



Neonatal impact of elective repeat cesarean delivery at term: A comment on patient choice cesarean delivery

Nicholas S. Fogelson, MD,^{a,*} M. Kathryn Menard, MD, MPH,^a
Thomas Hulsey, ScD,^b Myla Ebeling, HTBE^b

Departments of Obstetrics and Gynecology,^a and Pediatric Epidemiology,^b Medical University of South Carolina, Charleston, SC

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KEY WORDS

Elective cesarean section
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Objective: The object of this study was to compare neonatal outcomes of term uncomplicated pregnancies delivered by scheduled repeat cesarean with outcomes of babies born to mothers intending to deliver vaginally.

Study design: This retrospective cohort study describes neonatal outcomes of term uncomplicated pregnancies. Neonates of mothers intending to deliver vaginally (n = 3134) are compared with neonates born by elective repeat cesarean delivery prior to labor (n = 117).

Results: Neonates born by elective repeat cesarean are more frequently admitted to advanced care nurseries than infants born to mothers intending to deliver vaginally (risk ratio 3.58, 95% confidence interval 3.35-3.58).

Conclusion: The decision to undergo scheduled cesarean delivery appears to negatively impact immediate neonatal outcomes.

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In beneficence-based clinical reasoning regarding patient choice cesarean, maternal and neonatal risk and benefit must be considered.¹ Potential maternal benefits of patient choice cesarean delivery have been described,² but there is no published literature that directly compares neonatal outcomes of elective cesarean to outcomes of uncomplicated pregnancies intending to deliver vaginally.

Infants delivered by scheduled repeat cesarean are reported to have an increased risk of pulmonary hypertension,³ transient tachypnea of the newborn and respiratory distress.^{4,5} The objective of this study was to compare neonatal outcomes of pregnancies delivered by elective repeat cesarean delivery with the outcomes of uncomplicated pregnancies of mothers intending to deliver vaginally.

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* Reprint requests: Nicholas Fogelson, MD, 96 Jonathan Lucas Street, Suite 634, Charleston, SC 29425.

E-mail: fogelson@musc.edu

Material and methods

This study was an institutional review board–approved retrospective cohort analysis of mother-infant pairs born from January 1995 through June 2003 at a single tertiary care academic medical center. Data were extracted from

Table I Maternal and fetal demographic information

	Intended vaginal		Elective repeat cesarean	
	Number	Percent	Number	Percent
Number	3134		117	
Maternal demographics				
Black	1682	53.7	43	36.7
White	1049	33.5	51	43.6
Other	403	12.8	23	19.7
Age (y)				
< 20	862	27.5	10	8.6
20-29	1630	52.0	63	53.9
> 30	642	20.5	44	37.6
Fetal demographics				
Gestational age (mean)	39.7		39.5	
Gestational age (median)	40		39	
Birth weight (mean)	3368		3443	
Birth weight (median)	3340		3440	

Table II Neonatal outcomes of infants born to mothers intending vaginal delivery and those delivered by elective cesarean section

	Intended vaginal		Elective cesarean		P value
	n	Percent	n	Percent	
Number	3134		117		
Volume expander use at delivery	37	1.2	3	2.6	.1
IV medication use at delivery	3	0.1	0	0.00	.6
Surfactant use	7	0.2	1	0.9	.2
Intubated in nursery	21	0.7	1	0.9	.4
Transient tachypnea	54	1.7	7	6.0	.0009
1-min Apgar score \leq 4	144	4.6	7	6.0	.5
5-min Apgar score \leq 4	7	0.2	0	0.00	.8
5-min Apgar score \leq 6	40	1.3	0	0.00	.2
Level I admission	3007	96.0	100	85.5	< .0001
Level II admission	88	2.8	13	11.1	< .0001
Level III admission	39	1.2	4	3.4	.04
Advanced care nursery (II + III)	127	4.1	17	14.5	< .001

an internally validated research quality prospective database.

Mother-infant pairs were between 39-0/7 and 40-6/7 weeks' gestation by American College of Obstetrics and Gynecology criteria.⁶ Pregnancies complicated by maternal diabetes, chronic hypertension, renal failure, hemoglobinopathy, isoimmunization, heart failure, multiple gestation, vaginal birth after cesarean attempt, or induction of labor were excluded. Pregnancies with fetal complications such as congenital defect, growth restriction, oligohydramnios, and placental abnormalities were also excluded.

Primary outcomes were Apgar scores, need for oxygen at resuscitation, use of volume expanders or intravenous (IV) medications at delivery, use of surfactant, frequency of transient tachypnea of the newborn, and admissions to the advanced care nurseries.

