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RESEARCH ARTICLE

Impact Of Timing Of The Repeated Elective Cesarean Section On The Early Neonatal Outcomes.

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Abstract

Background: The infants born before 39 weeks of gestation are at increased risk for neonatal adverse outcomes, and the risk increases progressively as gestational age at birth declines.

Objective: We sought to evaluate the impact of timing of the repeated elective cesarean section on the early neonatal outcomes.

Methods: An observational study of 437 pregnant women admitted to the obstetric department for planned CS. Patients selected if they were planning to deliver effectively by CS, and had at least one previous CS. According to the gestational age mothers divided into five groups: 36wk, 37wk, 38wk, 39wk, and 40wk. All mothers and newborns parameters were recorded and the newborns followed up from delivery until discharge with a documented outcome.

The results: We found that 49.7% of pregnant women delivered earlier than 38 weeks gestation and had 15.2 % admissions to the NICU compared with 7.7 % in those delivered after completing 37 weeks gestation (RR= 1.97, 95% CI 1.1-3.4, p= 0.017). About 1.38 % death occurs in less than 38 weeks gestation group while no death occurs in the later gestational age group. Respiratory distress was the main neonatal cause of admission (9.2%) followed by transient tachypnea of newborn (4.1%) with tendency to occur more in earlier than 38 weeks of gestation (p <0.01 for both).

Conclusion: CS earlier than 38⁺⁶ weeks gestation is a significant contributing factor of increasing the neonatal morbidity and mortality rate and our results support the recommendations of delay elective CS until 39 weeks of gestation.

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INTRODUCTION

In the last decades, deliveries by Caesarean Section (CS) continuously increased in both developed and developing countries. In regions like Latin America, around 50% of patients underwent for Caesarean Section ⁽¹⁾. Similarly, the rate of CS in the United States rose from 20.7% in 1996 to 31.1% in 2006, mainly because of the declining rates of vaginal birth after CS ⁽²⁾.

However, there are certain obstetrical complications or serious maternal conditions determined the need for CS ⁽³⁾. Recently, the advances in anesthetic and surgical procedures, along with the widely accepted elective CS in cases of previous CS or breech presentation, has been the major determinant of changes in obstetric practice and patient choice ⁽⁴⁾. Besides the timing, the elective caesarean delivery has increasingly important public health implications ⁽⁵⁾. The risk for pulmonary disorders and subsequent transfer rates in the neonatal intensive care unit (NICU) are significantly higher after a planned CS delivery compared to planned vaginal delivery ^(7, 8). Tita *et al* ⁽⁹⁾ recently

showed that neonatal morbidity is still significantly higher in neonates born after an elective repeat caesarean section between 38⁺⁴ - 38⁺⁶ weeks as compared to neonates born thereafter.

Infants born before 39 weeks (wk) of gestation are at increased risk for neonatal adverse respiratory outcomes, and the risk increases progressively as gestational age at birth declines^(10, 11). In this study, we aim to evaluate the effect of timing of repeat elective CS on the primary neonatal outcome.

Methods:

An observational study of 437 pregnant women admitted to the obstetric department for planned CS. Patients selected if they were planning to deliver effectively by CS, and had at least one previous CS. All of them had single viable fetuses with uneventful, uncomplicated pregnancies.

Mothers and their newborns were excluded from the study if they have emergency CS, delivered normally, primigravida, CS before 36wk, multiple pregnancies, complicated pregnancies by high risk obstetric history, including poorly controlled diabetes mellitus, hypertension, cardiovascular disease, infection, renal disease, abnormal fetal condition diagnosed during antenatal period, congenital malformation or congenital infection and abnormal fetal presentation like transverse lie or breech presentation.

The gestational ages were determined depending on either early ultrasound before 20 weeks or calculated period from the last menstrual period. We categorized cases, according to the gestational age into 5 categories 36wk, 37wk, 38wk, 39wk, and 40wk.

Mothers' parameters including their age, parity, gestational age and weight were recorded. The newborns were followed up immediately after delivery and their Apgar score, birth weight, sex, resuscitation events and admission to the NICU and their condition after admission until their discharge were registered. All the information was taken from the NICU staff and newborn records.

