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Original Article

Comparison of Maternal and Neonatal Outcome Following Cesarean Section at 38-40 Weeks

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ABSTRACT

Background: The rate of Cesarean section is increasing which may be due to maternal and neonatal issues. Preterm Cesarean (at 38-39 weeks) has several morbidities and leads to maternal problems. The goal of this study was to compare neonatal and maternal complications following the performance of the Cesarean section after 38 weeks.

Methods: This cross-sectional study evaluated 1010 subjects with term Cesarean section that referred to Yas hospital, in Tehran, Iran during 2015-7. The participants were divided into three groups based on the week of delivery. Afterward, they were studied for different neonatal and maternal complications.

Results: According to the findings, the risk of adverse neonatal outcomes had a statistically negative relationship with the progress of gestational age. Moreover, the rate of hypoglycemia and hyperbilirubinemia and stillbirth was higher in neonates delivered before 38 weeks. Among the maternal complications, the rate of massive bleeding during cesarean section or in the postpartum period was significantly higher in deliveries before 39 weeks, whereas the rate of pelvic infection was higher in deliveries after 40 weeks.

Conclusion: Based on the results of this study, the best time for the Cesarean section is the 39th week of pregnancy which led to the elimination of maternal and neonatal complications.

Keywords: Cesarean section, Gestational age, Maternal and neonatal complications

Introduction

One of the most important issues in the healthcare system is maternal and neonatal complications after the Cesarean section that can impose a financial burden on the governments and families. Identification of these problems may lead to the determination of better strategies for managing them (1). Nowadays, one of the most important subjects among obstetricians is the best time for abortion (2). Early term neonates (infants born at 38-39 weeks) have several problems, such as a higher rate of cerebral palsy, learning disabilities, visual problems, hearing loss, and respiratory diseases that affect the future life of themselves and their families (2-5). Early term neonates may have low Apgar scores and need hospitalization in the neonatal intensive care unit (NICU). Moreover, they are more likely to have newborn jaundice, low birth weight, and a higher rate of mortality and morbidity (6-8). However, sometimes early abortion is necessary as a result of maternal complications, such as pre-eclampsia, gestational diabetes mellitus, and gestational hypertension (9). In addition, some obstetricians terminate pregnancy in 38 weeks of gestational age if there is no urgent situation or maternal complications that require the early termination of the pregnancy (10-12). Studies indicate that this approach can lead to long-term complications of neonates, compared with term pregnancy termination (13-15). The aim of this study was to assess the maternal and neonatal complications in term Cesarean section and find the best time for abortion to reduce neonatal complications.

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Methods

This cross-sectional study evaluated the maternal and neonatal complications of all cesarean sections at 38-40 weeks that were referred to Yas hospital, Tehran, Iran, during 2015-7. Women with maternal complications, prolonged preterm rupture of membrane, placental abruption, and congenital heart defect based on the non-stress test (NST) were excluded from this study. Moreover, neonates who were inflicted with congenital abnormalities or died in the first week were excluded as well.

These participants were divided into three groups. Group A consisted of mothers with 38-38 weeks + 6 days of gestation, Group B included mothers with 39-39 weeks + 6 days of gestation, and group C was comprised of mothers with 40 or more weeks of gestation.

The patient demographic form provided and examined the age, education, parity, and gestational age of the participants. Moreover, the information related to the maternal history and complications of the mothers was collected, such as the cause of cesarean, maternal death, postpartum hemorrhage, incisional hematoma, surgery site infection, deep vein thrombosis or pulmonary thromboembolism, and blood transfusion. Neonatal birth characteristics were examined which included the breastfeeding style, growth index of infants, neonatal weight and height, head circumference, NICU admission, and phototherapy or blood transfusion due to neonatal jaundice.

The Apgar score was evaluated by five indexes of the neonatal status, including 1) skin color, 2) heart rate, 3) reflexes, 4) muscle tone, and 5) respiration. Each one of them was given a score of 0, 1, or 2, depending on the observed condition.

The protocol of the study was approved by the ethical committee of Tehran University of Medical Sciences. The participants subsequently submitted a written consent form to participate in the trial. This trial was conducted according to the principles of the Declaration of Helsinki.

The collected data were analyzed in SPSS software (version 20) using the chi-squared test and ANOVA. A p-value of less than 0.05 was considered statistically significant

Results

In total, 1500 participants with cesarean section were recruited for the first evaluation during 2015-7. However, 490 subjects were not eligible due to maternal severe complications or infliction with prolonged preterm rupture of membrane, placental abruption or fetal heart abnormality based on NST.

