

A Prediction Score for Safe and Successful Vaginal Birth after Cesarean Delivery: A Prospective Controlled Study

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Abstract

The aim of this study was to; evaluate the demographic, obstetrical, and medical factors that influence the chances of vaginal birth after cesarean delivery to develop accurate prediction score for safe and successful Vaginal Birth after Cesarean Delivery (VBAC).

Patients and Methods: Two hundred fifty parturient women with previous one lower segment CS were included after Informed consent for the trail of VBAC if there were no contraindications for such trial.

Results: 77.6% of women delivered vaginally and 22.4% had emergency repeated CS. Trial of labor success rates were affected by maternal age, parity, gestational age, history of prior vaginal delivery inter-delivery duration, previous attempt of VBAC, indication of previous CS, BMI, Bishop score on admission, type of labor, and neonatal weight.

Conclusion: The variables of significant predictive value were; Bishop score (≥ 4), prior vaginal delivery, BMI < 30 kg/m², birth weight < 4.000 g, and the indication of previous CS. The proposed VBAC score may help to identify women with a greater chance for successful VBAC.

Recommendation: the trail of labor should be done under close maternal and fetal monitoring in a hospital with appropriate facilities and services for immediate CS in urgent cases.

Keywords: Planned VBAC; Successful VBAC; Unsuccessful VBAC

Introduction

Trial of vaginal birth after CS represents one of the most significant changes in obstetric practice in the recent time. Encouraging the vaginal birth after CS has been considered a key method of reducing the cesarean rate [1].

The American College of Obstetricians and Gynecologists (ACOG, 2010), states that women with a history of one previous low transverse cesarean delivery, a clinically adequate pelvis, and no prior classical uterine scar or rupture are good candidates for a Vaginal Birth after Cesarean Section (VBAC) trial provided that they are at an institution with adequate resources including physicians and anesthesiologists [2]. Although attempts at a Trial of Labor after a Cesarean Birth (TOLAC) have become accepted practice, the rate of successful vaginal birth after cesarean delivery, as well as the rate of attempted VBACs, has decreased during the past 10 years. Concerns about immediate maternal and neonatal complications associated with uterine rupture have contributed to a decrease in vaginal birth after CS rates [3].

In the event of a failed trial there is a definite increase in perinatal and maternal morbidity and mortality rates. The most important risk of vaginal birth after CS is rupture of uterine scar [4]. The incidence of uterine rupture with VBAC in a mother who has had a low transverse incision is approximately 0.2%-0.5%. Accompanying the elevated risk of uterine rupture is an increased risk for hysterectomy [5].

Several screening tools have been proposed for predicting VBAC. These tools take into account factors such as; maternal age, body mass index, prior vaginal delivery, prior cesarean indication, cervical dilation, and effacement at admission. The models have reasonable ability to predict the likelihood of a successful trial of labor at the population level but are not accurate in predicting the risk of a uterine rupture or unsuccessful trial of labor. Furthermore, some of these models were intended for use at the time of the first prenatal visit

and others were intended for use at the time of admission [6-12]. Women who are counseled early during pregnancy using antepartum factors alone may have a greater chance of success if they present for delivery with a favorable cervix. Being able to improve the accuracy of predicting a successful VBAC at the time of admission may encourage more women to undergo VBAC thereby preventing the downstream morbidity associated with multiple cesarean deliveries, including increased operative risk and abnormal placentation [13].

In a country like Kuwait and Egypt where, having a large family is encouraged by social and cultural norm, the trial of labor after CS should be considered in woman who has no contraindications, to avoid the limitation of the family size and to reverse rising cesarean rate and its complications. Meanwhile, midwives are qualified to manage care during pregnancy, labor and birth for a woman planning a vaginal birth after cesarean if appropriate arrangements for medical consultation and emergency care are in place. Developing a scoring system by midwives, could be reflective of evidence-based practice, enables to predict the chances of success vaginal birth after cesarean section and lower repeated cesarean rates in general.

The aim of the study was to evaluate the factors (demographic, obstetrical, and medical) that may influence the chances of vaginal

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birth after cesarean delivery in order to develop accurate prediction score for safe and successful vaginal birth after cesarean delivery.

