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Neonatal Outcomes in Relation to Timing of Term Cesarean Delivery: An Observational Study

Ali Khairrallah Alzahrani[1,2*]

[1]*Department of Pediatrics, College of Medicine, Taif University, Saudi Arabia*

[2]*Neonatal Intensive Care Unit, King Abdul Aziz Specialist Hospital, Taif, Saudi Arabia*

[*]**Corresponding author**: Ali Khairrallah Alzahrani, Department of Pediatrics, College of Medicine, Taif University, Saudi Arabia; E-mail: alizahrani44@yahoo.com

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Abstract

Aim: To study neonatal outcomes associated with emergency CS performed beyond 37 weeks' gestation.

Methods: This retrospective observational study was conducted at Obstetrics department, King Abdul-Aziz Specialist Hospital, KSA, from the start of July 2015 to the end of September 2016 among women presented for emergency CS beyond 37 weeks' gestation. 1105 cases were eligible for the study. Medical records were reviewed for demographic and clinical data, timing of emergency cesarean deliveries and any adverse neonatal outcomes. Main outcome measures were neonatal adverse outcomes (death, respiratory distress syndrome, neonatal sepsis, neonatal jaundice, cardiopulmonary resuscitation or ventilator support within 24 hours after birth, admission to the NICU) were assessed in relation to the timing of CS.

Results: Gestational age at delivery was divided into two groups: 37-38+6 weeks and 39-40+6 weeks. Most adverse neonatal outcomes were significantly higher with lower gestational age (P-value<0.05).

Conclusion: CS prior to 39 weeks is associated with significant adverse neonatal outcomes. Hence, delaying CS until 39 weeks of gestation in the absence of obstetric or medical indications for early delivery is a must.

Keywords: CS; Neonatal outcomes; Timing of delivery

Introduction

Cesarean section (CS) rates have been increasing all over the world and are now considered an international phenomenon [1]. Although often having a clear indication, cesarean delivery may also be medically unnecessary [2]. In a recent study by Shaaban, et al. they highlighted that lack of knowledge, deficiency in some clinical skills and certain professional attitudes may be behind the surge in CS rates [3,4].

Controversies had been raised in relation to the appropriate timing of CS since performing the operation prior to 39 weeks of gestation has been associated with many neonatal morbidities especially respiratory complications with increasing rates of Neonatal ICU (intensive care unit) admissions [5,6]. Therefore, many guidelines recommend that planned CS should not be routinely carried out before 39 completed weeks of gestation [7-9].

Despite these recommendations, CS prior to 39 weeks is still being carried out [10] and one of the reasons behind such practice is that between 38 and 39 weeks of gestation, approximately 10-14% of women go into spontaneous labor; meaning that a considerable number of women planned for elective CS at 39 weeks will deliver earlier in an unscheduled, frequently emergency setting [11].

Therefore, this study is conducted to assess the effect of timing of emergency CS at term, whether before or after 39 completed weeks of gestation on the neonatal outcomes.

Materials and Methods

After approval of ethics committee of faculty of medicine, Taif University; this retrospective observational study was conducted among women subjected to term emergency CS during the period from the start of July 2015 to the end of September 2016 at Obstetrics department of King Abdul-Aziz Specialist Hospital. This hospital is a tertiary hospital with about 11,000 deliveries per year. During this period a total of 3129 cesarean sections were performed including elective and emergency cesarean sections. Out of this number, 1495 elective CS cases were excluded and the remaining 1634 were emergency CS. Inclusion criteria involved all emergency CS at term (37 weeks and beyond) for any medical or obstetrical conditions that would warrant early or immediate delivery. Women who had multiple gestations or a fetus with a major congenital anomaly, intrauterine fetal death or with incomplete data sets were excluded from the study (n=529). The number of eligible women who were included in the study was 1105; they were subdivided into 649 of had a non-scarred uterus whereas 456 women had a scarred uterus. Outcome measures were the adverse neonatal outcomes in relation to the timing of CS. Neonatal adverse outcomes (death, respiratory distress syndrome, neonatal sepsis, neonatal jaundice, cardiopulmonary resuscitation or ventilator support within 24 hours after birth, admission to the NICU) were also assessed.

The diagnosis of respiratory distress syndrome required signs of respiratory distress, radiological features, and oxygen therapy with a fraction of inspired oxygen (FiO_2) of 0.40 or greater for at least 24 hours [12,13]. Newborn sepsis included both suspected infections (with clinical findings suggesting infection) and proved infections (as

confirmed in a subgroup of neonates with positive cultures of blood, cerebrospinal fluid, or urine obtained by catheterization or an unequivocal radiograph confirming infection in a neonate with clinical sepsis) [13], neonatal jaundice was defined as serum bilirubin level equal to or more 18 mg [14].

Data were collected through a data collection sheet attached to each file and extracted after the discharge of the woman and her baby from medical records department at King Abdul-Aziz Specialist Hospital. An electronic form of data collection was running in parallel.

Data were processed using SPSS version 16 (SPSS Inc., Chicago, IL, USA). Quantities data were expressed as means ± SD and qualitative data were expressed as numbers and percentages. Analysis of variance test was used to test the significance of difference for quantitative variables while Chi-square was used to test the significance of qualitative variables. Adjusted odds ratios (OR) for the association between neonatal outcomes and delivery time derived from logistic regression models were calculated. A two-sided p-value<0.05 was considered statistically significant.

