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Prevention of the first cesarean delivery

Catherine Y Spong, MD

Deputy Director, NICHD, NIH, Bethesda MD, spongc@mail.nih.gov

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Prevention; Cesarean; vaginal delivery; maternal and fetal

Introduction

Cesarean childbirth began as a practice to remove the infant from a dead or dying mother, it was a measure of last resort and was not intended to preserve the mother's life (1). From these origins, cesarean delivery has moved in the 21st century to become one of the most common major abdominal surgeries performed, and has a variety of obstetrical and medical indications.

Of the almost 4 million births in the United States in 2012, 32.8% were delivered by cesarean, a rate unchanged since 2010. From 1996 to 2010 the rate had steadily increased from 20.7% in 1996 to the current 32%. (2). In parallel with the rise in total cesarean births from 1996–2010 is a rise in primary cesarean deliveries. Prior to 1996, the rate was flat or declining from the mid 1980s, in part due to the increasing use of vaginal birth after cesarean; however the VBAC rate peaked in the mid 1990s and now accounts for less than ten percent of deliveries despite evidence supporting the method. (3).

Internationally, rates of cesarean vary dramatically ranging from <20% in northwestern European countries to 50% in southeastern Europe and over 60% in some Latin-American countries. (4)

Although overall cesarean is considered safe, it is generally accepted that there are increases in morbidity and mortality with cesarean (5–9):

- 2-fold increase in maternal mortality
- Greater blood loss
- Impaired neonatal respiratory function
- Increased incidence of maternal PP infections

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- Fetal lacerations
- Affects maternal-infant interaction
- Longer recovery
- Rehospitalization

Fetal risks include 1–2% risk of laceration, 1–4% risk of respiratory morbidity in those delivered by cesarean and 1–2% risk of shoulder dystocia in those delivered vaginally. Although the initial cesarean is associated with increases in maternal morbidity and mortality such as a rate of severe morbidity of 9.2% vs 8.6% in vaginal deliveries and mortality of 2.7% vs 0.9% respectively, the downstream effects are even greater due to the risks of repeat cesareans in subsequent pregnancies, and associated placentation complications. (10). Multiple repeat cesareans are associated with a dose dependent increase in (11):

- Placenta accreta
- Placenta previa
- Hysterectomy
- Transfusion of 4 units
- Maternal ICU admission

Solheim and colleagues (12) performed a decision analysis model of the downstream consequences of the rising cesarean rates and if they continue at current rates, by 2020 there will be

- CS rate of 56.2%
- Additional 6,236 previas per year
- Additional 4,504 accretas per year
- Additional 130 maternal deaths per year

Given the fall in VABC, the risks associated with multiple cesareans and the current trends, the most effective approach to reducing the overall cesarean delivery rates is to prevent the first cesarean.

Major indications for primary cesarean include those occurring prior to labor and those during labor. Prior to labor the major cause is malpresentation and during labor both first-stage and second-stage arrest (13).

To identify points for intervention, obstetric, fetal and maternal factors can be considered to identify those that are modifiable and may impact the overall cesarean rate. An expert panel convened to evaluate these factors and bin them into their diagnostic accuracy, the size of the effect if it were to be successful and preventative strategies for each factor (14). Of these many had limited diagnostic accuracy and small overall effects.

Both failed induction and arrest of labor had the greatest potential effect although the diagnostic accuracy was considered limited. Other obstetric factors with smaller impact include the use of external cephalic version for malpresentation, efforts to limit maternal weight gain to impact suspected macrosomia, and education for preeclampsia, cardiovascular disease, maternal request and inadequate pelvis.

The definitions of failed induction and arrest of labor were reviewed and rethought based on current information to provide practitioners guidance. Failed induction should be diagnosed only after an adequate attempt which is defined as least 24h of oxytocin with artificial membrane rupture (if feasible) with the failure to generate regular contractions and cervical change. Limiting the use of induction of labor to avoid elective inductions, recognize that association of cesarean with cervical status (less favorable cervix = higher risk of cesarean), and the importance of allowing the induction sufficient time to progress all may result in lower cesarean rates. (14). The obstetric care consensus went even further than the expert panel recommendations stating that induction of labor should only be used for maternal or fetal indications before 41 weeks of gestation (10)

The recent data demonstrating contemporary labor curves reinforce the need for patience during the labor process. It is critical to allow adequate time for normal latent and active phases of the first and second stages of labor, unless expeditious delivery is indicated. Zhang and colleagues studied over 60 thousand women with singleton pregnancies at term, all with spontaneous onset of labor, vaginal deliveries and normal neonatal outcomes. They found that the inflection point was at six centimeters dilation, not the traditionally taught 4cm, defining the active phase of labor, and that this only occurred in multiparous women. In addition, that the dilation at admission to labor and delivery affected the pattern of labor progression. (15). First and second stage arrest were also redefined to allow longer time and these were confirmed by the recent Obstetric care consensus document. (10,14)

Thus contemporary labor is not what was previously taught, spontaneous labor progresses more slowly. A measured, nuanced approach is needed along with consideration of the new definitions of the active phase of labor and definitions of labor arrest. Other considerations, such as the dilation at admission need to be considered in evaluating labor progress. In addition, other strategies to reduce cesarean in the second stage of labor need to be encouraged and taught including operative vaginal delivery and manual rotation of the fetal occiput. Despite the well known benefits of these approaches, many are not routinely taught or embraced by providers given the acceptance of cesarean. It is critical that not only are these taught but also that providers and patients are comfortable with their use.

In addition to the opportunities afforded by the obstetric, fetal and maternal factors, there are many other influences on delivery method. Practice models including different models of care, such as collaborative practice (16), hospitalists, integration of midwifery and others should be considered as opportunities to impact the cesarean rate. Several studies have demonstrated the use of models that enhance flexibility and reduce financial incentives influence delivery route. In addition, studies have shown that malpractice is associated with cesarean rates. States with higher malpractice rates correlated to lower vaginal delivery and higher cesarean deliveries. (17).

Another important component is accountability for the provider and clear hospital policies on indications for inductions, definitions, and protocols. For providers, audits, feedback and tracking in the singleton term gestation in vertex presentation the rates of:

- Non-medically indicated cesarean deliveries
- Non-medically indicated induction of labor
- labor arrest
- failed induction
- cesarean delivery for nonreassuring fetal heart rate

Education of both providers and patients on the importance of vaginal delivery, both for the current as well as future pregnancies will be essential to reverse the current trend of primary cesareans. When discussing cesarean with patients, counseling should include the effect on subsequent pregnancy risks including possibility of uterine rupture and placental abnormalities. In addition, counseling must include the concept that normal labor takes time. In the current era of information available instantaneously and instant gratification, the concept of allowing labor to occur naturally without interventions to initiate or augment unless medically necessary, is not prevalent. Societal expectations are for rapid and positive outcomes. Re-education on the natural process of labor, the importance of allowing the time needed and patience with both the duration of pregnancy and process of labor are essential.

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Key Points

- Prevention of the first cesarean is major driver to reducing overall cesarean rates.
- There are numerous obstetric, fetal and maternal factors that are modifiable and impact cesarean delivery rates.
- Patience is necessary to allow normal labor, recent data demonstrates that the labor course is longer than previously taught