

Comparison of the Maternal and Fetal Complications of Vaginal Birth After C-Section (VBAC) and Repeat Cesarean Section in Isfahan Province

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ABSTRACT

Background & Objective: Due to the uncertainties of maternal and neonatal complications after delivery and the lack of similar studies in this regard, this study aimed to compare the maternal and fetal complications of vaginal birth after C-Section (VBAC), natural delivery and repeat Cesarean section in Isfahan province.

Materials & Methods: In this one-year descriptive cross-sectional study, 49889 pregnant women who had the natural childbirth (29631 deliveries), elective repeat Cesarean section (20148 deliveries) and VBAC delivery (110 deliveries) were enrolled, then maternal and neonatal complications were compared in three groups.

Results: There was a significant difference between the three groups based on the maternal and neonatal outcome, Apgar scores in the first and fifth minutes after delivery and the need for resuscitation at birth ($P < 0.05$). Neonatal outcome was better in natural delivery and then VBAC compared to repeat C-section, respectively. Maternal outcome was better in VBAC and then repeat C-section than the natural childbirth. Apgar scores in the first and fifth minute were better in VBAC, and later natural delivery than repeat C-section. Resuscitation at birth demonstrated better results for natural delivery and then VBAC than repeat C-section.

Conclusion: Utilizing VBAC and natural delivery have better maternal and fetal outcomes compared to C-section, along with being more satisfactory and safer.

Keywords: Vaginal Birth after Cesarean (VBAC), C-Section, Neonate, Maternal, Outcome



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Introduction

Pregnant women who have given birth for the first time through Cesarean section often have difficulty deciding on their second delivery because some individuals choose elective repeat Cesarean section (ERCS) and some undergo vaginal birth after C-Section (VBAC) (1). However, the World Health Organization has noted that Cesarean delivery rates should not exceed 15% (2). According to the latest statistical reports in 2017, Cesarean delivery is performed with an average of %18.6 of all births and has a range between %6 and %27.2 in advanced countries (3). According to a meta-analysis study in 2014, the prevalence of Cesarean section in Iran was about %48, and %87 of them had been conducted in private centers (4). In a 2017 meta-analytical study, the prevalence of Cesarean section in Iran was estimated to be about %48. However, there is no precise information on the incidence of Cesarean section in Isfahan (4). Over the past two decades, the use of

Cesarean section has dramatically increased so that it can be said that the number of people who want to use the Cesarean delivery method is added every day (5). Also, the risk of Cesarean delivery is continuously rising in developed and developing countries. This increase in Cesarean sections by itself raises public and professional concerns (6). In recent years, several countries reported the decline in the use of VBAC, so that the overall rate of VBAC (successful cases of VBAC for all mothers with previous Cesarean section) declined from %24 in 1996 to %8 in 2010 (7-9). In fact, this decrease in the use of VBAC is due to physicians' concerns about the dangers of this method. So that several observational studies reveal the association of maternal and neonatal outcomes with unsuccessful childbirth. These studies show the increases in several complications including uterine rupture during delivery, complications of emergency Cesarean section, and death during childbirth (10). Also, several

studies reported that in cases where there were no indications for the Cesarean section, the success rates in natural vaginal delivery after the previous Cesarean section were between 60% and 80%. Some absolute and relative indications for Cesarean section include prolonged labor, fetal distress, placenta previa, the transverse lie of the fetus, breech presentation, oblique lie of the fetus, pregnancy-induced hypertension and multiple pregnancies (11). The increase in the Cesarean sections results in the increased rates of the complications associated with obstetrics and gynecology field. Some of these include secondary infertility, miscarriage, difficult hysterectomy due to adhesions to the bladder, placenta percreta, placenta previa, peripartum hysterectomy and cystostomy, maternal death due to severe bleeding, and major complications in an extended period (11). Although the Cesarean section is safer for the baby than the natural birth, it usually causes more maternal deaths than natural delivery. Sometimes families cannot undergo Cesarean section due to low economic status, and there may not be facilities for monitoring fetuses or anesthesia, or lack of trained personnel may exist in the primary health care facilities. These factors cause natural delivery to be more preferred compared to the Cesarean section.

