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Timing of Delivery and Adverse Outcomes in Term Singleton Repeat Cesarean Deliveries

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Abstract

Objective—To compare the maternal and neonatal risks of elective repeat cesarean delivery compared with pregnancy continuation at different gestational ages, starting from 37 weeks.

Methods—We analyzed the composite maternal and neonatal outcomes of repeat cesarean deliveries studied prospectively over 4 years at 19 U.S. centers. Maternal outcome was a composite of pulmonary edema, cesarean hysterectomy, pelvic abscess, thromboembolism, pneumonia, transfusion, or death. Composite neonatal outcome consisted of respiratory distress, transient tachypnea, necrotizing enterocolitis, sepsis, ventilation, seizure, hypoxic-ischemic encephalopathy, neonatal intensive care unit admission, 5 min Apgar of 3 or lower, or death. Outcomes after elective repeat cesarean delivery without labor at each specific gestational age were compared with outcomes for all who were delivered later due to labor onset, specific obstetric indications, or both.

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*For a list of other members of the NICHD MFMU, see the Appendix online at <http://links.lww.com/xxx>.

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Results—Twenty three thousand seven hundred ninety-four repeat cesareans were included. Elective delivery at 37 weeks had significantly higher risks of adverse maternal outcome (OR: 1.56, 95% CI 1.06–2.31); while elective delivery at 39 weeks was associated with better maternal outcome when compared with pregnancy continuation (OR: 0.51, 95% CI 0.36–0.72). Elective repeat cesareans at 37 and 38 weeks had significantly higher risks of adverse neonatal outcome (37 weeks OR: 2.02, 95% CI 1.73–2.36; 38 weeks OR: 1.39 95% CI 1.24–1.56); while delivery at 39 and 40 weeks presented better neonatal outcome as opposed to pregnancy continuation (39 weeks OR: 0.79, 95% CI 0.68–0.92; 40 weeks OR: 0.57 95% CI 0.43–0.75).

Conclusion—In women with prior cesarean delivery, 39 weeks of gestation is the optimal time for repeat cesarean delivery for both mother and baby.

INTRODUCTION

The risks and benefits of delivery at a specific gestational age need to be compared with the potential consequences of pregnancy continuation beyond that time point to determine the optimal timing for elective delivery. Elective delivery before 39 weeks is discouraged unless fetal lung maturity has been confirmed, as neonatal morbidity decreases with gestational age from 37 to 39 weeks (1–3). Some, however, argue that early deliveries may also have benefits such as avoidance of stillbirth or fetal compromise due to utero-placental insufficiency, removal of the fetus from a hostile uterine environment, and resolution of an underlying condition (eg, preeclampsia or gestational diabetes) before it worsens or secondary complications develop (4–6). In the event of a prior cesarean section, maternal risks of early delivery include complications related to a suboptimal development of the lower uterine segment and its relation with adhesions from prior surgery, accounting for increased intraoperative blood loss, and prolonged hospital stay (4). Early deliveries can also be beneficial as they can avert emergent unscheduled cesareans performed under suboptimal circumstances. Postponing repeat cesarean delivery until 39 weeks increases the chance that it will be performed unscheduled and after the onset of labor, as up to 25% of pregnant women experience uterine contractions associated with cervical changes between 38 and 39 weeks (5, 7). Moreover, repeat cesarean sections performed after the onset of labor carry higher risks of complications such as uterine rupture, infection and maternal mortality than elective procedures, performed in the absence of specific obstetric indications. This is particularly relevant when spontaneous labor occurs in women with placenta previa, accreta, prior classical cesarean delivery or myomectomy (8–11).

Prior studies have investigated the perinatal risks of elective delivery at 37–41 weeks and concluded that there is a higher risk of neonatal morbidity for deliveries before compared with delivery at 39 weeks (1, 3, 9). While these studies provide useful information, using women delivered at 39 weeks as the comparison group does not take into account the entire spectrum of adverse outcomes that could derive from delivery at later gestational ages. In order to be more relevant to clinical decision-making, the risk of delivery at a specific gestational age needs to be compared to the risk of delivering at a later time. Therefore, the objective of this study was to compare the risks of elective repeat cesarean delivery at each gestational age starting at 37 weeks, with the cumulative maternal and neonatal risks of pregnancy continuation beyond that time point.