A newborn who discharged to the mother within two hours after the normal care was regarded as normal outcome. A newborn who admitted for any indication, according to the neonatologist decision, was regarded as an abnormal primary outcome. The condition followed up throughout the admission until discharge with a determined final diagnosis.

Informed consent from the parents was taken before delivery. The study was approved by the local ethical and scientific committee at the college of medicine, University of Kufa.

Statistical analysis performed using SPSS 17 software (Statistical Package for the Social Sciences, Chicago, IL). Data were expressed as the number and percentage for qualitative variables, mean $\pm$ standard deviation for quantitative ones. ANOVA test was used to compare between more than two groups and z score for the proportion. P value < 0.05 was regarded as significant.

Results:

In this observational study of 437 pregnant women delivered electively by planned CS, we found no significant difference in the means of the mother's age, parity and weight between the five gestational age categories. The newborn's weight and Apgar score at 5 minutes were significantly different ($P = .009$, $p = .02$ respectively) and tends to be more in older gestational ages, table (1).

Table (1). Descriptive study parameters according to different Gestational Age.

Parameters	Gestational Age					P value
	36 weeks (N=40)	37wk (N=177)	38wk (N=156)	39wk (N=54)	40wk (N=10)	
Age (Yrs)	28.47(± 3.91)	28.27(± 4.78)	27.86(± 5.21)	27.52(± 5.51)	27.20(± 6.51)	0.78
Parity	2.65(± 0.92)	2.41(± 1.02)	2.28(± 1.24)	2.09(± 0.88)	2.80(± 2.39)	0.08
Weight of Mother (Kg)	72.99(± 9.47)	75.38(± 11.81)	74.09(± 13.21)	74.58(± 10.40)	72.38(± 7.98)	0.72
Weight of Baby (Kg)	2.95(± 0.39)	3.07(± 0.41)	3.092(± 0.50)	3.19(± 0.40)	3.45(± 0.66)	0.009*
Apgar Score 1 min	6.07(± 1.97)	6.34(± 1.86)	6.47(± 1.56)	6.67(± 1.36)	7.30(± 1.25)	0.20
Apgar Score 5 min	7.92 (± 2.20)	8.54(± 1.83)	8.77(± 1.52)	10.09(± 8.37)	9.40(0.69)	0.02
Data represented as mean $\pm$ SD, or N= number (%), * = $p < 0.05$						

There was no gender difference throughout the gestational age groups. We found that 49.7% (217 of 437) pregnant women delivered by elective CS earlier than 38 weeks gestation and had 15.2 % admissions to the NICU compared with 7.7 % in those delivered after completed 37 weeks gestation (RR= 1.97, 95% CI 1.1-3.4, p= 0.017). About 1.38 % death occurs in less than 38 weeks gestation group while no death occurs in the later gestational age group, table (2).

Table (2) Neonatal outcome, according to different Gestational Age.

Parameters		< 38 week	≥ 38 weeks	RR (95% CI)	P value
		N (%) 217(49.7)	N (%) 220(50.3)		
Gender	Male	120(55)	106(48)	-	0.65
	Female	97(45)	114(52)		
Admission	Yes	33(15.2)	17(7.7)	1.97(1.1 – 3.4)	0.017
	Not	184(84.8)	203(92.3)		
Outcome of admission	Cure	30(13.8)	17(7.7)	-	0.039
	Death	3(1.38)	0(0)	-	0.08
Duration of admission		4.06 (±3.42)	2.63(±0.77)	-	0.20
Data represented as N=number, (%) or mean (±SD), wk= week, *= p value <0.05					

Respiratory distress as an initial diagnosis (whether due to respiratory distress syndrome or congenital pneumonia or other causes) was the most common indication of admission in the newborn infants (9.2% in less than 38 weeker and 4% in more than 38 weeker) followed by transient tachypnea of newborn (4.1% in less than 38 weeker and 2.7 in more than 38 weeker) with tendency to occur more in earlier than 38 weeks of gestation, table (3).

Table (3) causes of the adverse neonatal outcome, according to gestational age.