However, considering the lack of studies on VBAC in Iran, especially in Isfahan, the uncertainty about the success or failure rates of VBAC, the limited studies on the benefits of VBAC, and the existence of contradictory results in this case, we aimed to measure the results of VBAC in one year in the city of Isfahan on mothers and infants, and compare the results with other individuals who had natural delivery and Cesarean section.

Methods

This cross-sectional study was conducted on 49889 pregnant women who had a natural delivery and Cesarean section in Isfahan according to the inclusion and exclusion criteria of the study. Besides, sampling for this study was achieved by extracting the information of all childbirths in Isfahan in a period of one year from the “registration system for safe delivery”. In this study, mothers without any comorbidity such as hypertension or diabetes mellitus, were divided into three groups: the first group included mothers who had natural delivery after Cesarean section (110 births and 110 newborns); The second group included mothers who had an elective repeat Cesarean section (history of previous Cesarean section or previous uterine scar) (20148 births and 20229 newborns), and the third group included mothers who had natural delivery without previous Cesarean section (29631 deliveries and 29648 newborns). The inclusion criteria involved the term (gestational age of 37 weeks or more) and AGA (Appropriate for gestational age) neonate with neonatal birth weight between 2500 and 4000 grams and the registration of maternal data in the

“safe childbirth registry system”. However, if the information of mothers were incomplete, access to them was unavailable through follow up, or if we did not have access to their records, we excluded them from the study. “Safe childbirth registry system” is one of the excellent sources of information for assessing the health indices of mothers and infants. Since the beginning of 2014, the system has been registering the information of maternal and neonatal childbirths in the labor delivery rooms and operating rooms of all hospitals. All maternal health information and birth statistics are recorded in this system. In this study, information such as maternal outcome (transferring to the ward, operating room, ICU and maternal death after delivery), neonatal outcome (transferring to the maternity room, transferring to the neonatal ward, transferring to the neonatal intensive care unit [NICU], stillbirth and infant mortality), resuscitation at birth (no resuscitation required, continuous positive airway pressure [CPAP], chest compression and drug administration), Apgar score in the first and fifth minutes after birth (7 and above and below 7) were extracted from the records of these mothers. Given that this system qualitatively expresses the information, the information was revealed as frequency (percentage). To analyze the data, SPSS software, version 16 (IBM SPSS, Armonk, NY, USA) was used, and the Chi-Square test was performed to compare the study groups. The P-value of less than 0.05 was considered as a significant relationship.

Results

According to the results of this study, %0.22 of mothers were in the VBAC group, %40.38 were in the repeat Cesarean section group, 59.40% had the natural delivery. Also, %0.22 of the neonates were in the VBAC group, %40.46 were in the repeat Cesarean section group, and 59.32% were in the natural delivery group. There was a significant difference between the groups concerning maternal and neonatal outcome, resuscitation at birth and Apgar scores in the first and fifth minutes ($P < 0.05$). In the interpretation of these cases, it can be concluded that based on the outcome of mothers, the transferring to ICU and maternal deaths were more frequent in the repeat Cesarean section and natural delivery groups compared to VBAC group. Also, the transfer rate to the operating room and ICU in the repeat Cesarean section group was more than the other two groups. Transition to the neonatal ward in the repeat Cesarean section group, transferring to NICU in the VBAC group, stillbirth in the natural delivery group and infant mortality in the repeat Cesarean and natural delivery groups were more frequent than other groups, respectively. Need for resuscitation at birth in the natural delivery group was less than other groups. Additionally, Apgar scores less than seven at the first minute after delivery in the repeat Cesarean section group, and at the fifth minute in the natural delivery group were more compared to the other groups (Table 1).

