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What we have learned about scheduling elective repeat cesarean delivery at term

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ABSTRACT

The optimal timing of delivery in the setting of various clinical conditions and scenarios remains one of the most common questions for obstetric providers. Over the past 5–10 years, the optimal timing of delivery at term, particularly for elective repeat cesareans, has been the subject of considerable investigation and discussion. There is an increasing consensus that when women opt for an elective repeat cesarean delivery, it should be performed at term rather than preterm. The recent redefinition of the “term” period into early term (37–38 weeks), full-term (39–40 weeks), late term (41 weeks), and post term designations (≥ 42 weeks) underscores observed heterogeneity in outcomes following delivery at term. The American College of Obstetricians and Gynecologists currently recommends that elective repeat cesarean delivery be performed at full-term. Herein, the available data to support this recommendation regarding timing of elective repeat cesarean delivery are reviewed, including contributions from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Maternal–Fetal Medicine Units (MFMU) Network.

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Definition and prevalence

An elective repeat cesarean delivery is one that is scheduled solely, because the patient declines a trial of labor in the absence of medical or obstetric complications that would warrant consideration of a preterm or early-term delivery.¹ Examples of these complications have been well reviewed by

the American College of Obstetricians and Gynecologists.^{2,3} An estimated 30–40% of all cesareans in the United States are repeat cesareans. In an MFMU Network cohort of repeat cesarean deliveries at term from 1999 to 2002, approximately 52% were elective and 36% of them were delivered prior to full-term.⁴ In comparison, 57% of elective cesareans at term in a Dutch population were delivered prior to full-term.⁵

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With the emphasis on reducing non-medically indicated early-term deliveries and successful efforts in the United States, the proportion of early-term delivery is on the decline.⁶

Perinatal outcomes

Respiratory and other neonatal morbidities including hypoglycemia are increased in early term compared with full-term elective cesarean deliveries, and the risk increases inversely with gestational age.^{2,4,5,7–11} In the aforementioned MFMU Network study of over 13,000 women who underwent elective repeat cesarean delivery, neonatal outcomes were compared with completed gestational age at term. Study outcomes included death, respiratory distress syndrome or transient tachypnea of the newborn, hypoglycemia, newborn sepsis, confirmed seizures, necrotizing enterocolitis, hypoxic-ischemic encephalopathy, cardiopulmonary resuscitation or ventilator support within 24 hours after birth, umbilical cord pH below 7.0, a 5-min Apgar score of 3 or below, admission to the neonatal intensive care unit, and prolonged hospitalization. Compared to births at 39 weeks, early-term births were associated with an increase in adverse neonatal outcomes by a magnitude of up to 4-fold at 37 weeks and 2-fold at 38 weeks.⁴ Also, 52% of early-term births occurred within the 3 days of 39 0/7 weeks, and they also manifested an increase in adverse neonatal outcomes compared to full-term births at 39 weeks.⁴ A reanalysis of the MFMU data that simulated a comparison of delivery at each gestational age at term vs. expectant management identified 39 weeks as the optimal timing of delivery.¹² The data also suggested increasing risks of adverse outcome particularly after 40 weeks. The main MFMU Network findings were confirmed by data from the Dutch birth registry involving 20,973 elective cesarean deliveries at term. The incidence of a primary composite of neonatal morbidity and mortality (including respiratory morbidities, sepsis, metabolic complications, neurologic dysfunction, and neonatal intensive care admissions) decreased with advancing gestational age—20.6% at 37 weeks, 12.5% before 38 weeks, 9.5% at 39 weeks, and 9.4% at 40 weeks.⁵

An important consideration for the optimal timing of delivery at term is the ongoing risk of stillbirth with increasing gestational age. This risk of unexplained stillbirth in the absence of medical indications for delivery is estimated to be low ($<0.5/1000$).⁴ Concern was raised further by one report suggesting that a policy limiting elective delivery before 39 weeks of gestation at one center resulted in a decline in deliveries prior to 39 weeks (33.1–26.4%), and this coincided with an increase in the risks of stillbirths at 37–38 weeks (0.3–0.9 per 1000) and macrosomia.¹³ However, further evaluations of stillbirth trends on U.S. population-based data have not shown an association between increasing gestational age at term and stillbirth.^{14,15} In one analysis of over 3.5 million singleton term births from 2005 to 2011, early-term births declined from 31.8% to 28.5%, but there was no increase in overall stillbirth risk at term (1.23–1.30 per 1000; $p = 0.2$).¹⁴ In the other analysis comparing births from 2006 to 2012, the stillbirth rate across preterm and term gestational ages remained unchanged at 6.05/1000 despite a 10–16% reduction in births at 34–38 weeks and a 17% increase in births at 39 weeks.¹⁵ Besides these reassuring data on stillbirths, population-based studies also suggest that early-term infants have higher

neonatal mortality rates that extend into the postneonatal and infant periods. At 37 and 38 weeks compared with 40 weeks of gestation, neonatal mortality rates were increased, with Blacks having the highest rates, and Hispanics having the lowest rates, compared with Caucasians.¹⁶

Long-term infant outcomes

Although preterm birth is one of the strongest predictors of cerebral palsy, a majority of infants born with cerebral palsy are delivered at term. A population-based study from Norway revealed that compared with delivery at 40 weeks' gestation, delivery at 37 or 38 weeks gestation was associated with an increased risk of cerebral palsy in infants surviving to at least 4 years of age.¹⁷ Although limited by heterogeneity, one systematic review found that early-term births had poorer outcomes in terms of school performance, neurodevelopment, behavior, emotional status, and long-term social outcomes.¹⁸ While further research is needed to tease out whether these outcomes are a consequence of gestational age at delivery solely (elective delivery) or due to the accompanying indications for early delivery, these reports support recommendations to avoid elective early-term deliveries.

Maternal outcomes

While the available neonatal and infant outcomes data favor elective repeat cesarean delivery at full-term gestational age, consideration should also be given to maternal outcomes. The limited data on maternal outcomes in relation to optimal timing of delivery at term do not support elective repeat cesarean delivery before 39 weeks.¹¹ Among elective repeat cesarean deliveries in the MFMU Network cohort, a composite of adverse maternal outcomes appeared to be modestly increased with delivery in the early-term period compared with delivery at 39 weeks.¹⁹ Maternal outcomes included death, uterine rupture, need for hysterectomy, transfusion, infections, and anesthetic and surgical complications; transfusion was the main contributor to the increase in the composite outcome with early-term delivery. Furthermore, early-term deliveries were associated with prolonged hospitalization (>4 days), most likely due to prolonged hospitalization of their early-term babies. Another report comparing maternal outcomes (endometritis, hysterectomy, intensive care admission, and length of hospital stay) did not associate early-term delivery with improved maternal outcomes.⁷ Overall, few studies exist that have examined maternal outcomes in relation to gestational age. Therefore, additional studies are warranted to further elucidate the relationship between maternal mortality/morbidity and early-term deliveries. The available data do not support early-term delivery for maternal benefit.

Other considerations

Questions concerning clinical nuances and ongoing controversies deserve consideration when formulating a policy regarding the timing of elective repeat cesarean delivery.

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