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Temporal trends in the rates of trial of labor in low-risk pregnancies and their impact on the rates and success of vaginal birth after cesarean delivery

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KEY WORDS
Trial of labor
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Objective: The national rate of vaginal birth after cesarean delivery decreased by 55% between 1996 and 2002. The objective of this investigation was to determine, in our population in upstate New York, whether this decline in the vaginal birth after cesarean delivery rate was due to temporal changes in the trial of labor rates or in the vaginal birth after cesarean delivery success rates.

Study design: Regional perinatal databases were used to obtain birth certificate data from a total of 135,833 live births in upstate New York from 1998 to 2002. Trial of labor, vaginal birth after cesarean delivery, and vaginal birth after cesarean delivery success rates were calculated for the 11,446 women who had had a previous cesarean delivery and a singleton, low-risk pregnancy at $\geq$37 weeks of gestation. Additional factors that were analyzed included age, race, education, insurance, body mass index, parity, gestation, area of residence, prenatal care provider, size of hospital, and level of newborn nursery specialization. Tests for trends were conducted by year for each of the variables.

Results: The trial of labor rate declined 39% from 58.7 in 1998 to 35.7 per 100 eligible women in 2002 ($P < .01$). The decline in trial of labor rates persisted after stratification within almost all groups ($P < .01$). The overall vaginal birth after cesarean delivery rate decreased 44%, from 42.7 in 1998 to 24.1 per 100 eligible women in 2002 ($P < .01$). The decline in vaginal birth after cesarean delivery rates persisted after stratification within almost all groups ($P < .01$). The rate of vaginal birth after cesarean delivery success was unchanged from 1998 to 2002 ($P =$ not significant).

Conclusion: We found a major decline in trial of labor and vaginal birth after cesarean delivery rates in low-risk women from 1998 to 2002. There was no change in vaginal birth after cesarean delivery success in those patients who attempted trial of labor. This suggests that the decline in the vaginal birth after cesarean delivery rates that have been observed nationally may be due to a decline in trial of labor attempts and not to a change in vaginal birth after cesarean delivery success rates. The steep declines in trial of labor attempts and vaginal birth after cesarean deliveries suggest that there was a rapid change in the perception of optimal treatment practices for these patients by obstetricians.

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The optimal treatment of a pregnant patient who previously has had a cesarean delivery has been debated.[1-5] Over the last several decades, there have been significant changes in physician and patient perceptions about the treatment of a patient with a previous cesarean delivery. Until the 1980s, the dictum was "once a section, always a section." Starting from the late 1990s, the cesarean delivery rate began to increase. In 2003, the National Center for Health Statistics reported that, for 2002, the overall United States rate of cesarean delivery was 26.1%, which was the highest since information about the rates first became available.[6] An important component of this increase was from a significant decline in the number of women who had a vaginal birth after previous cesarean delivery (VBAC). Between 1996 and 2002 there was a 55% decrease in the national VBAC rate.[6] The basis for the decline in the VBAC rates may be the recognition of the risk of complications, particularly uterine rupture, during a trial of labor (TOL). A number of reports had documented an increase in the rate of uterine rupture when comparing TOL with elective repeat cesarean deliveries.[7-11] The concerns regarding the safety of TOL were reinforced when Lydon-Rochelle et al[9] reported not only an increase in uterine rupture among TOL patients, especially in women who were given prostaglandins for labor induction, but also a 10-fold increase in infant death in those women who had a uterine rupture. Furthermore, the American College of Obstetricians and Gynecologists recently reiterated its recommendation for the availability of anesthesia services and personnel for women who undergo a TOL in the event of an emergency that requires an emergency cesarean delivery.[5,12] These reports and recommendations were well publicized and may have resulted in physician reconsideration of the optimal treatment plans of patients who previously had cesarean deliveries.

The objective of this investigation was to determine, in our population in upstate New York, whether this decline in the VBAC rate was due to temporal changes in the TOL rates or in the VBAC success rates. The temporal trends for TOLs in recent time periods, given new perceptions about TOL management, have not been investigated in detail in large populations. The reported TOL rates are in the range of 50% to 70%.[13-15] These rates represent the rates of patients who have undergone a TOL in different areas and with different indications. In this study, we assessed the TOL attempts and VBAC rates in upstate New York State from 1998 to 2002 in women with at least one previous cesarean delivery and a singleton pregnancy at $\geq$37 weeks of gestation. As part of this, we analyzed whether these rates were affected by maternal and hospital factors. Furthermore, we analyzed whether the VBAC success rates have changed over the same time interval. Our investigations were made to better understand the changes in clinical practice and to understand the factors that may have contributed to the recent changes in obstetrics practice, especially given the changing perceptions about the safety of cesarean deliveries.

Material and methods

Database

Data were obtained from the New York State Perinatal Data System for the 2 contiguous western regions in upstate New York, the Finger Lakes region and the Western New York region, which began data collection in 1997 and 1998, respectively. The Perinatal Data System is the regionalized perinatal data system that was built from the New York Electronic Birth Certificate and contains information on $>$200 demographic, obstetric, medical, and outcome data items. There are a total of 33 hospitals in the combined (Finger Lakes and Western New York) regions. The hospitals represent all institutions where obstetrics services are available in the 17 counties of the region. Data about method of delivery, maternal and fetal conditions during pregnancy, maternal demographics, maternal personal traits, and provider information and hospital information were abstracted by the personnel who were employed by each hospital for this purpose. The database information that is contained in the New York State birth certificate has been validated, and the information concerning the method of delivery was 99.8% accurate.[16] Therefore, the database information would be considered accurate for the analysis performed in this study.

This study received the approval of the University at Buffalo's Institutional Review Board (SPM0260203E, December 2003) before the initiation of the study; the use of this data adhered to the requirements listed in the data use agreements at each of the regional centers.

Study population

Our initial population consisted of all 135,833 live births in 17 western counties of New York State that occurred between July 1998 and September 2002. For this study, the population was limited to low-risk women with at least one previous cesarean delivery who were delivered during this time period. Women were considered low risk if they had a singleton pregnancy with a gestational age of $\geq$37 weeks and did not have any known indications for repeat cesarean delivery. There were 3170 women who were excluded because of contraindications to a TOL. These contraindications included both maternal factors (placenta previa, abruptio placenta, chronic hypertension, preeclampsia, eclampsia, pregnancy-induced hypertension, history of herpes infection, and chronic heart conditions) and fetal factors (hydrocephalus, neural tube defect, omphalocele/gastroschisis,