Patients and Methods

A prospective study was conducted at the labor ward at Al-Sabah Maternity Hospital, in Kuwait and Zagazig University Hospitals, Zagazig, Egypt during the period from the first of March 2012 to the end of September 2012. First hospital is a teaching hospital affiliated to the Ministry of Health. Being a large maternity hospital in metropolitan city its obstetric and gynecological departments attract women from all over Kuwait with total capacity of 474 beds. Second hospital is a University tertiary referral medical center its obstetric and gynecological departments has capacity of 300 beds. In 2012, the total admission number to labor rooms was 5,045 parturient women (Al Sabah Maternity Hospital record) and 4307 parturient women in Zagazig university hospital.

Any woman admitted to the delivery unit during the time of the study was eligible for being recruited in the study sample according to the following inclusion criteria.

- Women with previous one lower segment caesarean section
- Parturient women, who desired and accepted the trial of VBAC
- Having single viable fetus
- With vertex presentation at the onset of labour
- Their gestational age was ≥ 37 weeks
- Having spontaneous onset of labour
- As well as women whose previous CS was performed at the Maternity Hospital in order to collect data related to their previous cesarean history

Women were excluded if they had

- Previous two or more cesarean section
- Cephalopelvic disproportion
- Past history of uterine rupture
- Any indication for elective cesarean section in the current pregnancy related to fetal mal-presentation, placenta previa or any other maternal complications such as pre-eclampsia, diabetic mellitus....etc.

Data collection was done through the use of the following tools:

Structured Interview sheet: Include the following

- Demographic variables included maternal age, parity, gestational age at delivery by best obstetric estimate, pre-pregnancy body mass index (BMI, calculated as weight (kg) / [height (m)]²), and insurance status. Age, educational level, and occupation
- Gravidity, parity, abortion and preterm labor. Also history the previous cesarean as; spacing between previous CS and current pregnancy, indication of previous CS, Intra-partum or postpartum complications, and wound healing
- Present obstetric history such as; last menstrual period, and gestational age

Maternal assessment sheet upon admission to labor room include the following parts:

- General examination such as; vital signs, height, weight, BMI, and any signs denoting complications
- Local abdominal examination to determine the level of the funds, fetal position and presentation as well as the fetal heart rate. The characteristics of uterine contractions; frequency, intensity and duration were also recorded
- Vaginal examination to determine the onset of labor and exclude any abnormality. It gave an idea about the condition of vulva and vagina, cervical effacement and dilatation. The Bishop score was calculated Using the first digital cervical examination at the time of admission by a resident (second-year or third-year resident in a university-based program), attending physician, hospital-based certified nurse midwife, or trained labor and delivery nurse. Women with missing cervical examination data were excluded
- The condition of the membranes whether intact or ruptured was also recorded. Diagnosis of labor was determined and adequacy of the pelvis was assessed. Bishop Score. *Ultrasonography* to evaluate fetal gestational age, fetal viability, fetal weight, fetal presentation, amniotic fluid index, gross fetal anomalies, the position of the placenta, and the condition of the retro placental space

Cardiotocography was done for every parturient woman to assess the fetal heart rate and uterine contractions.

Partograph was used in collecting data related to the fetal, maternal condition, and labor progress during the first stage of labor.

Summary of labor sheet include the following:

- mode of delivery, whether spontaneous, assisted vaginal delivery or emergency repeated CS
- duration of the stages of labor
- condition of the uterus, placenta and perineum
- occurrence of postnatal problems such as; postpartum hemorrhage, hysterectomy, uterine dehiscence or rupture
- Administration of IV blood
- The period of hospital stay
- *Neonatal assessment* of the newborn condition, Apgar score Weight of the neonate
- Need for resuscitation
- Admission to NICU

Fetal condition was assessed using the Cardio-Toco Graphy. Fetal monitoring by CTG was done for each studied women throughout labor by the researcher, under the supervision of the on duty obstetrician and assigned nurse. Fetal and maternal condition during the first stage of labor was assessed every 30 minutes. Uterine contractions "intensity, duration, and frequency" were assessed every 30 minutes. Assessment of labor progress was recorded in the partograph. The obstetrician was present at all times in order to manage any problem that can be happened during TOL such as; non reassuring fetal heart rate pattern or inadequate progress of labor. Epidural anesthesia was used for patient according to the woman's request.

Augmentation of labor was applied for patient with following criteria:

- Cervical dilatation 4 cm
- Regular uterine activity
- No cervical change during the preceding one hour

In case of non-reactive CTG tracing or failure to progress which needed an emergency action, the situation was reassessed whether to continue the trial of labor or re-evaluate the plan.

Maternal and neonatal assessment was done after labor and signs denoting complications were reported and recorded.