MATERIALS AND METHODS

This is a secondary analysis of the Cesarean Section Registry of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network. The study was approved by the human subjects committees at each participating center. The registry contains detailed, prospectively collected information on consecutive repeat cesareans performed at 19 United States academic centers from 1999 to 2002. Women with a singleton gestation at term and prior cesarean delivery were studied. The details of the study have been published elsewhere (12). For this analysis, data from four groups were included as previously reported by Spong et al (13): women delivering by elective (nonindicated) repeat cesarean delivery without labor, women delivering by elective (non indicated) repeat cesarean delivery performed after the onset of labor, women delivering by indicated repeat cesarean delivery without labor, and women delivering by indicated repeat cesarean delivery with labor (Figure 1).

The primary outcomes analyzed were composites. Composite maternal outcome included any of the following: death, pulmonary edema, cesarean hysterectomy, pelvic or abdominal abscess, confirmed DVT or pulmonary embolism, pneumonia, or blood transfusion. Composite neonatal outcome consisted of any of the following: death, respiratory distress, transient tachypnea of the newborn, necrotizing enterocolitis, sepsis, mechanical ventilation, seizure, hypoxic-ischemic encephalopathy, NICU admission, or 5 min Apgar score of 3 or lower. The definitions of the specific components constituting the composite maternal and neonatal outcomes have been previously reported (3, 12, 14). In accordance with the Maternal-Fetal Medicine Units Network procedures, the data collected underwent routine edits and audits.

The timing of delivery was determined in completed weeks of gestation such that 37 weeks (for example) included deliveries at 37 0/7–37 6/7 weeks. Gestational age was based on the best obstetric estimate (last menstrual period compared to ultrasound) determined by providers and used for clinical decision-making (12).

The incidence of adverse maternal and neonatal outcomes was calculated for each completed week of gestation at the time of cesarean delivery. Odds ratios (ORs) were used to compare the composite maternal and neonatal outcomes after elective cesareans without labor at a specific gestational age with the outcomes of all who were delivered later due to labor onset, specific obstetric indications, or both. Logistic regression models were used to adjust for potential confounders including race/ethnicity, number of prior cesarean sections, marital status, payer, smoking, medical history, maternal age and BMI. Categorical variables were analyzed using the chi-square test or Fisher exact test. Continuous variables were analyzed using the Wilcoxon rank sum test. A two-sided $p < 0.05$ was considered statistically significant. Data were analyzed using SAS (SAS Institute Inc, Cary, NC).

RESULTS

Out of 378,063 women enrolled in the NICHD MFMU Network Cesarean Registry, 23,794 underwent repeat cesarean delivery at or after 37 0/7 weeks' gestation. Among these, 14,993

were delivered by cesarean section before labor and in the absence of any medical or obstetric indications (Figure 1). Elective deliveries were defined according to Spong et al (13) (Figure 1). The detailed distribution of the stringent exclusion criteria applied to select prelabor elective cesarean delivery has been previously reported (3). Within the study population, 12.1% (n = 2866) were delivered at 37 completed weeks' gestation, 30.6% (n = 7280) at 38 weeks, 41.7% (n = 9921) at 39 weeks, 11.0% (n = 2611) at 40 weeks, 3.8% (n = 901) at 41 weeks, and 0.9% (n = 215) at 42 weeks or later. The maternal characteristics of the study population are displayed in Table 1. Women delivered at specific gestational ages, when compared to those who were delivered at a later time, were more frequently affected by medical disorders, had undergone more than 1 previous cesarean delivery (37–40 weeks), were more likely Caucasian, married, and insured. The data on individual and composite adverse outcomes for both mothers and neonates are presented in Table 2. The incidence of blood transfusion was significantly higher among women delivered at 37 weeks as opposed to the ones expectantly managed ($p = 0.016$), the opposite trend was noticed with 39 week deliveries ($p < 0.001$). Similarly, pneumonia was more frequent with elective deliveries at 37 weeks ($p = 0.042$), while cesarean hysterectomy was more commonly encountered in those who were still pregnant after 39 weeks ($p = 0.035$). The rate of the composite maternal outcome was significantly higher among women electively delivered at 37 weeks when compared to women expectantly managed ($p = 0.03$), but it was significantly lower among 39 week deliveries as compared to later deliveries ($p < 0.001$). Respiratory distress syndrome (RDS), transient tachypnea of the newborn, sepsis, mechanical ventilation, and NICU admissions were significantly more prevalent within the groups electively delivered at 37 and 38 weeks, and among pregnancies expectantly managed after 40 weeks (except mechanical ventilation). Significantly more neonatal deaths were recorded when pregnancies were expectantly managed after 40 weeks as compared to the ones electively delivered at 39 weeks ($p = 0.031$).