Results

The incidence of adverse neonatal outcomes by gestational age at delivery is presented in Table 1. There were no cases of neonatal mortality. There was statistically significant increase in the incidence of all studied outcomes (except CPR or required ventilation in the first 24 hours) with decreasing gestational age at delivery among neonates of both scarred and non-scarred uterus groups. Respiratory distress syndrome and transient tachypnea of newborn were significantly higher with earlier gestational age at delivery in both groups. Neonatal sepsis and neonatal jaundice were significantly more among newborn of lower gestational age. NICU admission and neonatal hospitalization were both more likely to occur with earlier gestational age at delivery.

Gestational age (completed weeks)	Scarred uterus n=456		p-value	Non-scarred uterus (n=649)		p-value
N	37-38+6 weeks 201	39-40+6 weeks 255		37-38+6 weeks 311	39-40+6 weeks 338	
Respiratory distress syndrome	3.50%	0.40%	0.03*	2.90%	0.30%	0.02*
Transient tachypnea of newborn	6.50%	1.60%	0.01*	5.50%	1.80%	0.02*
Newborn sepsis	2.50%	0%	0.03*	2.90%	0.30%	0.01*
Neonatal jaundice	5.90%	1.60%	0.02*	4.50%	0.90%	0.008*
CPR or ventilation in 1st 24 hours	1.50%	0.40%	0.5 (NS)	0.90%	0.30%	0.6 (NS)
NICU admission	9.90%	2.70%	0.002*	7.40%	1.80%	0.001*
Prolonged hospitalization (>3 days)	6.50%	1.20%	0.005*	5.10%	0.90%	0.003*
Neonatal mortality	0%	0%	-	0%	0%	-
*Statistically Significant Difference, NS: No Statistically Significant Difference.						

Table 1: Adverse neonatal outcome by gestational age at cesarean delivery.

		Scarred uterus		Non-scarred uterus	
		OR	95%CI	OR	95%
Neonatal outcomes	Respiratory distress syndrome	9.2	1.2-414.5*	10.04	1.4-441.4*
	Transient tachypnea of newborn	11.01	3.8-43.6*	19.5	3.1-81.6*
	Newborn sepsis	6.8	1.3-9.6*	10.04	1.4-441.4*
	Neonatal jaundice	3.9	1.2-17.2*	5.3	1.4-28.8*
	CPR or ventilation in 1st 24 hours	1.09	0.6-1.3	1.04	0.2-1.9
	NICU admission	3.9	1.5-11.2*	4.4	1.7-13.4*
*Statistically significant, OR: Odds Ratio, CI: Confidence Interval, NICU: Neonatal Intensive Care Unit, CPR: Cardiopulmonary Resuscitation.					

Table 2: Odds ratios for neonatal adverse outcomes according to completed weeks of gestation (37-38+6 weeks versus 39-40+6 weeks).

No statistically significant difference versus scarred uterus group of similar gestational age (Table 2).

Odds ratio and logistic regression analysis , as regards neonatal outcomes; early delivery was associated with increased risk of all studied adverse outcomes (except CPR or required ventilation in the

first 24 hours) with OR ranged from 3.9 for (neonatal jaundice) up to as high as 19.5 for (Transient tachypnea of newborn). Also, it was noted that there weren't significant discrepancies between scarred and non-scarred uterus groups regarding the risk of neonatal morbidities with early delivery.

Discussion

To the best of our knowledge, this is one of few retrospective studies to assess the effect of CS timing on neonatal outcomes. Although we recorded no neonatal mortality, there was a significant increase in the incidence of all adverse neonatal outcomes such as respiratory distress syndrome (RDS), transient tachypnea of newborn, NICU admission and prolonged hospitalization with decreasing GA at cesarean delivery. These findings are consistent with the recently published study by Mohammed and colleagues, [15] who evaluated the adverse neonatal outcomes in relation to the timing of ERCS (39 weeks versus 38 weeks). They found a significant association between NICU admission and RDS with delivery prior to 39 weeks of gestation. In their study – as well as the present one – respiratory related complications (RDS) is the most common reason for NICU admission.

Also in a recently published study by Ertuğrul et al. [16], elective CS prior to 38 weeks was associated with significant increase in neonatal adverse outcomes particularly related to respiratory complications (RDS and transient tachypnea of the newborn).

Interestingly, Tita et al. [17] reported that for an average hospital with 4500 births a year and a 10% elective cesarean delivery rate, scheduling delivery at 38 weeks rather than 39 weeks will result in an additional 10 neonates with respiratory morbidity a year, assuming an additional 2% neonatal morbidity for those delivered at 38 weeks as compared to 39 weeks.

Conclusion

In conclusion, the American College of Obstetricians and Gynecologists recommended delaying cesarean delivery until 39 weeks of gestation in the absence of obstetric or medical indications for early delivery. We recommend performing CS in the previously scarred uterus at or just after 38 weeks while in the non-scarred uterus, it is appropriate to wait until 39 weeks.

Brief Points

- Cesarean sections are now considered an international phenomenon.
- Controversies had been raised in relation to the appropriate timing of CS.
- Much neonatal morbidity especially respiratory complications were associated with CS with increasing rates of Neonatal ICU (intensive care unit) admissions.
- This study in Taif city, Saudi Arabia concluded that CS prior to 39 weeks is associated with significant adverse neonatal outcomes.
- Hence, delaying CS until 39 weeks of gestation in the absence of obstetric or medical indications for early delivery is a must.
- Performing CS in the previously scarred uterus at or just after 38 weeks while in the non-scarred uterus, it is appropriate to wait until 39 weeks is a must.

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