Lastly, a predictive score for vaginal birth after cesarean delivery done in order to reduce the rate of CS and increase the safe vaginal birth after cesarean section attempts.

Statistical Design

After data were collected it was revised, coded and fed to statistical software SPSS version 16. The given graphs were constructed using Microsoft excel software. All statistical analysis was done using two tailed tests and alpha error of 0.05. P value equals to or less than 0.05 was considered to be significant.

Fetal station above zero was delineated as high, and more specific details were not available. For the purpose of this analysis, any station higher than zero was not assigned any points in the calculation of the Bishop Score for that individual patient. Within decile of predicted probability, the predicted and observed VBAC rates were compared. A logistic regression model of the probability of VBAC success was estimated with calculated VBAC score as the only predictor. The corresponding AUCs and 95% CIs of the ROC curves were calculated.

Descriptive statistics is in the form of mean with standard deviation for the normally distributed data and median with range for skewed data.

One-sample kolmogorov-smirnov test

Independent samples T test

Analysis of categorical data

Mont Carlo exact test and Fishers exact test

Multiple stepwise logistic regressions

Results

Table 1 presents distribution of women according to their socio-demographic characteristics more than one third (34.8%) of women were in the age of 25 to less than 30 years old, with a mean age was 29.9 ± 5.3 years. (82.4%) had secondary and university level of education and only 1.6% were illiterate (53.6%) of women were working and almost an equal percent were Kuwaiti and Egyptian women (49.8% & 50.2%, respectively).

Table 2 present the distribution of the studied sample according their mode of the present delivery. (77.6%) of women had successful VABC. Of those (73.6%) had spontaneous vaginal delivery and less than one tenth (4.0%) had assisted vaginal delivery. (22.4%) of the study sample had ERCS due to either fetal distress (60.7%) or failure of labor progress (39.3%).

Table 3 shows the relationship between the mode of the present delivery and the past obstetric history. Women who had successful VBAC were more likely to have low parity (≤ 3) compared to those in

the ERCS (90.2% vs 76.8% respectively) ($X^2=28.1$ & $p=0.000$). 94.2% of VBAC group had a gestational age between 37th and less than 40 weeks compared to 41.1% in the ERCS group ($t=6.5$ & $p=0.000$). 61.9% of the successful VBAC group had vaginal delivery in their last delivery vs.26.8% of the ERCS group ($p=0.000$). The incidence of successful VBAC was significantly higher in women who had a history of prior vaginal delivery, compared to those who had not (71.1% & 28.9%, respectively).

Table 4 demonstrates that, women in the VBAC group were more likely to have longer spacing period (≥ 18 months) between their previous CS and their present pregnancy compared to those in the ERCS group (74.1% vs. 32.1%, respectively) ($t=7.3$ & $P=0.000$).

Prediction of VBAC success at the time of admission was highly dependent on the initial cervical examination. However, using the Bishop score al one would only generate an AUC of 0.6 5. Women with an admission integer VBA C score less than 10 had a likelihood of VBA C success of less than 50%. Patients with an admission score more than 16, had a VBAC success rate more than 85%.

Table 5 displays the numbers of previous successful attempted of VBAC among the two studied groups. Women in the successful VBAC group had two previous successful attempted VBAC (38.2%) compared to those in the ERCS group (14.3%).

Table 6 showed that failure of labour progress was the most common indication for CS (39.3%), followed by macrosomia (28.6%), and fetal distress (10.7%) in the ERCS group compared to, women in the successful VBAC group (3.7%, 23.8% and 2.5 % respectively). On

Socio-demographic data	No (n=250)	%
Age in years		
■ 20-	39	15.6
■ 25-	87	34.8
■ 30-	69	27.6
■ ≥ 35	55	22.0
Mean ± SD	29.9 ± 5.3	
Education level		
■ Illiterate/ Read & write	4	1.6
■ Primary	40	16.0
■ Secondary	124	49.6
■ Higher level	82	32.8
Occupation		
■ House wife	116	46.4
■ Working	134	53.6
Nationality		
■ Kuwaiti	124	49.8
■ Egyptian	126	50.2

Table 1: Distribution of the studied women according to their socio-demographic characteristics.

Mode of delivery	No	%
Successful VBAC:	194	77.6
■ Spontaneous vaginal delivery	184	73.6
■ Assisted vaginal delivery "due to"	10	4.0
- Maternal distress	3	30
- Prolonged 2nd stage(>1hour)	5	50
- Foetal distress	2	20
Emergency caesarean section "due to"	56	22.4
- Foetal distress	34	60.7
- Failure to progress	22	39.3

Table 2: Distribution of the studied women according to their mode of the present delivery.