Figure 2 and 3 respectively summarize the rate of composite maternal and neonatal outcomes in women electively delivered at successive gestational ages as compared to those expectantly managed. Both maternal and neonatal adverse outcomes are decreased in those electively delivered after 39 weeks, and increased in those expectantly managed after 39 weeks. Table 3 provides the crude and adjusted odds ratios for composite maternal and neonatal outcomes of elective cesarean delivery versus expectant management at various gestational ages. Elective delivery at 37 weeks' gestation had a significantly higher risk of adverse maternal outcomes as compared to later deliveries (OR: 1.56, 95% CI 1.06 – 2.31); while, 39 week deliveries were associated with better maternal outcomes when compared to pregnancy continuation (OR: 0.51, 95% CI 0.36 – 0.72). Elective repeat cesarean deliveries at 37 and 38 weeks' gestation had a significantly higher risk of adverse neonatal outcomes as compared to expectant management (37 weeks OR: 2.02, 95% CI 1.73 – 2.36; 38 weeks OR: 1.39, 95% CI 1.24 – 1.56); in contrast, 39 and 40 week deliveries were associated with better neonatal outcomes when compared to pregnancy continuation (39 weeks OR: 0.79, 95% CI 0.68 – 0.92; 40 weeks OR: 0.57, 95% CI 0.43 – 0.75). These associations remained after adjusting for confounders.

This secondary analysis was not designed to evaluate the risks of stillbirths, as these were very rare events in the cohort (only 6 IUFDs were detected in pregnancies 37 weeks'

gestation, and these were excluded from the registry). Undoubtedly, some stillbirths could be prevented if repeat cesareans were performed at 37 or 38 weeks rather than waiting until 39 weeks. However, these are rare and earlier delivery would result in much higher risks of adverse maternal and neonatal outcomes imposed on many pregnancies to prevent a disproportionately low number of deaths in utero. Moreover, assuming an IUFD incidence of 0.5% at 37–40 wks and 0.1% at 41–42 wks (15, 16) more than 800,000 subjects would be needed to detect with adequate confidence and precision a decrease in stillbirth rate from 0.1% to 0.05% anticipating elective deliveries from 41 to 37 wks.

DISCUSSION

We found that in women with previous cesarean section, delivery during the 39th week of gestation is the optimal timing for elective delivery with the lowest risk of both maternal and neonatal complications, even after taking into consideration the risks associated with pregnancy continuation.

Concern that delivery at 39 weeks may be associated with adverse maternal outcomes, particularly among women with a prior cesarean delivery, has been suggested as one reason to recommend earlier delivery (17). However, we found that maternal outcomes tended to be better with continued pregnancy rather than elective cesarean at 37 or 38 weeks. Our findings are consistent with the work of Tita et al that showed a higher incidence of blood transfusion and maternal hospitalization > 5 days among elective repeat cesarean delivery at 37–38 gestational weeks as compared to 39 weeks (14). The authors speculated that the development of the lower uterine segment and its relation to adhesions due to prior surgery might not be optimal for avoiding blood loss before 39 weeks (14). Compared with spontaneous vaginal deliveries, cesarean deliveries are associated with increased maternal morbidity (18), but when carried out electively the risks of maternal complications are lower than when performed in labor or emergently (10, 11). In fact, unscheduled cesareans performed during labor or due to maternal or fetal deterioration are associated with higher risks of uterine rupture, infection, DVT and maternal mortality than elective procedures; moreover, they also have higher anesthesia related complications such as failed intubation and pulmonary aspiration (8–11). In our analysis, we demonstrated decreased maternal complications with deliveries electively performed at 39 weeks; such findings can be related to the lower rates of cesarean sections performed in labor, as many women go into labor after 39 weeks (9).

Given that the majority of women with a previous cesarean delivery elect a repeat cesarean (19), that more than 25% of primary cesarean sections are scheduled (20), and that cesarean sections on maternal request are on the rise (21), the timing of cesarean delivery and its effect on infant outcomes have substantial public health importance. Our findings are consistent with the results of other cohort studies conducted in both the United States and Europe demonstrating increased neonatal morbidity and mortality with elective cesarean delivery before 39 gestational weeks (1, 3, 9, 22). Similarly, we confirmed that elective deliveries at 39 and 40 weeks are associated with fewer adverse neonatal outcomes than is pregnancy continuation (3).

