



Neonatal outcomes in elective repeated caesarean section at term pregnancy

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Abstract

Background: Caesarean delivery is associated with adverse health outcomes on both women and newborn infant. Timing of elective caesarean delivery also had an effect on the neonatal outcomes.

Objective: To find out the association between neonatal outcomes and gestational age and determining the favorable time for elective caesarean delivery.

Patients and Methods: A hospital-based cross-sectional study was done from 1st July, 2014 to 31st January, 2015 at the maternity teaching hospital in Erbil. A convenience sample of 200 full term pregnant women was selected from those admitted to the hospital for elective repeated caesarean delivery. Gestational age was determined by 1st trimester ultrasound and last menstrual period. Data on fetal variables probably associated with neonatal outcomes were collected in especially designed questionnaire.

Results: The rate of elective repeated caesarean section before 39th week of gestation was 81.5%. Mean weight of infants and mean Apgar scores of infants at delivery were increasing with gestational age $P < 0.001$. The rate of admission to neonatal intensive care unit was higher among those delivered at 37th than 38th week of gestation. No admission was reported among those delivered at 39th week of gestation ($P=0.006$). No significant variations in the duration of admission, status of infant on discharge, and rates of respiratory symptoms were demonstrated between those delivered at 37th and 38th week of gestation.

Conclusion: The vast majority of elective caesarean delivery are performed early before 39th week of gestation, which is associated with high incidence of neonatal morbidity and mortality.

Key words: Caesarean delivery, Gestational age, Neonatal morbidity, Neonatal outcome.

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Introduction

Globally, in the past three decades, there is an extraordinary increase in the rates of caesarean section in all developed and many of developing countries. This mode of delivery is associated with adverse health outcomes on both women and newborn infant [1][2]. In newborn infants, these outcomes range from respiratory morbidity

to hypoglycemia, sepsis, neonatal intensive care unit admission, and hospitalization for five days or more [3]. Similarly, the time of performing these techniques also had an effect on the neonatal outcomes. Infants electively delivered before the 39th week of gestation are more liable to have prematurity related neonatal complications



than those infants born after the 39th week of gestation [4][5].

The rates of caesarean deliveries were highest in Chile and Brazil with rates of 40% and 37% respectively and lowest in Belgium and Ireland with a rates ranging from 5% to 12% [2]. In the Arabic countries, the rates were lowest (<5%) in Yemen, Sudan, Mauritania, and Algeria, and highest (>15%) in Lebanon, Qatar, and Bahrain. The remaining East Mediterranean region countries have a rates ranging between 5%-15% [6]. Nationally (including Kurdistan region), caesarean section rates increased dramatically between 2000 and 2010 with rates of 10% and 32%, respectively [7][8]. The WHO reported that caesarean section rates more than 15% are associated with more harmful outcomes [9].

Very little information on the neonatal outcomes associated with caesarean delivery is available in Kurdistan Region, although high rates of caesarean delivery are reported in the region [10]. The objectives of this study, therefore, were to find out the relationship between neonatal outcomes and gestational age in addition to determining the favorable time for elective caesarean delivery in a sample of low risk pregnant women at full gestational age in Erbil.

Patients and Methods

A hospital-based cross-sectional study was done between 1st July, 2014 to 31th January, 2015 at the maternity teaching hospital in Erbil. A convenience sample of 200 low-risk, full term (37th week to 42nd week of gestation) pregnant women was selected from those admitted to the hospital for elective repeated caesarean delivery under general anesthesia. Low risk pregnant women are those whose maternal age are not very young (teenage) or very old (>35 years), with no previous history of multiple births (twins, triples, etc.), overweight or obese, existing health conditions (hypertension,

diabetes, and HIV), smoking, alcoholism, and drug addiction [11].

All full term low risk pregnant women included in this study had a detailed history and full clinical examination. Data were collected from each woman by direct interview in especially designed questionnaire. Gestational age was determined by 1st trimester ultrasound (11th -14th week of gestation) and last menstrual period. Data were obtained on weight of neonate, Apgar score at 1st, 5th, and 10th minutes, admission and duration of admission to neonatal intensive care unit (NICU), neonatal status on discharge from NICU, and respiratory symptoms of infants admitted to the NICU.

High risk pregnant women, preterm deliveries, pregnant suffering from intrauterine growth retardation or fetal distress, or those with unknown gestational age, and those delivered by caesarean delivery under spinal anesthesia were excluded from the study.

The study was approved by the research ethics committee of the college of medicine of Hawler medical university. An informed verbal consent was obtained from each woman before being enrolled in the study, and an official permission was obtained from directorate of health (DOH) of Erbil and directorate of the maternity hospital to collect data.

Statistical analysis

Statistical analysis was carried out with SPSS software version 19. Chi square test, Fisher's exact test, and ANOVA were used, as appropriate, for statistical analysis. P value less than or equal to 0.05 was considered statistically significant.

Results

Around 81% of the pregnant woman had arranged their elective caesarean delivery before the 39th week of gestation. Mean weight of infants at delivery was significantly



($P < 0.001$) increasing with gestational age, as shown in Table 1.

Table (1): Mean weight of infants by gestational age.

Gestational age (weeks)	No. of infants (%)		Mean weight at delivery (Kg)
	37 th	81	(40.5)
38 th	82	(41.0)	3.31±0.36
39 th	37	(18.5)	3.38±0.28
Total	200	(100.0)	
P value			<0.001

The mean Apgar scores of infants were increasing gestational age at 1st, 5th, and 10th minutes of delivery (Table 2). significantly ($P < 0.001$) increasing with

Table (2): Mean Apgar scores of infants by gestational age.

