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Comparison of Maternal and Neonatal Outcomes in Vaginal Birth after Caesarean Section

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ABSTRACT

Background and Objective: Previous cesarean sections are the most common cause of increased cesarean section in many parts of the world, although it is not always necessary. Considering the high statistics of cesarean section in Iran and especially the high rate of repeat cesarean section and creating motivation for vaginal birth after cesarean section, this study was conducted in order to investigate the maternal and neonatal outcomes of vaginal birth after one cesarean section.

Methods: This cross-sectional study was conducted on 104 pregnant women with a previous caesarean section and transverse incision on the lower segment in Ayatollah Rouhani Hospital of Babol in two groups; 50 people in the first group who underwent repeat emergency cesarean section and 54 people in the second group who consented to vaginal birth after cesarean section (VBAC). Demographic characteristics and maternal and neonatal complications were investigated and compared between the two groups.

Findings: In this study, there were no significant differences between the two groups in terms of demographic characteristics. Infant mortality rate was reported in 6 cases (12%) in the first group and 2 cases (3.7%) in the second group. Furthermore, 3 babies (6%) in the repeat cesarean section group and 9 babies (16.7%) in the vaginal birth group after cesarean section were admitted to the neonatal intensive care unit. The 5-minute Apgar was also significantly higher in the babies of the vaginal birth group after cesarean section (p=0.04). The duration of mother's hospitalization was 3.98±5.53 and 2.11±0.31 days in the repeat cesarean and vaginal birth groups, respectively (p=0.02).

Conclusion: According to the results of this study, maternal and neonatal complications did not increase in vaginal birth after cesarean section, and if the mother wishes, vaginal birth can be performed after one cesarean section.

Keywords: *Cesarean Section, Vaginal Birth after Cesarean Section, Complications, Maternal Outcome, Neonatal Outcome.*

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Introduction

Caesarean section is defined as giving birth to a fetus by making incisions in the abdominal wall (laparotomy) and uterine wall (hysterotomy) (1) and is a common surgery in most childbirth cases today (2). The use of cesarean section technique has been increasingly popular in the last 50 years, while before that, cesarean section was only used for mothers whose lives were in danger due to pregnancy and childbirth (3). Previous cesarean sections are the most common reason for the increase in cesarean section in many parts of the world (4, 5). According to the World Health Organization, in every region of the world, about 15% of births can be performed by cesarean section with the correct indication (4). There are many national and international differences in the cesarean rate. Worldwide, about 10-30% of births are performed by cesarean section, but currently, 50-65% of births in Iran are by cesarean section, and about 90% of them are performed in cities and private hospitals (6).

Studies have shown that babies of mothers who undergo elective repeat caesarean section are more at risk of respiratory diseases (7). Furthermore, maternal complications, damage to internal organs, hospitalization in ICU, hysterectomy, blood transfusion, and long-term hospitalization are correlated with elective repeat cesarean section. Maternal and neonatal complications of cesarean section are more than vaginal birth (8). Its side effects include the inability of the mother after a cesarean section, which causes the mother's lack of full attention and proper breastfeeding of the baby after birth, and the increase in costs (9). Moreover, the incidence of anesthesia, psychological and ectopic pregnancy complications increases (10).

There has been very little research on maternal and neonatal outcomes following vaginal birth after cesarean section. The safety of vaginal birth after cesarean section in women has been shown in several studies, but if there is no specific monitoring system for the evaluation of vaginal birth and cesarean section, vaginal birth with all its undeniable advantages will give way to surgical operations with more complications (2).

Repeat cesarean section is not always necessary. With vaginal birth after cesarean section (VBAC), the number of cesarean section cases can be reduced (11). Several factors have been proposed to determine the success rate of vaginal birth after cesarean section, among which the mother's age, BMI, history of previous vaginal birth, and previous VBAC can be mentioned (13). The success rate of vaginal birth after a previous cesarean section has been reported to be 60-80% in many studies, provided that the cause of the initial cesarean section is not repeat caesarean section (1.14). A successful vaginal birth after a cesarean section has fewer complications and major problems (15) as well as a shorter recovery period and higher maternal satisfaction (16, 17) compared to a repeat cesarean section. The outcome of babies born by VBAC method in the first 28 days of a baby is better than cesarean delivery (18, 19) and these mothers breastfed their babies more (20). Considering the high rate of cesarean section in Iran, this study was conducted with the aim of investigating maternal and neonatal outcomes in natural childbirth after one cesarean section in a third-level teaching hospital.