The sudden death of a fetus in utero has tragic implications, especially when the alternative could have been a healthy neonate had delivery occurred earlier. The risk of unexplained stillbirth has been reported to increase after 37 weeks' gestation (23, 24). Earlier delivery may also prevent pregnancy complications from uncontrolled gestational diabetes, gestational hypertension, preeclampsia and eclampsia that increase proportionally with gestational age (4, 25, 26). However, despite the large sample size, this secondary analysis was not designed to evaluate the risks of stillbirths.

The strengths of our analysis include the large sample size, the large number of sites and clinical practices represented, the prospective and rigorous collection of data, and our ability to adjust for multiple potential confounders. In addition, the use of a hazard approach to evaluate the risks involved in the decision to deliver versus not to deliver at various gestational ages is a more accurate representation of the actual implications of such decision. Previous studies have compared maternal and neonatal outcomes at different gestational ages, but did not account for the potential consequences of pregnancy continuation. Instead, the hazard approach allowed us to compare the outcomes after elective repeat cesareans at a specific gestational age with the outcomes of all who were delivered later. Our study also had some weaknesses. We did not have information about testing for lung maturity. Moreover, we were unable to determinate all the nuances surrounding elective cesarean sections, including delivery indications such as maternal fatigue or anxiety.

By accounting for the risk associated with continuing pregnancy beyond specific gestational ages, our analysis confirmed that 39 weeks is the optimal timing for elective delivery for both mother and baby. These findings further support enforcement of a policy that recommends repeat cesareans after 39 completed weeks in the absence of specific maternal or fetal indications for earlier delivery.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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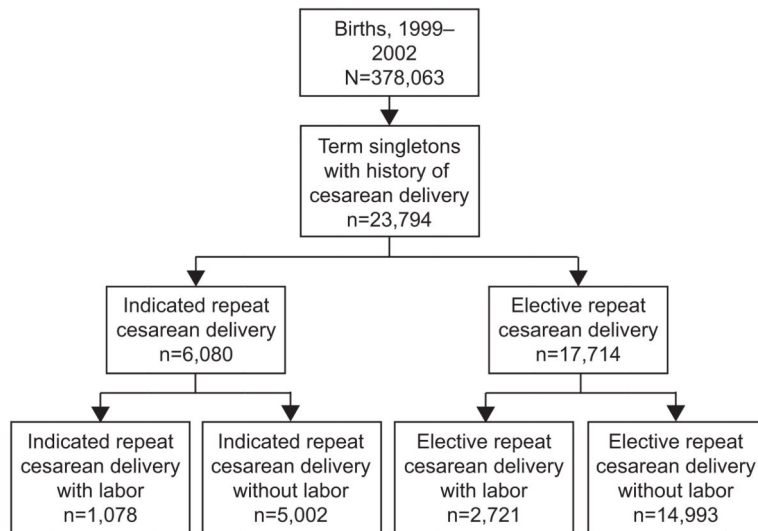


Figure 1. Patients included in this secondary analysis of the Maternal-Fetal Medicine Units (MFMU) cesarean registry.

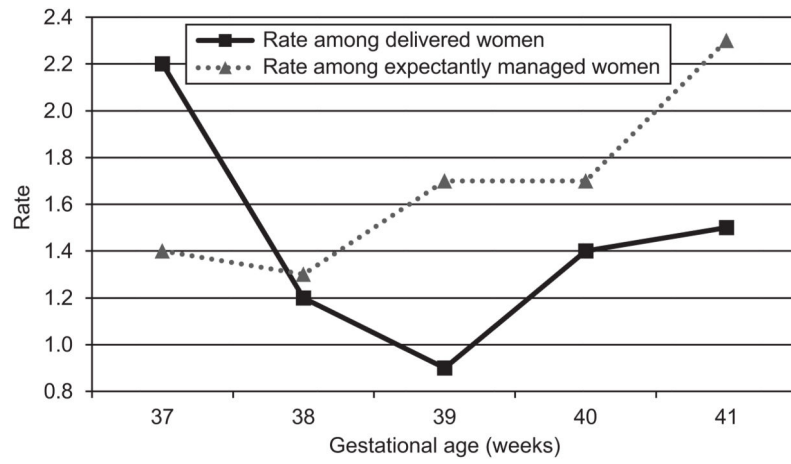


Figure 2. Composite maternal outcome for delivery compared with expectant management. Rate is expressed as percentage of women with adverse outcomes.