Obstetric History	Group				X ²	P
	Successful VBAC (n=194)		ERCS (n= 56)			
	No	%	No	%		
Parity					28.1	0.000*
■ ≤ 3	175	90.2	43	76.8		
■ >3	19	9.8	13	23.2		
Gestational age (weeks)					73.4	0.000*
■ 37-	179	94.2	23	41.1		
■ 40-42	15	5.8	33	58.9		
Mean ± SD	38.2 ± 1.2		40.7 ± 1.0		t=6.5	0.000*
Mode of the last delivery					21.5	0.000*
■ Vaginal	120	61.9	15	26.8		
■ C.S	74	38.1	41	73.2		
Prior vaginal delivery					15.2	0.000*
■ Yes	138	71.1	24	42.9		
■ No	56	28.9	32	57.1		

Table 3: Women obstetrical history in the two studied groups.

Duration between previous CS and current pregnancy(months)	Groups				X ²	P
	Successful VBAC (n=194)		ERCS (56)			
	No.	%	No.	%		
<18 months	50	25.9	38	67.9	33.4	0.000*
≥ 18 months	144	74.1	18	32.1		
Mean ± SD	25.6 ± 8.9		16.9 ± 6.2		t=7.3	0.000*

Table 4: The duration between the previous CS and the current pregnancy in the two studied groups.

Variables	Groups				X ²	P
	Successful VBAC (n=194)		ERCS (n=56)			
	No	%	No	%		
Number of prior attempted VBAC					26.4	0.000*
■ Not applicable	56	28.8	32	57.1		
■ 1	64	33.0	16	28.6		
■ 2	74	38.2	8	14.3		

Table 5: The number of prior attempted of successful VBAC.

Variables	Groups				X ²	P
	Successful VBAC (n=194)		ERCS (n=56)			
	No	%	No	%		
Indications of previous C.S					72.8	0.000*
■ Foetal distress	46	23.8	6	10.7		
■ Ante partum haemorrhage	23	11.8	3	5.3		
■ Failure of labour progress	7	3.7	22	39.3		
■ Malpresentation	74	38.1	4	7.2		
■ PIH	25	12.9	3	5.3		
■ Macrosoma	5	2.5	16	28.6		
■ Multiple pregnancy	14	7.2	2	3.6		

Table 6: Indications of previous CS in the two studied groups.

the other hand, mal-presentation, fetal distress, and pregnancy induced hypertension are more common among successful VBAC group (38.1%, 23.8%, and 12.9% respectively) (X=72.8, p=0.000).

Table 7 revealed that women who had successful VBAC was more likely to be higher among women with Bishop Score ≥ 4 than those with Bishop Score <4 (88.1% & 11.9% respectively). Women in the successful VBAC group were more likely to have spontaneous rupture of membranes and the amniotic fluid being clear than those in the ERCS group (87.1 & 97.4% vs 37.5% & 78.5% respectively) (p=0.000).

Table 8 indicates that women with ERCS were more likely to suffer from postpartum haemorrhage (8.9%) and to receive blood transfusion (7.1%) compared to women who had successful VBAC (2.1% and 1.5%

respectively), but with no statistical significant difference. Meanwhile women who had ERCS were more likely to have uterine dehiscence 7.1% compared to none of those who had successful VBAC (Table 9).

Table 10 shows the scoring system for prediction of successful vaginal birth after previous cesarean section based on the values of the odds ratios and the relative weight of each of the five most significant variables in the final regression model. Each of these five variables was assigned a score ranging between 0-3. The calculated probabilities for successful vaginal birth after cesarean section were given a maximum score of 10.

Table 11 demonstrates the probabilities of having Successful VBAC according to the score value. The probabilities of VBAC success

Local examination on admission	Groups				X ²	P
	Successful VBAC (n=194)		ERCS (n=56)			
	No	%	No	%		
Bishop score						
■ <4	23	11.9	37	66.1	70.0	0.000*
■ ≥ 4	171	88.1	19	33.9		
Membrane condition on admission					13.9	0.000*
■ Intact	76	39.2	49	87.5		
■ Ruptured	118	60.8	7	12.5		
Mode of rupture					58.6	0.000*
■ Artificial	25	12.9	35	62.5		
■ Spontaneous	169	87.1	21	37.5		
■ Clear	189	97.4	44	78.5	24.3	0.000**
■ Bloody	0	0.0	0	0.0		
■ Meconium stained	5	2.6	12	21.5		

Table 7: Admission data in the two studied groups.

