery.

As the 21st century approached, there emerged a demand for elective primary cesarean delivery on maternal request, without fetal or maternal indication. The concept of patient autonomy, fear of labor pain, aesthetics, avoidance of pelvic floor damage, the safety of the neonate, and the perceived safety of the mother may have contributed to this request. Obstetricians faced the threat of patient discontent, and transfer of care if they did not acquiesce to maternal request. This practice has accelerated to the point that presently approximately 12–15% of cesarean deliveries are attributed to elective maternal request.⁴

Concern regarding cesarean delivery on maternal request resulted in a National Institutes of Health State of the Science Conference, March 22–29, 2006, which concluded that the magnitude of cesarean delivery on maternal request was difficult to quantify and that there was insufficient evidence to evaluate fully the benefits and risks of cesarean delivery on maternal request compared with planned vaginal delivery.⁷ The conference's conclusions provided little assistance to obstetricians. In December of 2007, the American College of Obstetricians and Gynecologists published a Committee Opinion acknowledging cesarean delivery on maternal request, but outlined that it should not be motivated by the unavailability of effective pain management and that it is not recommended for women desiring several children given that the risk of placenta previa, placenta accreta, and the need for gravid hysterectomy increase with each cesarean delivery.⁸

The avoidance of pelvic floor damage is consistently posed as a major argument supporting elective primary cesarean delivery. However, a retrospective cohort study in the *New England Journal of Medicine* in October of 2003 comparing Norwegian women who were younger than 65 years of age and had had no deliveries, cesarean deliveries only, or vaginal deliveries only reported that in the nulliparous group 10.1% developed urinary incontinence.⁹ In the cesarean delivery group it was 15.9%, and in the vaginal delivery group 21.0%.⁹ The authors concluded that the risk of urinary incontinence was higher among women who have had cesarean delivery (15.9%) than among nulliparous women (10.1%), and was even higher among women who have had vaginal deliveries (21%); however, these findings should not be used to justify an increase in the use of cesarean deliveries.⁹ In a treatise in *Clinical Obstetrics & Gynecology*, Ann

Weber commented on the State of the Science Conference by the National Institutes of Health regarding cesarean delivery on maternal request and outlined that the panelists at the Consensus Conference determined that weak quality evidence supported elective cesarean delivery over planned vaginal delivery for urinary incontinence.¹⁰ Although the duration of effect was not clear for other maternal outcomes related to pelvic floor function, including pelvic organ prolapse, fecal incontinence, and other anorectal symptoms and sexual function, weak quality evidence did not favor either route of delivery.

Safety for the fetus is purportedly the most compelling reason to perform cesarean delivery, both elective primary and elective repeat cesarean delivery. However, in a large prospective four-year observational study of perinatal outcomes associated with a TOLAC, comparing outcomes between women who underwent a trial of labor and women who had an elective repeat cesarean delivery without labor; there were 12 neonates in the TOLAC group who had hypoxic ischemic encephalopathy compared with none in the elective repeat cesarean group; seven of the twelve were from uterine rupture.¹¹ The authors concluded that the risk of an adverse perinatal outcome at term among women who TOLAC is approximately 1 in 2000 (0.46 per 1,000 TOLAC).¹¹ By calculation, the risk of an adverse perinatal outcome at term among women who TOLAC and have a uterine rupture is 1 in 4,000 (0.27 per 1,000 TOLAC). Leung, however, has demonstrated that when uterine rupture occurs, and the decision to delivery interval is less than 18 minutes, the fetus is not at risk for irreversible hypoxic ischemic encephalopathy.¹²