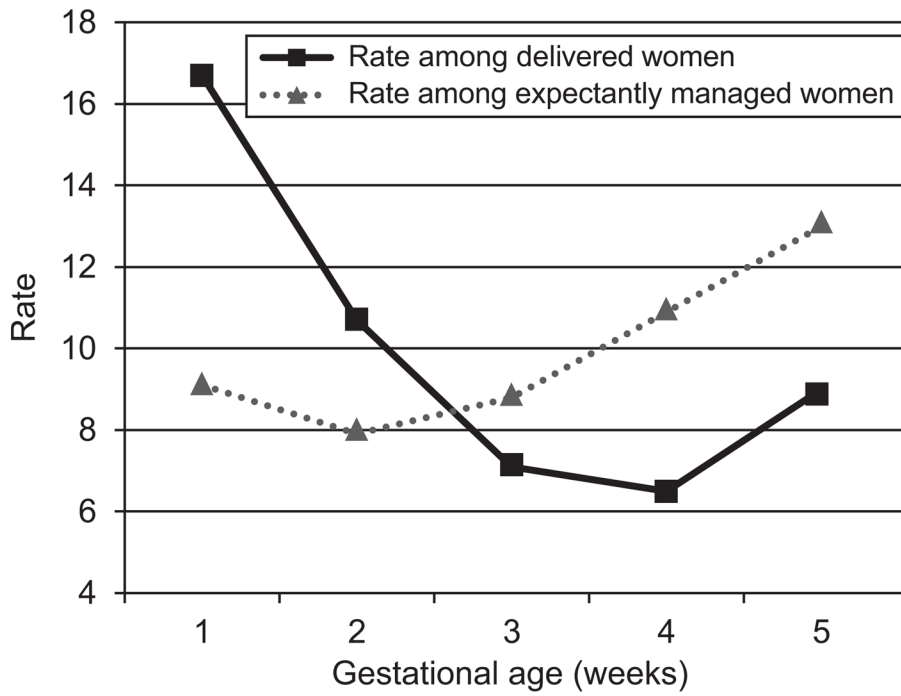


Figure 3. Composite neonatal outcome for delivery compared with expectant management. Rate is expressed as percentage of neonates with adverse outcomes.

Table 1
Demographics of the Patients Delivered at Successive Gestational Ages Compared With Those Who Were Delivered Later