Methods

After receiving the code of ethics IR.MUBABOL.HRI.REC.1396.200, this cross-sectional study was conducted on pregnant mothers undergoing cesarean section who were hospitalized for emergency termination of pregnancy in Ayatollah Rouhani Hospital, Babol. The inclusion criteria included a cesarean section with transverse incisions, mother's consent, singleton pregnancy and the absence of conditions threatening the life of the mother and the baby. First, all pregnant mothers who entered the study were

counseled about the benefits and risk factors of both types of delivery, cesarean delivery and VBAC, according to the guidelines of the College of Obstetrics and Gynecology (20) by the senior resident. Then these people were divided into two groups based on the type of delivery. The first group included those who did not consent to perform VBAC despite the counseling for delivery and underwent repeat cesarean section, and the second group included those who consented to natural delivery after cesarean section. Then both groups completed and signed the written consent to enter the study and the demographic data of the patients including age, number of pregnancies, deliveries and abortions, body mass index at the time of hospitalization, education level, history of vaginal delivery, history of previous VBAC, reason for previous cesarean section, gestational age, dilatation and effusion at the time of admission, distance from previous cesarean section, and prenatal education were completed by questionnaire. Then, in both groups, the level of maternal satisfaction, maternal and neonatal complications, maternal complications including fever, need for blood transfusion, uterine rupture, laparotomy, hysterectomy, damage to the vagina, endometritis, length of hospitalization, hospitalization length of mother and infant in special care, Apgar and baby weight were compared. Data were analyzed using SPSS v.22 and Chi-square and t-test tests, and $p<0.05$ was considered significant.

Results

In this study, sampling was done by census method and 104 pregnant mothers undergoing caesarean section were included in the study. According to the obtained results, the average age of mothers in the vaginal birth group after cesarean delivery was (31.76±4.40 years) and in the repeat cesarean group was (31.16±3.95 years), and this difference was not significant. The body mass index of mothers in the repeat cesarean group (31.32 kg/m2) was higher than the group of vaginal birth after cesarean delivery (28.28 kg/m2) ($p<0.001$) (Table 1). The number of previous pregnancies and deliveries of the two groups did not differ (Table 2).

Both in the repeat cesarean group and in vaginal birth after cesarean section group, 64% of women had an obstetric emergency as the reason for their previous cesarean section. In addition, 36% of women in the repeat cesarean section group and 35.2% of women in vaginal birth after cesarean section group had elective cesarean section, and no significant relationship was observed. 98% of women in the repeat cesarean group and 72.2% of women in the vaginal birth group did not have labor stimulation after cesarean section, 2% of women in the repeat cesarean group and 9.3% of women in vaginal birth after cesarean section group had induced pain, and 10 patients (18.5%) in vaginal birth after cesarean section group experienced induced pain exacerbation and this relationship was statistically significant ($p=0.001$).

According to the obtained results, there were 6 cases (12%) of infant death in the repeat cesarean section group and 2 cases (3.7%) in vaginal birth after cesarean section group, and the difference was not significant. Moreover, 3 babies (6%) in the repeat cesarean section group and 9 babies (16.7%) in vaginal birth after cesarean section group were admitted to the Neonatal Intensive Care Unit (NICU), which did not show a significant difference. The 5th and 10th minute Apgar scores were significantly higher in the babies of the vaginal birth after cesarean section group ($p=0.04$). The length of mother's hospitalization in the repeat cesarean group was 3.98±5.53 days and in the vaginal birth after cesarean section group was 2.11±0.31 days ($p=0.02$) (Table 3).

Table 1. Data regarding quantitative demographic variables of research units based on group

Variable / Group	Repeat cesarean section group Mean±SD	Vaginal birth after caesarean section Mean±SD	p-value
Mother's age (years)	31.16±3.95	31.76±4.40	0.46
Gestational age (weeks)	36.82±3.14	35.72±4.13	0.13
body mass index (kg/m2)	31.32±3.77	28.28±3.24	<0.001
Length of time since the last caesarean section (years)	5.86±2.70	6.50±3.44	0.29

Table 2. Information on qualitative demographic variables of research units based on group

Variable / Group	Repeat cesarean section group Number(%)	Vaginal birth after cesarean section Number (%)	p-value
Number of pregnancies			
2	34(68)	34(63)	
3	12(24)	13(24.1)	0.70
More than 3	4(8)	7(13)	
Number of deliveries			
1	4(88)	40(74.1)	0.08
2 and more	6(12)	14(25.9)	
Cause of previous caesarean section			
Elective	18(36)	19(35.2)	0.99
Emergency	32(64)	35(64.8)	
Having a miscarriage	10(2)	8(14.8)	0.60
Having a history of vaginal birth	6(12)	5(9.3)	0.75
Having a history of vaginal birth after caesarean section	-	2(3.7)	0.49

Table 3. Evaluation of maternal and neonatal outcomes of research units based on group

Variable / Group	Repeat cesarean section group Number(%)	Vaginal birth after cesarean section Number(%)	p-value
Neonatal death			
Yes	6(12)	2(3.7)	0.11
No	44(88)	52(96.3)	
Newborn admission in NICU			
Yes	3(6)	9(16.7)	0.08
No	47(94)	45(83.3)	
Apgar (Mean±SD)			
Zero minute	8.02±2.31	8.72±0.67	0.04
5-minute	9.15±2.26	9.80±0.53	
Duration of mother's Hospitalization (Mean±SD)	3.98±5.53	2.11±0.31	0.02

Also, one case of endometritis in repeat cesarean delivery and one case of blood transfusion in vaginal birth after cesarean section group was observed, and this difference was not significant. The weight of babies in the repeat cesarean section group was 2972.80±82.82 grams and in the vaginal birth after cesarean section group was 2624.26±878.50 grams (p=0.03).