An additional subgroup analysis was performed comparing the outcomes of infants born by scheduled cesarean section to infants born by cesarean section for intrapartum indications.

Fisher's exact and χ^2 tests were applied where appropriate. Logistical regression analysis was performed to control for the potential confounding effect of maternal age and race. *P* values are reported where cell size is too small to report confidence intervals.

Results

We identified 117 uncomplicated term elective repeat cesareans prior to labor and 3134 mothers intending to deliver vaginally. Mother-infant pairs in the intended vaginal delivery group were delivered by spontaneous

Table III Neonatal outcomes of infants born by intrapartum cesarean section and those born by scheduled elective repeat cesarean section

	Intrapartum cesarean		Elective cesarean		P value
	n	Percent	n	Percent	
Number	285		117		
Volume expander use at delivery	37	1.2	3	2.6	.1
IV medication use at delivery	2	0.7	0	0.00	.5
Surfactant use	3	1.1	1	0.9	.4
Intubated in nursery	5	1.8	1	0.9	.3
Transient tachypnea	14	4.9	7	6.0	.7
1-min Apgar score ≤ 4	42	14.7	7	6.0	.01
5-min Apgar score ≤ 4	3	1.1	0	0.00	.4
5-min Apgar score ≤ 6	11	3.9	0	0.00	.02
Level I admission	255	89.5	100	85.5	.3
Level II admission	20	7.0	13	11.1	.2
Level III admission	10	3.5	4	3.4	.2
Advanced care nursery (II + III)	30	10.5	17	14.5	.3

vaginal delivery (2524), operative vaginal delivery (325), or cesarean following labor for intrapartum indication (285). The groups had similar mean gestational ages and mean birth weights. The groups differed in race distribution and maternal age distribution (Table I). After logistical regression, race and maternal age were not linked to the need for advanced care nursery care or transient tachypnea.

Our initial comparison compared all infants born to mothers intending vaginal delivery with infants born by elective repeat cesarean (Table II.) The rate of neonatal admission to an advanced care nursery was higher in the elective cesarean group, 14.5% versus 4.1% to the intended vaginal group (risk ratio [RR] 3.58, 95% confidence interval [CI] 3.35-3.58). Infants born by elective cesarean were admitted to an intermediate care nursery 11.1% versus 2.8% in the intended vaginal group (RR 3.95, 95% CI 3.85-4.07.) Neonatal intensive care unit admissions were more frequent in the elective cesarean group, 3.4% versus 1.2% ($P = .04$.) Transient tachypnea was more common with elective cesarean, 6.0% of cases versus 1.7% in the intended vaginal group (RR 3.48, 95% CI 3.16-3.81). Surfactant use and need for intubation in the nursery were statistically similar, as were Apgar scores at 1 and 5 minutes. The need for IV medications and volume expanders were similar between groups. Oxygen was used at resuscitation more frequently in the cesarean group.

A subgroup analysis was performed, comparing infants born by unscheduled cesarean delivery for obstetrical indication with infants born by scheduled elective repeat cesarean delivery (Table III). This comparison found differences only in the frequency of low 1- and 5-minute Apgar scores, which were more frequent in the intrapartum cesarean group. Rates of intermediate and intensive care nursery admissions were similar

between groups, although there was a trend toward greater need for intermediate level care in the elective cesarean group. There was a trend toward more transient tachypnea in the elective cesarean group, although this was not statistically significant.

Comment

In this cohort of uncomplicated, well-dated term pregnancies, elective repeat cesarean delivery was associated with a higher rate of short-term neonatal morbidity, compared with a trial of labor. Transient tachypnea of the newborn was more common with scheduled cesarean delivery. Past literature⁷ suggests that significant respiratory morbidity in term cesarean deliveries may be the result of iatrogenic prematurity. In this cohort, transient tachypnea of the newborn was prevalent, despite the exclusion of poorly dated pregnancies and deliveries less than 39 weeks. This supports the theory that labor may confer benefit in terms of neonatal respiratory morbidity.

The subgroup analysis is suggestive that in this low-risk population, infants born by intrapartum cesarean are not more likely to have immediate neonatal problems than infants born by elective cesarean, despite a higher rate of low Apgar scores.

The intention of this study was to describe data that would be useful when counseling women considering patient choice cesarean. Until data on a large number of patient choice cesarean deliveries are available, we believe that it is reasonable to consider neonatal outcomes of scheduled repeat cesareans as a surrogate for outcomes of patient choice cesarean.

The decision to undergo elective cesarean delivery appears to have negative impact on immediate neonatal outcomes. In ethical discussions of beneficence and

those with women considering elective cesarean delivery in an uncomplicated pregnancy, clinicians should counsel patients about potential neonatal issues in addition to concerns for maternal well-being.

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