Table 1. Information on postpartum maternal and neonatal complications in three groups of the study

Variable	VBAC	Repeat C-section	Natural delivery	P-value	
Number of childbirths (percentage)	110(0.22%)	20148(40.38%)	29631(59.40%)	-	
Number of infants (percentage)	110(0.22%)	20229(40.46%)	29648(59.32%)	-	
Maternal outcome	Transferring to the ward	109(0.99.1%)	19551(97%)	29022(99.6%)	<0.0001
	Transferring to the operation room	1(0.9%)	539(2.7%)	84(0.3%)	
	Transferring to ICU	0	57(0.3%)	22(0.1%)	
	Maternal death	0	1(0)	3(0)	
Neonatal outcome	Transferring to the maternity room	105(95.5%)	19872(98.2%)	29252(98.7%)	<0.0001
	Transferring to the neonatal ward	1(0.9%)	215(1.1%)	232(0.8%)	
	Transferring to the neonatal intensive care unit (NICU)	4(3.6%)	122(0.6%)	101(0.3%)	
	Stillbirth	0	17(0.1%)	57(0.2%)	
	Infant mortality	0	3(0)	6(0)	
	No requirement	108(98.2%)	19911(98.8%)	29256(99.5%)	
Resuscitation at birth	CPAP	1(0.9%)	223(1.1%)	120(0.4%)	<0.0001
	Chest compression	1(0.9%)	8(0)	9(0)	
	Drug administration	0	6(0)	6(0)	
Apgar score at first minute	7 and above	110(100%)	19944(98.99%)	29431(99.31%)	<0.0001
	Below 7	0	204(1.01%)	200(0.67%)	
Apgar score at fifth minute	7 and above	110(100%)	20103(99.78%)	29521(99.63%)	0.012
	Below 7	0	45(0.22%)	110(0.37%)	

Discussion

In our study, a large number of pregnant women in Isfahan province were studied, and postpartum maternal and neonatal complications were evaluated to choose a preferred method of delivery. According to our results, maternal outcomes in mothers who had natural delivery or VBAC were better than mothers who had repeat Cesarean section, and neonatal

Neonatal outcomes in the natural delivery group (although stillbirths were higher in this group) were better than those who had repeat Cesarean section and VBAC, but on the other hand, in the VBAC group no transportation to ICU or maternal deaths were seen, and no stillbirths or neonatal mortality was displayed. Hence, mortality in the VBAC group was less than

repeat Cesarean section and natural delivery. Resuscitation at birth had better results in the natural delivery group because most of the cases did not require resuscitation, and the use of CPAP and chest compression in this group was lower than the other groups. Apgar scores in the first and fifth minutes in mothers who had VBAC were 7 and above 7 in all cases, and no scores below seven were reported.

In a study by Devkare et al. in India which evaluated the maternal and neonatal outcomes following VBAC delivery, the authors concluded that out of the 260 cases that were included in the study, only %12 of them needed emergency Cesarean section. Besides, the success rates for VBAC in the age group of 18 to 20 years old were %100, and %88.3 in the age group of 20 to 25 years. In cases where the weight of newborns was less than 3.5 kg, the successful results of the VBAC were higher. In this study, the rupture of the scar and the unsuccessful progress of labor were the most critical factors that led to the repeat Cesarean section. In this study, it was also stated that the use of the VBAC method reduces the duration of hospitalization, mortality, and morbidity (12).

In a theoretical study comparing VBAC and repeat Cesarean section on 180 mothers in Bojnourd, it was concluded that the rate of uterine rupture in the first stage, hysterectomy, and constipation in the VBAC group was lower compared to the repeat Cesarean section group, and the authors suggested that VBAC method could be used to prevent unnecessary and repetitive Cesarean sections (13).

In a study by Zweifler et al. which found inconsistent results with our research and examined VBAC in California, USA, from 1996 to 2002 on 386232 deliveries, it was concluded that there was not any difference between VBAC and repeat Cesarean section regarding the rate of maternal and neonatal mortality. Particularly in mothers with the infant weighing more than 1500 grams, the rate of VBAC motility was similar to that of Cesarean section outcomes (14).