	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P			
	Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*				
Gestational age at delivery	37	38		38	39		39	40		40	41		41	42	
n	1296	20928		6941	13648		3727	1492		535	215		535	215	
Maternal age	30.6 ± 5.6	29.5 ± 5.7	<0.001	30.6 ± 5.4	29.1 ± 5.7	<0.001	28.2 ± 5.8	28.7 ± 5.8	<0.001	28.1 ± 5.9	27.3 ± 5.8	<0.001	28.1 ± 5.9	27.3 ± 5.8	0.139
Delivery body mass index	34.1 ± 7.6	33.4 ± 6.9	0.018	33.2 ± 6.9	33.5 ± 6.9	0.009	33.8 ± 6.8	33.8 ± 6.7	0.026	34.5 ± 6.6	34.0 ± 7.1	0.689	34.5 ± 6.6	34.0 ± 7.1	0.196
Race or ethnicity			<0.001			<0.001			<0.001			<0.001			0.090
Caucasian	624 (48.1)	8107 (38.7)		2472 (53.7)	4716 (34.6)		922 (24.7)	491 (32.9)		127 (23.7)	33 (15.4)		127 (23.7)	33 (15.4)	
Black	289 (22.3)	4545 (21.7)		849 (18.5)	3090 (22.6)		1023 (27.5)	387 (25.9)		138 (25.8)	63 (29.3)		138 (25.8)	63 (29.3)	
Hispanic	315 (24.3)	7297 (34.9)		1068 (23.2)	5216 (38.2)		1589 (42.6)	540 (36.2)		237 (44.3)	105 (48.8)		237 (44.3)	105 (48.8)	
Other	68 (5.3)	979 (4.7)		212 (4.6)	626 (4.6)		193 (5.2)	74 (5.0)		33 (6.2)	14 (6.5)		33 (6.2)	14 (6.5)	
Married	886 (68.4)	13199 (63.1)	0.001	3339 (72.6)	8206 (60.1)	<0.001	1928 (51.7)	859 (57.6)	<0.001	284 (53.1)	89 (41.4)	<0.001	284 (53.1)	89 (41.4)	0.004
Payor			<0.001			<0.001			<0.001			<0.001			0.007
Medicaid or none	631 (48.7)	11831 (56.5)		1838 (40.0)	8380 (61.4)		2708 (72.7)	936 (62.7)		408 (76.3)	183 (85.1)		408 (76.3)	183 (85.1)	
Other	665 (51.3)	9094 (43.5)		2760 (60.0)	5268 (38.6)		1019 (27.3)	556 (37.3)		127 (23.7)	32 (14.9)		127 (23.7)	32 (14.9)	
Smoker	154 (11.9)	2415 (11.5)	0.712	512 (11.1)	1604 (11.8)	0.249	456 (12.2)	182 (12.2)	0.509	54 (10.1)	21 (9.8)	0.780	54 (10.1)	21 (9.8)	0.887
Prior cesarean delivery			<0.001			<0.001			<0.001			<0.001			0.018
1	708 (54.6)	13952 (66.7)		2811 (61.1)	9280 (68.0)		2879 (77.3)	1083 (72.6)		431 (80.6)	153 (71.2)		431 (80.6)	153 (71.2)	
2	419 (32.3)	5589 (26.7)		1365 (29.7)	3557 (26.1)		704 (18.9)	332 (22.2)		88 (16.4)	54 (25.1)		88 (16.4)	54 (25.1)	
3 or more	169 (13.1)	1381 (6.6)		425 (9.2)	806 (5.9)		143 (3.8)	77 (5.2)		16 (3.0)	8 (3.7)		16 (3.0)	8 (3.7)	
Maternal disease	455 (35.1)	4027 (19.2)	<0.001	1093 (23.8)	2328 (17.1)	<0.001	468 (12.6)	206 (13.8)	<0.001	54 (10.1)	24 (11.2)	0.005	54 (10.1)	24 (11.2)	0.664

* Sum of indicated repeat cesarean delivery with labor, indicated repeat cesarean delivery without labor and elective repeat cesarean delivery with labor.
Data are n (%) or mean ± standard deviation unless otherwise specified.

Maternal disease was defined as asthma, diabetes, pregestational chronic hypertension treated with medication, seizure disorder, thyroid disease, renal disease, or connective tissue disease.