Maternal post natal problems	Groups				FEP
	Successful VBAC (n=194)		ERCS (n=56)		
	No	%	No	%	
Postpartum haemorrhage	4	2.1	5	8.9	0.540
Blood transfusion	3	1.5	4	7.1	0.571
Uterine dehiscence	0	0.0	4	7.1	0.002*
Hospital stay after delivery (days)					t=15.8 0.000*
■ Range	1-3		1-6		
■ Mean ± SD	1.2 ± 0.7		4.1 ± 0.6		

Table 8: Maternal postnatal problems in the two studied groups.

Risk factors	P value	OR	95% C.I for OR	
			Lower	Upper
Bishop Score (≥ 4)	.000	10.14	3.11	33.04
Prior vaginal delivery	.000	9.16	2.75	30.54
BMI pre-pregnancy (<30 kg/m ²)	.000	6.42	2.51	16.40
Birth weight <4000g	.000	4.59	1.46	12.38
Pervious indications of the 1 st CS	.000	3.19	1.69	7.80
• Malpresentation	.000	3.13	1.68	5.92
• Foetal distress				

Table 9: Variables studied and their adjusted odds ratios in predicting successful VBAC.

Factor	No	Yes
Bishop score ≥ 4	0	3
Prior vaginal delivery		2
Maternal age		
<35	0	1
>35	0	2
BMI pre-pregnancy (<30 kg/m ²)	0	
Birth weight		2
• BW <3.000kg	0	
• BW 3.000 -3.500 kg	0	1
Indication of previous CS:		
• Malpresentation	0	2
• Fetal Distress	0	1
Total	10	

Table 10: Scoring system for prediction of successful VBAC.

increase with increasing the total score value: If score >2, chances for vaginal birth after cesarean section are 24.9%; if score >4, chances for vaginal birth after cesarean section are 68.3%, if score >6, chances for vaginal birth after cesarean section are 78.0%, and if score >8, chances for vaginal birth after cesarean section are 90.1%.

Discussion

In a country like Kuwait and Egypt where, having a large family is encouraged by social and cultural norm, the trial of labor after CS should be considered in woman who has no contraindications, to avoid the limitation of the family size and to reverse rising cesarean rate and

Score values	Probabilities of having Successful VBAC
Total score levels	
■ > 2	24.9%
■ > 4	68.3%
■ > 6	78.0%
■ > 8	90.1%

Table 11: Successful VBAC rate according to the score value.

its complications. Meanwhile, midwives are qualified to manage care during pregnancy, labor and birth for a woman planning a vaginal birth after cesarean if appropriate arrangements for medical consultation and emergency care are in place.

In the present study vaginal birth after CS was achieved in more than three quarters of women with one previous CS. Of those, the majority had spontaneous vaginal delivery and less than one tenth had assisted vaginal delivery due to either prolonged second stage or maternal distress. Meanwhile, almost one fifth of the study sample underwent ERCS due to either fetal distress or failure of labor progress. This is in accordance with the results found in other studies, which demonstrate success rate of VBAC ranging from 60.0%-80.0% [13,14].

The relatively high prevalence of the successful vaginal birth after CS revealed in the present study may reflect the meticulous selection of cases together with the application of clinical and scientific evidences in the management of these cases for the provision of successful trial of labour after CS.

A significant relationship between some obstetric variables and the outcome of subsequent delivery was evident in the present study. Thus women who had successful VBAC were more likely to have low parity (≤ 3) compared to those who had ERCS. A similar finding was previously reported the author investigated the outcome in women with planned VBAC in comparison to ERCS and to those undergoing vaginal birth [15]. They found that a significant higher percentage of successful VBAC was in women of low parity. On the contrary, another study found that women with successful trial of labor were of grater parity [16]. The discrepancy with the present study finding could be due to research design and sample characteristics. As the majority of patients would have oversized baby with advanced parity which could predispose to failed trial, in addition to ostomyalytic changed in pelvis with increased parity.

The present study revealed that the chance for successful VBAC in women with prior vaginal delivery was higher, compared to women with no history of prior vaginal delivery. This result is in line with others who have reported that, prior vaginal delivery is apparently the strongest predictor of successful VBAC [17,18].