In another study in Mashhad, Iran, the success rate of VBAC was 91%, and the rate of neonatal complications such as NICU admission and neonatal resuscitation was significantly lower in VBAC method compared to the Cesarean section. No maternal and neonatal deaths were reported. Additionally, the duration of hospitalization in VBAC was less than the Cesarean section, and the success rate of breastfeeding in the VBAC group was much higher than that of Cesarean section group (15).

Durnwald et al., studied 768 mothers who had given birth with VBAC and Cesarean section methods in 2004 and concluded that favorable initial pelvic examination, spontaneous labor and a lack of oxytocin use are among the factors that correlate with a successful VBAC. Also, VBAC delivery was associated with maternal infection and reduced Apgar scores, and neonatal outcomes in the VBAC group

were similar to those who had the repeat Cesarean section (16). In our study, the Apgar scores in the VBAC group and neonatal outcomes in the natural delivery group were better than the other cases.

In an inconsistent research in 2018 that focused on maternal and fetal complications after VBAC, it was concluded that VBAC delivery is associated with higher maternal and fetal morbidity and mortality risk compared to the Cesarean section (17). In a study that compared VBAC and Cesarean section in four European countries (Italy, Germany, Ireland and Belgium) in 2018, it was concluded that VBAC delivery was more effective than repeat Cesarean section and had fewer risks for mothers (18).

There are some criteria that predict success of VBAC. A non-recurring indication for previous Cesarean section, such as breech presentation or fetal distress, and also prior vaginal deliveries are associated with a much higher successful VBAC rate. A low vertical uterine incision in comparing to a low transverse incision does not seem to adversely affect VBAC success rates. Maternal obesity and diabetes mellitus adversely affect VBAC outcomes but Fetal macrosomia and Twin gestation do not appear to be a contraindication for VBAC (19). In a study on 2006 women who planned for TOLAC, 84.0% had VBAC. Gestational age, history of vaginal delivery, estimated birth weight, body mass index, spontaneous onset of labor, cervix Bishop score and rupture of membranes were associated with successful VBAC rate (20). A cohort study conducted in Thailand such as old studies also showed that late gestational age and high maternal BMI were associated with a higher failure rate (21, 22).

Uterine rupture is the most significant complication which can occur in patients undergoing TOLAC. Uterine rupture is a medical emergency for both mother and fetus that need an immediate management to save their lives. When uterine rupture occurs, blood and oxygen flow to the baby is interrupted, and this can result in fetal acidosis, need for neonatal intensive care unit admission, and even death. Also, in these cases the mother is also at significant risk such as hemorrhage that may lead to massive transfusion, and sometimes hysterectomy, so it is necessary to control the bleeding (1, 23). A Systematic review with A total of 39 documents shows that the uterine rupture incidence was 0.15-0.98% in spontaneous labor; 0.3-1.5% in stimulation and induction with oxytocin, and 0.68-2.3% in prostaglandin inductions (24) Overall, according to our study and previous studies, VBAC is a reasonable choice for the majority of women if patient conditions and risk assessment are well considered.

Conclusion

According to the results of the current study and other investigations, it seems that using VBAC and natural delivery can be more satisfactory than using

repeat Cesarean section delivery. The reason is some results such as the maternal outcomes, Apgar scores in the first and fifth minutes, and the mortality rate in VBAC was less than that of repeat Cesarean section, and some results such as resuscitation at birth and the neonatal outcomes were better in natural delivery than repeat Cesarean section method. It should be noted that our study is the first investigation in Isfahan with a considerable sample size (almost all deliveries) to examine maternal and neonatal complications. The small number of VBACs compared to natural birth and Cesarean section, and unevaluated factors that are involved in the maternal and neonatal outcomes are some of the most significant limitations of our study. We suggest that in cases where there is no need for the repeat Cesarean section, natural vaginal delivery or VBAC should be used. Also, extensive studies throughout the country should be conducted to examine neonatal and maternal complications.

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Conflict of Interest

The authors have no conflicts of interest to declare.

Statement of Ethics

The patient had assigned the informed consent in the aim of reporting present article.

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Author Contributions

Providing article and comparing the result of several articles and choosing the appropriate ones in addition to designing the mention surveillance study has been done by all colleagues.

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