EDITORIAL

Initiatives to Reduce Cesarean Delivery Rates for Low-risk First Births

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An estimated 4 million births occur each year in the US, and almost 1 in 3 births involve cesarean delivery.[1] The national rate of cesarean delivery steadily increased from 20.7% in 1996 to 32.8% in 2010, and for the past decade, this rate has remained largely unchanged.[1,2] Although cesarean delivery can be lifesaving for both the mother and neonate, the increase in cesarean delivery rates has not been associated with any demonstrable improvements in maternal or neonatal morbidity or mortality.[2-4] Because of these procedure rates, obstetric leaders and organizations have highlighted the importance of addressing cesarean delivery, especially among low-risk births.[2,4,5]

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Preterm births, multifetal gestations, and breech presentation have considerable risk for cesarean delivery.[6] Nulliparous (first birth) women with term (completed ≥37 weeks based on the obstetric estimate), singleton (1 fetus), vertex (cephalic or head first) births are also referred to as nulliparous, term, singleton, vertex (NTSV) or low-risk births.[1] The cesarean delivery rate for NTSV births is a measure endorsed by the National Quality Forum, the Joint Commission, the Leapfrog Group, and the Centers for Medicare & Medicaid Services.[6] The US Centers for Disease Control and Prevention set a target rate for low-risk cesarean delivery of 23.9% as part of its Healthy People 2020 goals; however, the US rate remained relatively unchanged between 2016 (it was 25.0%) and 2018 (it was 25.9%).[1,7]

In this issue of *JAMA*, Rosenstein and colleagues[8] report data from a study focusing on improving cesarean delivery rates for NTSV births in California following deployment of a statewide initiative known as the California Maternity Quality Care Collaborative (CMQCC). In 2016, the CMQCC launched a multifaceted, multilevel initiative to reduce cesarean delivery rates for NTSV births. The specifications for the perinatal care cesarean birth measure (PC-02; ie, rates of cesarean delivery for NTSV births) from the Joint Commission were used to classify NTSV births in the study. Hospitals with cesarean delivery rates for NTSV births greater than 23.9% were invited to join an 18-month quality improvement collaborative (the Supporting Vaginal Birth Collaborative).

Three rounds of the initiative were deployed in June 2016, January 2017, and January 2018 and included multidisciplinary mentorship, shared learning, and rapid-cycle data feedback. Examples included physician-nurse mentor pairs providing site visits with grand rounds and use of an evidence-based toolkit. In addition to the program, a partnership among nonprofit organizations, state governmental agencies, purchasers, and health plans addressed the external environment through transparency with publicly reported metrics, award programs, and incentives for all hospitals in California during this period.

The primary outcome was the change in cesarean delivery rates for NTSV births. Severe unexpected newborn complications (including hypoxic ischemic encephalopathy, seizures, requirement of ventilation, neonatal sepsis, birth injury, and hospital transfer to a higher level of care among term neonates without preexisting conditions) were assessed as a measure of infant safety. Of the 149 California hospitals with baseline cesarean delivery rates for NTSV births greater than 23.9%, 91 hospitals (61%) participated in the collaborative project totaling 679 086 deliveries. A total of 147 hospitals (58 eligible with baseline cesarean delivery rates >23.9% and 89 ineligible with baseline cesarean delivery rates ≤23.9%) were exposed to the statewide actions even though they did not join the collaborative.

Overall, cesarean delivery rates for NTSV births at California hospitals declined from 26.0% in 2014 to 22.8% in 2019. From 2015 to 2019, cesarean delivery rates for NTSV births among women delivering at the 91 hospitals participating in the collaborative decreased from 28.6% (n = 9858/34 437) during the first half of 2015 to 24.2% (n = 7439/30 728) during the first half of 2019 (unadjusted absolute difference, 4.2%). The rate of cesarean delivery for NTSV births at the 147 hospitals that did not participate in the collaborative decreased from 23.0% (n = 9575/41 677) to 22.0% (n = 8019/36 498) during the same period. Comparatively, the US cesarean delivery rate for NTSV births was unchanged during this time at 26.0% in both 2014 and 2019.

In California, the statewide rate of severe unexpected newborn complications was 2.1% in 2015 and 1.5% in 2019, suggesting no significant adverse risk to the infant associated with this lower cesarean delivery rate. The authors concluded that the combination of hospital-level quality improvement interventions with statewide actions were associated with substantial and sustained decreases in cesarean delivery rates for NTSV births without adverse effects to newborns in California.

The findings from the study by Rosenstein et al[8] highlight both the value of standardization and the importance of performance measures using relevant quality data. These findings are particularly pertinent given that the 91 hospitals that participated in the collaborative were less likely to be teaching hospitals compared with the 147 hospitals that did not participate (8% vs 16%), were less likely to have fewer than 1000 annual births (18% vs 39%), and were less likely to be located in a rural area (6% vs 19%). These findings suggest that decreasing cesarean delivery rates for NTSV births can be accomplished in hospitals other than large academic medical centers. Because labor management decisions can

influence cesarean delivery rates for NTSV births, providing checklists, order sets, and education are tangible examples of process measures that were deployed to ensure standardization in this study.