A total of 1100 participants with the Cesarean section at beyond 38 weeks were included. However, only 1010 subjects were enrolled in the analysis due to the lack of data. The cesarean section was performed for 551 (56.4%) of the participants who were at 38-38 weeks + 6 days, 295 (29.2%) of them who were at 39-39 weeks + 6 days, and 164 (16.2%) of them who were at 40-40 weeks + 6 days. There was no Cesarean beyond 41 weeks of gestation. The maternal and neonatal characteristics are shown in Table 1. There was no significant difference between groups regarding their age, the gender of the neonate, and >2500 gr birth weight. Nevertheless, delivery before 39 weeks in multiparas was significantly higher, compared to other groups ($P<0.0001$). As expected, the birth weight, height, and head circumference were significantly increased after 40 weeks of gestation ($P<0.0001$).

The rates of most adverse outcomes are shown in Table 2. The rate of stillbirth had a statistically significant difference between the groups and was higher before 39 weeks ($P<0.0001$). Moreover, there was no neonatal death and death during one week after the birth in 3 groups ($P<0.0001$).

Neonatal sepsis was found only in group A which was not statistically significant ($P=0.081$). Furthermore, there was no significant difference between groups regarding the neonatal asphyxia, apnea, bradycardia, hypothermia, and breathing disorders.

A significant correlation was observed between neonatal hypoglycemia and gestational age ($P<0.0001$). The blood glucose values of neonates in group A were less than those in groups B and C (3% of newborns of group A suffered from hypoglycemia while none of the neonates in groups B and C had this problem).

Group A had the highest rate of admission due to neonatal hyperbilirubinemia (26.1 %) which had a significant difference with groups B ($P=0.005$) and C ($P=0.01$) ($P<0.0001$). However, the difference between groups B and C was not significant ($P=0.66$). The mean age of neonatal hyperbilirubinemia that led to admission was 38 weeks + 6 days and after 39 weeks of gestation, newborns did not need hospitalization for neonatal hyperbilirubinemia.

The three groups did not have a significant difference regarding NICU admission ($P=0.3$). There was not a significant correlation between the 1-minute Apgar score and the gestational age ($P=0.549$). Moreover, 1.6% of the newborns in

Table 1. Maternal and neonatal characteristics shown by the week of delivery

Characteristics	n (%)	n (%)	n (%)
Week of delivery	38 to 38^{+6}	39 to 39^{+6}	40 to 40^{+6}
Proportion of deliveries	551 (56.4)	295 (29.2%)	164 (16.2%)
Age of the mother			
<20	22 (4)	9 (3.1)	9 (5.5)
20-25	110 (20)	54 (18.3)	32 (19.5)
25-30	174 (31.6)	85 (28.8)	48 (29.3)
30-35	174 (31.6)	95 (32.2)	48 (29.3)
35-40	62 (11.3)	39 (13.2)	24 (14.6)
>40	9 (1.6)	13 (4.4)	3(1.8)
Parity			
Primiparas	446 (80.9)	267 (90.5)	149 (90.9)
Multiparas	105 (19.1)	28 (9.5)	15 (9.1)
Socioeconomics			
Low	492 (89.3)	265 (89.8)	145 (93.9)
High	59 (10.7)	30 (10.2)	99 (9.8)
Gender			
Male	313 (56.8)	157 (53.2)	89 (54.3)
Female	238 (43.2)	138 (46.8)	75 (45.7)
Birth weight			
<2500 gr	23 (4.2)	14 (4.7)	2 (1.2%)
≥2500 gr	528 (95.8)	281 (95.3)	162 (98.8)
Birth weight (Mean±SD)	3194±427	3218±422	3438±406
Birth height (Mean±SD)	49.8±2	49.6±2	51.1±1
Head circumference (Mean±SD)	34.6±1	34.6±1	35±1

Table 2. Adverse outcome after cesarean section by the week of delivery

Characteristics	n (%)	n (%)	n (%)	p
Week of delivery	38 to 38^{+6}	39 to 39^{+6}	40 to 40^{+6}	
Proportion of deliveries	551 (56.4)	295 (29.2%)	164 (16.2%)	
Stillbirth	26 (4.7)	4 (1.4)	0 (0)	0.000
Sepsis	6 (1.1)	0 (0)	0 (0)	0.081
Hypoglycemia	17 (3.1)	0 (0)	0 (0)	0.001
APGAR (Mean±SD)				
1-minute	8.8±0.5	8.8±0.3	8.9±0.3	0.549
5-minute	9.93±0.2	9.92±0.3	9.9±0.1	0.176
Apnea	4 (0.7)	0 (0)	0 (0)	0.188
Bradycardia	2 (0.4)	4 (1.4)	0 (0)	0.112
Respiratory Distress Syndrome	17 (3.1)	14 (4.7)	4 (2.4)	0.333
Hypothermia	1 (0.2)	0 (0)	0 (0)	0.659
Hyperbilirubinemia	144 (26.1)	44 (14.9)	22 (13.4)	0.000
Asphyxia	2 (0.4)	0 (0)	0 (0)	0.434
Maternal readmission	9 (1.6)	1 (0.3)	4 (2.4)	0.139
Severe bleeding	27 (4.9)	17 (5.8)	1 (0.6)	0.028
Hematoma	29 (5.3)	16 (5.4)	11 (6.7)	0.773
Wound infection	41 (7.4)	16 (5.4)	11 (6.7)	0.537
Pelvic infection	0 (0)	1 (0.3)	4 (2.4)	0.000
Thromboemboli	1 (0.2)	0 (0)	0 (0)	0.659
Transfusion	5 (0.9)	4 (1.4)	0 (0)	0.333

group A had Apgar score bellow 7 while 0.6% of the newborns in group C and none of them in group B had this complication. There was no significant correlation between 5-minute Apgar and the pregnancy age (P=0.176).