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Table 2

Composite and Individual Maternal and Neonatal Outcomes

	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P
	Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*	
Gestational age at delivery	37	38		39	40		40	41		41	42	
n	1296	20928		13648	6941		3727	1116		535	215	
Maternal outcomes												
Death	0 (0)	5 (0.02)	>0.999	4 (0.03)	4 (0.06)		0 (0)	0 (0)		0 (0)	0 (0)	---
Pulmonary edema	1 (0.08)	15 (0.07)	0.618	10 (0.07)	3 (0.04)	0.761	3 (0.08)	2 (0.2)	0.580	2 (0.4)	0 (0)	>0.999
Cesarean hysterectomy	5 (0.4)	57 (0.3)	0.410	34 (0.3)	11 (0.2)	0.862	14 (0.4)	3 (0.3)	0.531	1 (0.2)	2 (0.9)	0.199
Abscess	0 (0)	4(0.02)	>0.999	3 (0.02)	1 (0.01)	0.577	1 (0.03)	0 (0)	---	0 (0)	0 (0)	---
Deep vein thrombosis of pulmonary embolism	1 (0.08)	20 (0.1)	>0.999	12 (0.09)	3 (0.04)	0.421	4 (0.1)	0 (0)	0.510	0 (0)	0 (0)	---
Pneumonia	4 (0.3)	19 (0.09)	0.042	14 (0.1)	4 (0.06)	0.387	7 (0.2)	2 (0.2)	0.580	1 (0.2)	0 (0)	>0.999
Blood transfusion	25 (1.9)	238 (1.1)	0.016	142 (1.0)	46 (0.7)	0.346	52 (1.4)	15 (1.3)	0.864	5 (0.9)	5 (2.3)	0.160
Composite outcomes	28 (2.2)	292 (1.4)	0.030	177 (1.3)	60 (0.9)	0.543	63 (1.7)	19 (1.7)	0.630	8 (1.5)	5 (2.3)	0.536
NeonatalOutcomes												
Death	1 (0.08)	30 (0.1)	>0.999	15 (0.1)	4 (0.06)	0.164	8 (0.2)	2 (0.2)	>0.999	2 (0.4)	0 (0)	>0.999
Respiratory distress syndrome	49 (3.8)	333 (1.6)	<0.001	178 (1.3)	71 (1.0)	<0.001	58 (1.6)	19 (1.7)	0.239	6 (1.1)	3 (1.4)	0.721
Transient tachypnea of the newborn	69 (5.3)	735 (3.5)	0.001	439 (3.2)	203 (2.9)	0.001	142 (3.8)	56 (5.0)	0.003	24 (4.5)	12 (5.6)	0.572
Necrotizing enterocolitis	1 (0.08)	1 (0.005)	0.113	1 (0.01)	0 (0)	>0.999	1 (0.03)	1 (0.09)	0.428	0 (0)	0 (0)	---
Sepsis	92 (7.1)	811 (3.9)	<0.001	476 (3.5)	204 (2.9)	0.003	167 (4.5)	62 (5.6)	0.003	24 (4.5)	17 (7.9)	0.075
Mechanical ventilation	30 (2.3)	176 (0.8)	<0.001	91 (0.7)	39 (0.6)	0.037	28 (0.8)	8 (0.7)	>0.999	4 (0.8)	0 (0)	0.583
Seizure	1 (0.08)	11 (0.05)	0.514	6 (0.04)	3 (0.04)	0.348	2 (0.05)	2 (0.2)	0.183	2 (0.4)	0 (0)	>0.999
Hypoxic ischemic encephalopathy	0 (0)	1 (0.005)	>0.999	0 (0)	0 (0)	---	0 (0)	0 (0)	---	0 (0)	0 (0)	---
Neonatal intensive care unit admission	212 (16.4)	1825 (8.7)	<0.001	1046 (7.7)	484 (7.0)	<0.001	315 (8.5)	117 (10.5)	<0.001	44 (8.2)	27 (12.6)	0.073

	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P	Indication for Delivery and Gestational Age at Delivery		P
	Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*		Elective Repeat Cesarean Delivery Without Labor	Other*	
Gestational age at delivery	37	38		39	40		40	41		41	42	
5-min Apgar 3	1 (0.08)	30 (0.1)	>0.999	12 (0.09)	5 (0.1)	0.077	4 (0.6)	1 (0.09)	>0.999	1 (0.2)	0 (0)	>0.999
Composite outcomes	217 (16.7)	1894 (9.1)	<0.001	493 (10.7)	329 (8.8)	<0.001	494 (7.1)	122 (10.9)	<0.001	48 (9.0)	28 (13.0)	0.108

* Sum of indicated repeat cesarean delivery with labor, indicated repeat cesarean delivery without labor, and elective repeat cesarean delivery with labor. Data are n (%) unless otherwise specified.

Table 3
Crude and Adjusted Odds Ratios for Elective Cesarean Delivery Compared With Expectant Management at the Designated Week

Gestational Age (Weeks)	Univariate			Multivariable		
	Crude Odds Ratio	95% CI	P	Adjusted Odds Ratio	95% CI	P
Composite maternal outcome						
37	1.56	[1.06, 2.31]	0.030	1.53	[1.02, 2.29]	0.038
38	0.90	[0.67, 1.23]	0.543	0.96	[0.69, 1.34]	0.811
39	0.51	[0.36, 0.72]	<0.001	0.54	[0.37, 0.81]	0.003
40	0.82	[0.44, 1.54]	0.630	0.69	[0.34, 1.38]	0.291
41	0.64	[0.21, 1.97]	0.536	0.66	[0.20, 2.16]	0.486
Composite neonatal outcome						
37	2.02	[1.73, 2.36]	<0.001	1.71	[1.45, 2.01]	<0.001
38	1.39	[1.24, 1.56]	<0.001	1.44	[1.28, 1.62]	<0.001
39	0.79	[0.68, 0.92]	0.002	0.83	[0.71, 0.97]	0.019
40	0.57	[0.43, 0.75]	<0.001	0.57	[0.42, 0.76]	<0.001
41 or more	0.66	[0.40, 1.08]	0.108	0.69	[0.40, 1.18]	0.172

CI, confidence interval.