In addition to these process measures, the CMQCC used a web-based tool to generate near real-time performance metrics that were monitored, benchmarked, and analyzed. Among the hospitals that participated in the collaboration project, 77 (85%) shared unblinded clinician-specific cesarean delivery rates. This transparency was suggested to be a powerful adjunct and is being adopted by health care agencies. For instance, the Joint Commission began publicly reporting hospitals with consistently high cesarean delivery rates on July 1, 2020, based on hospitals' rates on the perinatal care cesarean birth measure (PC-02; ie, rates of cesarean delivery for NTSV births).[9]

Before the California quality improvement initiative to reduce cesarean delivery rates for NTSV births can be adopted elsewhere, several caveats should be considered. First, the amount of infrastructure needed for accurate data acquisition, reporting, and program deployment may be substantial. Second, several program-directed as well as statewide efforts were deployed during this period of study, and the contribution of the collaborative components, categories, statewide external actions, or combination of all 3 that led to these improved rates remains unknown. Unraveling the most effective interventions may help mitigate the costs and resources needed to bring this program forward elsewhere. Third, the use of severe unexpected newborn complications as a counterbalanced measure has limitations. This outcome is relatively infrequent among NTSV births (1-2 per 100 births), may occur only a few times per year at smaller hospitals, and it is not a comprehensive metric for infant, or any maternal, sequelae.[8] Fourth, these findings do not address the influence of case mix on a given facility's cesarean delivery rate for NTSV births or variation against others as a comparison.[10] The Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network recently examined 38 275 NTSV births to better elucidate the contribution of case mix and facility differences in the rates of cesarean delivery for NTSV births.[11] Across 25 academic centers in the US, the cesarean delivery rate for NTSV births varied from 15% to 35.2% by facility.[11] Patient characteristics accounted for 24% of the variation, and adjusting for patient characteristics had meaningful implications for hospital rankings in the data set.[11] Notably, the PC-02 measure, now reported publicly, does not require risk adjustment.[9]

Based on data from a state representing 1 of every 8 births in the US,[1] the study by Rosenstein and colleagues[8] provides support for standardization, process measures, and education to reduce cesarean delivery rates for NTSV births. Numerous professional societies in the US have highlighted the importance of reducing the rates of cesarean delivery. These findings offer hope for improvement and a glimpse into the future of transparency with publicly reported quality metrics. With publicly reported quality data, such as cesarean delivery rates for NTSV births (PC-02), the importance of understanding what does and what does not affect performance matters now more than ever.

ARTICLE INFORMATION

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REFERENCES

1. Martin JA, Hamilton BE, Osterman MJK, Driscoll AK. Births: final data for 2018. *Natl Vital Stat Rep*. 2019;68(13):1-47.

2. Spong CY, Berghella V, Wenstrom KD, Mercer BM, Saade GR. Preventing the first cesarean delivery: summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, and American College of Obstetricians and Gynecologists Workshop. *Obstet Gynecol*. 2012;120(5):1181-1193. doi:10.1097/AOG.0b013e3182704880

3. Main EK, Chang SC, Cape V, Sakowski C, Smith H, Vasher J. Safety assessment of a large-scale improvement collaborative to reduce nulliparous cesarean delivery rates. *Obstet Gynecol*. 2019;133(4):613-623. doi:10.1097/AOG.0000000000003109

4. American College of Obstetricians and Gynecologists; Society for Maternal-Fetal Medicine. Obstetric care consensus No. 1: safe prevention of the primary cesarean delivery. *Obstet Gynecol*. 2014;123(3):693-711. doi:10.1097/01.AOG.0000444441.04111.1d

5. World Health Organization. WHO recommendations on non-clinical interventions to reduce unnecessary caesarean births. Accessed January 11, 2021. https://www.who.int/reproductivehealth/publications/non-clinical-interventions-to-reduce-cs/en/

6. Main EK. Leading change on labor and delivery: reducing nulliparous term singleton vertex (NTSV) cesarean rates. *Jt Comm J Qual Patient Saf*. 2017;43(2):51-52. doi:10.1016/j.jcjq.2016.11.009

7. National Center for Health Statistics. Chapter 26: Maternal, infant, and child health. In: *Healthy People 2020 Midcourse Review*. National Center for Health Statistics; 2016.

8. Rosenstein MG, Chang S-C, Sakowski C, et al. Hospital quality improvement interventions, statewide policy initiatives, and rates of cesarean delivery for nulliparous, term, singleton, vertex births in California. *JAMA*. Published April 27, 2021. doi:10.1001/jama.2021.3816

9. Joint Commission. The Joint Commission will begin publicly reporting cesarean section rates by July 2020. Accessed December 30, 2020. https://www.jointcommission.org/-/media/tjc/idev-imports/topics-assets/the-joint-commission-will-begin-publicly-reporting-cesarean-section-rates-by-july-2020/peformance_measure_pc-02_jcp1218pdf.pdf?db=web&hash=0B6188162756DF430763686A4CC3276C

10. Main EK, Chang SC, Cheng YW, Rosenstein MG, Lagrew DC. Hospital-level variation in the frequency of cesarean delivery among nulliparous women who undergo labor induction. *Obstet Gynecol*. 2020;136(6):1179-1189. doi:10.1097/AOG.0000000000004139

11. Pasko DN, McGee P, Grobman WA, et al; Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Variation in the nulliparous, term, singleton, vertex cesarean delivery rate. *Obstet Gynecol*. 2018;131(6):1039-1048. doi:10.1097/AOG.0000000000002636