Gestational age (weeks)	Mean Apgar score		
	At 1 st min	At 5 th min	At 10 th min
37 th	7.11±1.08	7.48±1.07	8.27±1.04
38 th	7.56±0.89	8.00±0.82	8.85±0.79
39 th	7.95±0.52	8.00±0.53	8.89±0.92
P value	<0.001	<0.001	<0.001

The proportion of admission to NICU was significantly ($P = 0.006$) higher among those delivered at 37th than 38th week of gestation. No admission was reported among those delivered at 39th week of gestation.

No significant variations in the duration of admission and status of infant on discharge were demonstrated between those delivered at 37th and 38th week of gestation. Details are shown in Table 3.

Table (3): NICU admission and neonatal status on discharge from NICU by gestational age.

Gestational age (weeks)	No. of infants	Admission to NICU		Duration of admission		Neonatal status on discharge	
		No	%	<5 days	5 days	Improved	Death
				No. %*	No. %*	No. %*	No. %*
37 th	81	17	(21.0)	14 (82.4)	3 (17.6)	13 (76.5)	4 (23.5)
38 th	82	9	(11.0)	8 (88.9)	1 (11.1)	8 (88.9)	1 (11.1)
39 th	37	0	(0.0)	-	-	-	-
Total	200	26	(13.0)	22 (84.6)	4 (15.4)	21 (80.7)	5 (19.3)
P value		0.006		0.66		0.44	

*Out of total admitted to NICU.

There were also no significant variations in the proportions of the respiratory symptoms (tachypnea, apnea,

dyspnea, and grunting) between those delivered at 37th and 38th week of gestation (Table 4).

**Table (4):** Respiratory symptoms among infants admitted to NICU by gestational age.

Gestational age (weeks)	Total No.	Respiratory symptoms			
		Tachypnea No. %	Apnea No. %	Dyspnea No. %	Grunting No. %
37 th	17	6 (35.3)	1 (5.9)	4 (23.5)	6 (35.3)
38 th	9	2 (22.2)	0 (0.0)	2 (22.2)	5 (55.6)
Total	26	8 (30.8)	1 (3.8)	6 (23.1)	11 (42.3)
P value		0.49	0.45	0.94	0.31

Discussion

Many studies have demonstrated that caesarean deliveries have more risks for NICU admission than vaginal birth, and if elective repeated caesarean delivery was performed before 39th week of gestation or post-term, the risk increases even more [12-21]. Despite this, when we look at the literature today, the rates of elective repeated caesarean delivery before 39th week of gestation are still very high [15][16]. Medical reasons contribute to these high rates, which cannot be avoided, but maternal request and obstetricians' opinion about the appropriate time for caesarean delivery are the other factors responsible for the vast majority of elective deliveries before the 39th week of gestation which can be avoided [22-24]. In an effort to reduce the iatrogenic prematurity associated with elective caesarean section, the American College of Obstetricians and Gynecologists recommended scheduling elective caesarean section at 39th week of gestation or later based on menstrual dates and first ultrasound [25].

In this study more than 80% of elective caesarean deliveries at term were performed before the 39th week of gestation compared to the Netherlands, where 56.6% of elective caesarean sections were performed before 39th week of gestation [15]. In a study in the United States, 35.8% of elective repeated caesarean sections were performed before 39th week of gestation [16]. The rates of elective caesarean delivery before 39th week of gestation were higher in two European cohorts, ranging from 51% to 83% [26][27].

The incidence of maternal and neonatal complications is significantly higher in women undergoing emergency caesarean deliveries than those undergoing elective caesarean deliveries, and in women delivered before 39th week of gestation [16][28-30]. In this study, deliveries at 37th and 38th weeks of gestation were associated with a preventable increase in neonatal morbidity reflected in a significantly lower mean weight and lower mean Apgar score among those delivered before 39th week of gestation, which agree with the findings of other studies [1][31][32].

Deliveries before 39th week of gestation were also associated with a significant increase in NICU admission with highest rate among those delivered at 37th week of gestation (21%) in comparison with 11% and 0% among those delivered at 38th and 39th weeks of gestation, respectively. In the Netherland, the proportions of NICU admission were 20.6%, 12.0%, and 9.5% among those delivered at 37th, 38th, and 39th weeks of gestation, respectively [15].

Similarly, a study in the US showed that the proportions of NICU admissions were decreasing with advance in gestational age; they were 15.3%, 11.3%, and 8.0% for deliveries at 37th, 38th, and 39th weeks of gestation, respectively [16]. These variations in proportions are most probably attributed to our small sample size compared with the larger sample size of the other two studies.

In our study death occurred among nearly 24% of neonates admitted to the NICU and delivered at 37th week of gestation, in



comparison with 11% among neonates delivered at 38th week of gestation. All neonates admitted to the NICU were for respiratory complications including tachypnea, apnea, dyspnea, and grunting. Respiratory complications were a common cause for NICU admissions after elective caesarean deliveries [5, 21, 33, 34].

In conclusion, the vast majority of elective caesarean deliveries at the Erbil maternity hospital are performed before 39th week of gestation. Elective caesarean deliveries before 39th week of gestation are associated with increased risk of neonatal morbidity, NICU admission, and neonatal death.

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