Evidence has also accumulated regarding the timing of elective repeat cesarean delivery at term and neonatal outcomes. In a seminal article, Alan Tita, in a retrospective cohort study at 19 academic medical centers (N=13,253), outlined that 35.8% of elective repeat cesarean deliveries were performed before 39 completed weeks of gestation, and concluded that in this cohort there was an increase in respiratory and other adverse neonatal outcomes.¹³ Kamath, in a retrospective cohort study of 672 women with one prior cesarean delivery and a singleton pregnancy at or after 37 weeks of gestation compared this cohort with a cohort undergoing VBAC and concluded that in comparison with VBAC, neonates born after elective repeat cesarean delivery have significantly higher rates of respiratory morbidity and neonatal intensive care unit admission, and longer length of hospital stay.¹⁴ A third study by Wilmlink from the Netherlands, included all elective cesarean deliveries of singleton preg-



nancies beyond 37 weeks of gestation and concluded that performing elective cesarean delivery at less than 39 weeks of gestation jeopardized neonatal outcome and should be avoided whenever possible.¹⁵

With an increase in cesarean delivery, maternal morbidity and mortality has risen. A number of recent studies have documented an increased incidence of placenta previa and accreta with repeated uterine scars. Clark concluded that a woman with two prior cesarean deliveries has a 2% incidence of placenta previa; nearly half of these cases are associated with placenta accreta.¹⁶ Silver has also demonstrated an increase in placenta accreta with the number of cesarean deliveries and concluded that because of serious maternal morbidity increasing progressively with increasing numbers of cesarean deliveries, the number of intended pregnancies should be considered during counseling regarding elective repeat cesarean delivery compared with a trial of labor, and when debating merits of elective primary cesarean delivery.⁵ Nisenblat has also substantiated these concerns and concluded that women should be counseled that 9% of women undergoing multiple cesarean deliveries may suffer from major complications and that 1% will require hysterectomy, most commonly as a result of abnormal placentation.¹⁷ In an article titled "Changing Trends in Peripartum Hysterectomy Over the Last 4 Decades," Flood performed a retrospective cohort study to identify changing trends in peripartum hysterectomy.¹⁸ During this timeframe, the overall cesarean delivery rate increased from 6% to 19% during the four decades.¹⁸ The percentage of peripartum hysterectomy that occurred in a setting of a previous cesarean delivery increased from 27% to 57%.¹⁸ Of significance was that placenta accreta as an indication of peripartum hysterectomy increased significantly from 5.4% to 46.5%.¹⁸ In an article titled "Peripartum Hysterectomy," the authors cited five studies in which placenta accreta was the indication in 49%, 33%, 38%, 50%, and 38%, respectively.¹⁹

In just six years, from 1998 to 2004, the maternal mortality rate in the United States has increased from 10 per 100,000 to 14 per 100,000.⁴ Although advanced maternal age, co-morbidities, a dramatic increase in maternal obesity, along with an increase in multiple gestations necessitating operative delivery are contributors; there is also the alarming concern of an increased incidence of placenta accreta associated with multiple uterine scars, requiring the need for emergency cesarean hysterectomy, blood transfusion, and maternal mortality due to obstetrical hemorrhage.

To reverse the trend of the rising cesarean delivery rate in America, we as obstetricians must reduce the

primary cesarean delivery rate, and avoid the performance of a uterine incision unless absolutely necessary for fetal or maternal indications. For women with one previous low transverse cesarean delivery we must promote a trial of labor after previous cesarean delivery in those women who desire three or more children. Patients requesting an elective primary cesarean delivery on maternal request should be extensively counseled regarding the risk of this procedure, particularly if they are planning to have several children. Additionally, in the conduct of labor, obstetricians and midwives need to avoid cesarean delivery for dystocia until the active phase of labor is firmly established, particularly in nulliparous women, and in induced labor. The sensitivity of fetal heart rate monitoring for a non-reassuring fetal heart rate tracing is only 50%; hence, nurses, obstetricians, and midwives must remain competent and current in their knowledge of fetal heart rate monitoring interpretation. Finally, obstetricians should be compensated for conducting a TOLAC at the same level as an elective repeat cesarean delivery.

By embracing these practices going forward, hopefully we can reverse the rising cesarean delivery trend in the United States, and mitigate the risk inherent in the performance of cesarean delivery. We must constantly remind ourselves *Primum non nocerum*.

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rev 2/2011