Discussion

In this research, infant death, which is one of the important criteria in choosing the delivery method, had a lower percentage (3.7%) in vaginal birth after cesarean section group. Although due to the lack of significance of this criterion, it cannot be mentioned as an indicator of superiority, but it can indicate the safety of vaginal birth after cesarean section for the baby.

The hospitalization of the baby in the neonatal intensive care unit was higher in the vaginal birth after cesarean section group compared to elective cesarean section (16.7% to 6%). One of the other influential factors in the hospitalization of infants in the NICU is the weight of the infant. That's because in many cases of childbirth, the weight of the baby is very interfering, and mothers with low weight babies usually choose a vaginal birth more easily. Therefore, babies born in this way are underweight and the possibility of admission to NICU increases in these babies.

Among the other neonatal outcomes examined was the 5-minute Apgar score. Based on the findings, the average 5-minute Apgar score in the vaginal birth after cesarean section group was higher than that of repeat cesarean delivery. Based on this, it can be said that the health of the baby is maintained in the vaginal birth after cesarean section group.

In their study, Nazari et al. stated that there was no difference in neonatal outcomes such as infant weight, external anomalies, hospitalization, need for resuscitation and breastfeeding in the first hour of birth between the two delivery methods (21). It should be noted that the variables related to neonatal outcome in two studies are different from each other; in the present study, the Apgar score of the newborns and the death rate were also examined, and the common point of the two studies was the hospitalization of the newborn in the intensive care unit. In their study, Nazari et al. also found that 7.7% of babies born via vaginal birth after cesarean section were admitted to NICU, which was higher than repeat cesarean section (21), and is similar to the present study.

In the study of Mone et al., the hospitalization rate of infants did not differ between the two methods (22). Of course, regarding this difference, we can point to the difference in the weight of the newborn babies and the number of premature babies in two studies. In their study, Sharifizad et al. found that the 5-minute Apgar score of babies and the death of babies within 10 days after delivery were the same in two groups (23). This was despite the fact that the 5-minute Apgar score of the studied babies in the vaginal birth after cesarean section group was higher than the repeat cesarean section group.

In the study of Senturk et al., it was found that there was no significant difference between the two groups in terms of neonatal outcomes (24). Shamsa et al. also stated in their study that maternal and neonatal outcomes in vaginal birth after cesarean section are better than repeat cesarean section (25). Caesarean section also affects the outcomes of subsequent pregnancies (26).

In their study, Yosofzadeh et al. stated that complications such as fever, bloating, constipation and hysterectomy in the vaginal birth after cesarean section group were less than repeat cesarean section (27). In the present study, none of the above complications occurred, so comparison is not possible.

In the study of Bolbol Haghighi et al., the prevalence of natural childbirth in women who had previously had cesarean delivery was investigated and they showed that the prevalence of vaginal birth after cesarean section was equal to 10% (2). The prevalence rate of vaginal birth after cesarean section was not investigated

in this study because the aim was to compare the complications in babies born via vaginal birth after cesarean section, but it is suggested to conduct a study to examine the prevalence rate of vaginal birth after cesarean section in a region in the north of Iran. Rageth et al. and Richman et al. in two separate studies stated that there is a lot of evidence of the relative safety of vaginal birth in most women with a low transverse cesarean section (28, 29).

Various issues are involved in the choice of delivery method, and the fear of uterine rupture and life-threatening risks for the mother and the fetus are very effective in decision-making. One of the strong points of this research was examining maternal outcomes and comparing them in two delivery methods. There were no cases of uterine rupture or neonatal death during labor in mothers who delivered naturally after cesarean section, which can confirm the safety of vaginal birth after cesarean section.

The cases of endometritis and blood transfusion could not be analyzed and compared due to their low frequency. Another point about the duration of the mother's stay in the hospital is that repeat caesarean section increases the duration of the mother's stay, which in turn increases the cost to the individual, family and society.

According to the results of the present study, maternal and neonatal outcomes did not increase in vaginal birth after cesarean section, and this method can be recommended if the mother is satisfied and if the mother and baby have suitable conditions for vaginal birth after previous cesarean section.

Conflict of interest: None of the authors of this study, individuals or sponsoring centers have any conflict of interest for publishing this article.

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