Almost three quarter of the women in the VBAC group had a longer spacing period (≥ 18 months) between their previous CS and their present pregnancy, compared with those who had a duration <18 months. This may be attributed to the reasonable effect of the time required for the uterine scar to heal completely. Such finding was supported other who analyzed the different factors associated with successful trial of labor after previous one lower segment cesarean delivery [6]. He reported that one of the factors that were found to be significantly associated with successful trial of labor is inter-pregnancy interval longer than 12 months.

The present study revealed that, increasing gestational age is associated with a decreased rate of successful VBAC. This may be attributed to the fact that, among fetus with gestational age beyond

40 weeks, the risk of fetal distress is expected to be increased as the placental insufficiency is common.

Bishop score indicates the relationship between cervical ripeness and the likelihood of entering spontaneous labor. In the present result women in the successful VBAC group were significantly more likely to have Bishop Score ≥ 4 . In this regard have concluded that, higher Bishop score indicates more favorable cervix, which is the best predictor for successful VBAC [19,20].

The present study revealed that the majority of the successful VBAC group had spontaneous rupture of membrane with clear liquor compared to the ERCS group. This finding is partially in agreement with that of who have demonstrated that, previous CS performed for a non repetitive indication such as; breech presentation, history of a previous successful VBAC, station of -1 or more, intact membranes and cervical dilation of 4 cm or more "on admission to labor room" were all positively correlated with increased likelihood of successful VBAC.

According to the data analysis of the partograph, it was found that there was a significant failure in labor progress during the active phase (at cervical dilatation 4-7) in more than two thirds of the ERCS group compared to almost one tenth in the successful VBAC group. This failure was obvious in the delay of cervical dilatation, abnormal uterine contraction and failure in descent. This is in agreement with a study who found that, failure of progress was the most common (40.2%) indication of ERCS [9].

Univariate and multiple stepwise logistic regression models were fitted to calculate Odds Ratios (ORs) and 95% Confidence Intervals (CIs). After excluding the significant variables of non- significant odds ratio, five variables were found to be independently associated with successful VBAC:

Bishop score of 4 and more, previous vaginal delivery, pre-pregnancy BMI less than 30, birth weight <4.000 g and the indications of the 1st CS for malpresentation or fetal distress. This finding is very close to the study done by who found that previous vaginal delivery, spontaneous labor, birth weight <4000 g, and BMI <30.5 kg/m² were all a predictive variables of success VBAC. Recently two studies in India about "Prognostic factors for successful vaginal birth after cesarean section" found that, maternal age, prior vaginal delivery, neonatal weight, inter-conceptional period, and prior CS indication were all statistically significant predictors of successful VBAC [19,20].

The present study has devised a scoring system that could predict which reasonable accuracy the chance for successful VBAC. The score was developed on the basis of their relative weight (OR) and their success rate in predicting successful VBAC. Each of these five variables was assigned a score ranging between 0-3, where 0 is the lowest and 3 is the highest probability. The calculated probabilities for successful vaginal birth after cesarean section were given a maximum score of 10. The probabilities of VBAC success increase with increasing the total score value; women with a score >2 have a probability of 24.9% to deliver vaginally, while women with a score >8 have a probability of 90.1% to deliver vaginally.

Similarly, a study conducted at Israel by attempted to develop a scoring system based on five factors significantly associated with successful VBAC, abnormal presentation as indication for first CS, previous VBAC, cervical dilation, gestational age ≤ 41 weeks and lower gestational age at the time of the first CS [9]. In the proposed VBAC score, each of the five most significant variables was assigned

a score ranging between 0 and 3 based on the probability for VBAC. Additionally, Grobman et al. [12] study (10 on 11,856 women with previous CS, 8659 (73.0%) had successful VBAC. They have developed a predictive nomogram model, which incorporate variables easily ascertainable at the first prenatal visit that allows the determination of a patient specific chance for successful VBAC for those women who undertake trial of labor. The prediction model is based on a multivariable logistic regression, including the variables of maternal age, body mass index, ethnicity, prior vaginal delivery, the occurrence of a VBAC, and a potentially recurrent indication for the cesarean delivery.

The use of such a scoring system may enable the obstetricians and midwives to predict the chances for success in the individual patient and to evaluate the risks and benefits, thus improving outcome in a trial of labor after previous cesarean section.

Future studies should be conducted to identify which factors impact most on women accepting or declining trial of VBAC (e.g. patient information leaflet, previous childbirth experiences, desired family size, understanding the risk analysis during counseling, hospital sitting, or cost effect).

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