Parameters	<38 week	≥ 38 weeks	P value
	N(%) 217(49.7)	N(%) 220(50.3)	
RD	20(9.2)	9(4.1)	0.001*
TTN	9(4.2)	6(2.7)	0.001*
Asphyxia	3(1.38)	0(0)	-
Sepsis	1(0.5)	0(0)	-
Hypoglycemia	0(0)	2(0.9)	-
Data represented as a N= number (%);RD= respiratory distress, TTN= transient tachypnea of newborn, * = p≤ 0.01			

Discussion:

In this study we try to assess the effect of the obstetrician decision for timing of elective CS as a contributing factor of neonatal morbidity and mortality. The design of this small study allows to enroll the lowest risk deliveries and to exclude any concomitant factor that could affect the obstetrician decision on CS timing.

In a situation with increasing rate of CS like Iraq (31.7 % in 2012 in this regional hospital) ⁽¹²⁾. In this study, we found that 49.7% of the elective CS performed earlier than 38 weeks gestation and associated with 15.2 % of the newborn infants admitted to the NICU (RR =1. 96) of whom 1.38 % neonates died.

In USA with CS rate was 31.1% to 50 % increase since 1996 ⁽¹³⁾. Alan *et al* ⁽⁹⁾, in a large study, found that 51.9% of the elective CS were performed earlier than 39 weeks with relative risk, 1.21 and had only one death. Wilmlink *et al* ⁽¹⁴⁾ found that more than 50 % of the CS were done before 39 weeks and associated with 20.6% of neonatal adverse outcome when these CSs performed before 38 weeks and decrease to 9.5 % risk when done before 39 weeks. These studies were consistent with our results that confirm the increased adverse neonatal outcomes with the earlier timing of the CS.

More consistent with these results was the lower Apgar score at the 5 minute in newborns delivered earlier than 38 weeks gestation ($p=0.02$), same as Wilmink *et al*, who found Apgar scores of less than 3 at 5 minutes in newborns delivered earlier than 39 weeks gestation⁽¹⁴⁾.

Respiratory distress was the commonest neonatal complication in the newborns admitted to the NICU followed by transient tachypnea of newborn (TTN) and they were significantly more in those delivered earlier than 38 weeks gestation. It was the same as Tita *et al*⁽⁹⁾ and Wilmink *et al*⁽¹⁴⁾ results, who found more RDS and TTN in earlier than 39 weeks gestation. Several studies^(8, 15-17) that examined the association of the timing of elective caesarean delivery with neonatal outcomes consistently demonstrated increased respiratory morbidity with elective Caesarean delivery before 39 weeks.

Although the decision to perform CS either electively or at an early stage in abnormal labor appears to increase the risk of respiratory problems, it has been associated with a reduced risk of neonatal encephalopathy and meconium aspiration syndrome⁽¹⁴⁾. Signor⁽¹⁸⁾ confirmed these advantages and recommended that clinicians should adhere to the American College of Obstetricians and Gynecologists (ACOG) practice guidelines which specify that elective delivery should not be undertaken before 39 weeks⁽¹⁹⁾.

In our study, we found a high mortality rate (1.38%). Several studies showed that a significant number of term newborns delivered by elective C-section are admitted to NICUs because of TTN⁽²⁰⁻²²⁾. Other studies showed increased rates of mechanical ventilation for newborns that developed distress after elective C-section^(23, 24). Jain⁽¹³⁾ described the deterioration of several patients with TTN secondary to the development of pulmonary hypertension without clear etiology, which was termed Malignant TTN. Heritage⁽²⁵⁾ and Keszler⁽²⁶⁾ reported severe respiratory morbidity and mortality due to this condition in newborns delivered by elective C-section who developed pulmonary hypertension, the condition required high standards to treat, which is lacking in our situation.

The main limitation of this study is a small size sample.

Conclusion:

As a conclusion, the early timing of elective CS before 38⁺⁶ weeks gestation is a significant factor in increasing the neonatal morbidity and mortality rate and support the recommendations of delay elective CS until 39 weeks of gestation.

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Competing Interests:

All authors had no conflict of interest to declare

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