The mean hospital stay after the Cesarean section was 1.62 days in all groups. However, group A had the longest hospital stay after the Cesarean section and there was a significant difference between group A with groups B and C (P=0.021).

In the present study, 85.25% of the mothers had no complications, 10.79% had just one complication, and less than 0.7% showed 2 or more complications, while no maternal death was reported. Moreover, 4.46% of mothers suffered from massive bleeding during the Cesarean section which indicated a significant difference

between the groups (P=0.028). According to the data analysis, massive bleeding was observed in 5.7%, 4.9%, and 0.6% of the members of groups B, A, and C, respectively. Blood transfusion was needed in 0.9% of pregnancies and did not show any significant difference (P=0.333). Incisional hematoma and infection were reported in 5.54% and 6.73% of the participants, respectively. Thromboemboli was reported just in one participant in group A.–However, readmission, incision hematoma, wound infection, and blood transfusion had no correlation with gestational age (P=0.139, P=0.773, P=0.537, and P=0.333, respectively).

Overall, 2.4%, 0.3%, and 0% of groups C, B, and A had pelvic infection, respectively. This rate showed a significant difference between the three groups (P<0.0001).

There was a significant correlation between maternal complications and different causes of cesarean delivery (P<0.0001). Cesarean delivery on maternal request, müllerian anomalies of the uterus, and active herpes infection in the genital tract had no significant correlation with maternal complications. However, the maternal complication was reported in 9.18% and 5.57% of repeat cesarean sections with and without uterus contraction, respectively. Moreover, maternal complications were observed in the Cesarean section due to macrosomia (3.8%), pre-eclampsia (3.03%), and previous uterus surgery, such as myomectomy (22.08%), pre-eclampsia/eclampsia (12.12%), and breech/transverse presentation (10/08%).

There was a significant difference between various causes of the Cesarean section and 1-minute Apgar score (P<0.0001). Cesarean section due to Placenta accreta/previa and repeated Cesarean section due to uterus contraction had 1-minute Apgar score below 7 rather than other causes. There was also a significant correlation between the causes of the Cesarean section and 5-minute Apgar score (P=0.005). Moreover, 66.67% and 16.67% of neonates with low Apgar scores were delivered by cesarean section due to placenta accreta/previa and repeat cesarean section with uterus contraction, respectively.

Discussion

This study evaluated neonatal and maternal complications in women with the Cesarean section at 38 weeks. The growth index, such as weight, height, and head circumference increased with the progress of gestational age in neonates of all groups.

In a study conducted by Houweling LM et al., the Apgar score increased after 39 weeks, which was not consistent with those of the present study (14). There was not any significant correlation between 5-minute Apgar score and the gestational age in the present study which can be due to the proper treatments and interventions after The birth.

Among neonatal complications, the three groups had a significant difference regarding the hypoglycemia. Moreover, all the groups experienced an increase in hypoglycemia before 39 weeks of gestation. Moreover, group A had a higher rate of neonatal hyperbilirubinemia that led to hospitalization and phototherapy. These correlations may be justified by lower gestational age, nutritional status, or less developed liver function. However, there was no significant correlation between hypoglycemia and neonatal hyperbilirubinemia. Moreover, there was no significant correlation between neonatal NICU admission and gestational age. These results were in line with previous studies that were performed by Tita et al., Wilmink et al., and Signore and Klebanoff (15-17).

Among the maternal complications, massive bleeding during cesarean section or postpartum period caused a significant difference between the three groups so that mothers at 39-39 weeks + 6 days had the most bleeding, while the hospital stay after Cesarean section increased in group A. However, this was inconsistent with the result of Murphy et al. and Laopaiboon et al., which indicated that other risk factors, such as nutritional status of mothers, weight gain during the pregnancy, and prenatal care could affect this results (18, 19).

This study revealed the existence of a significant correlation between maternal complications and different causes of cesarean delivery which was in line with the findings of a study conducted by Somboonviboon et al. (20). However, this correlation could be due to other risk factors, such as cesarean section because of fetal bradycardia or different drugs that were used during anesthesia, similar to the results of a study performed by Hansen et al. and Villar et al. (21, 22).

Conclusion

The results of this study revealed that the best time for the cesarean section is week 39. This approach can decrease the rate of some of the maternal and neonatal complications.

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Conflicts of interest

The authors declare no conflict of interest regarding the conduction of the present research.

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