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The Effect of Previous Successful Vaginal Birth After Cesarean Delivery on Subsequent Trial of Labor

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Objective: The aim of our study was to determine the effects of previous vaginal deliveries after cesarean section on subsequent trial of labor.

Methods: This was a retrospective study from 1999 to 2002 where all women with a history of ≥2 previous vaginal deliveries before the cesarean section and with or without previous vaginal birth after caesarean section (VBAC) were reviewed to determine the VBAC rate and the effects of previous vaginal deliveries on the success rate.

Results: The study population comprised of four hundred-sixteen women with attempted VBAC. They were divided into two groups: 149 (35.82%) had no previous attempted VBAC and the last delivery was cesarean section (group 1), compared to 267 (64.2%) with previous ≥ 1 successful VBAC (group 2). The VBAC success rates were 86 % versus 95.5 % in groups 1 and 2 respectively (P=.001). Twenty-one (14.1%) women were induced with prostaglandin E2 in group 1 as compared to 12 (4.5%) in group 2 (P=.001). However, the indications of induction, labor augmentation and duration of labor between the two groups were not statistically different. There were 3 stillbirths, 2 with no fetal heart detected due to massive placental abruptions and 1 with major congenital anomaly. The fetal weight, number of macrosomic infants, Apgar score <7 at five minutes and admission to neonatal intensive care unit (NICU) between the two groups were not statistically significant. There was no uterine rupture or dehiscence in both groups; but the length of hospital stay was prolonged and statistically significant in group 1.

Conclusion: women with ≥1 previous vaginal delivery after cesarean section are likely to have a higher rate of successful VBAC than those with no previous VBAC. Although, there was no uterine rupture or dehiscence, one should be cautious in interpreting the findings as the study is small. However, repeat trial of labor with previous VBAC is safe and further study is needed.

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In the literature, the data on the effects of sequence of previous mode of delivery on the success of VBAC are few. Caughey et al reported that recent vaginal delivery after cesarean, was associated with a decrease in cesarean section rate and

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less duration of labor in subsequent pregnancies regardless of the indication for the previous cesarean delivery[1]. Also, several studies have reported that the risk of uterine rupture was less in patients with prior vaginal delivery and 1 cesarean[2-4]. Recently, attempts have been made to design VBAC scoring systems that would help to predict the success in subsequent trial of labor[5]. However, their validity in predicting successful VBAC is still debated. Although no controlled trials have been conducted regarding this subject, several studies have substantiated the efficacy and safety of a trial of VBAC. In this social culture, high parity is common and elective repeat cesarean delivery is considered a limiting factor. The aim of the study was to determine the effects of previous vaginal deliveries after cesarean section on subsequent trial of labor.

METHODS

This is a retrospective study conducted at King Abdulaziz University hospital, Jeddah, Saudi Arabia, between January 1, 1999 and December 31, 2002. Data was extracted and analysed from the medical records, labor and delivery charts. All women with ≥ 2 prior vaginal deliveries before the cesarean section and with or without previous achieved VBAC were reviewed to determine the VBAC rate and success, delivery outcome and safety of trial of labor. The study population was divided into two groups according to obstetric history: multiparous women who had no previous attempted VBAC (group 1), and compared to multiparous women who had previous ≥ 1 successful VBAC (group 2). The inclusion criteria for the study were: 1) Patient completed 37-week gestation or more with previous vaginal delivery before the cesarean 2) Couple request to undergo VBAC after counseling regarding the potential risks, 3) Cephalic presentation, 4) Fetal estimated weight < 4000 g, 5). Absence of contraindications for VBAC exclusion criteria were: 1) More than one previous cesarean section, 2) Previous classical or low vertical uterine incision, 3) Multiple gestation, and 4) Breech presentation.

The fetal heart monitoring was carried out for all women during labor. Augmentation with Oxytocin (if needed) was given according to the labor protocol, which prescribes an initial infusion rate of 1 mU/ minute and is increased (if needed) every 30 minute by 1 mU/ minute until the patient had adequate contractions (three uterine contractions every 10 minutes, each lasting for at least 45 seconds) with maximum dose of 16-mU/ minute. Analgesia in labor was provided by intramuscular pethidine with phenergan and/or inhalation analgesia (Entonox). The labor and delivery progress were managed in the two groups by senior residents obstetricians with consultant supervision on call.

The maternal and perinatal outcomes of the two groups were compared. Successful VBAC was defined as an attempted trial of labor resulting in vaginal delivery, whether spontaneously or assisted with vacuum or forceps. Failed VBAC was defined as an appropriately selected patient for trial of labor, who attempted vaginal delivery but, for whatever the indication, ended with repeat cesarean delivery. Statistical analysis performed by percentage (%), means ± SD, Student t-test, Chi-square test, and Fisher's exact test, were used as appropriate using SPSS-PC for windows, version 7.5. Logistic regression model was used and we controlled for possible confounding effects of maternal age, gestational age, previous indications of cesarean delivery, fetal weight,

induction, and oxytocin used, and labor duration. A P value less than 0.05 were considered statistically significant.

RESULTS

A total of 16,071 women delivered during the study period. Four hundred-eighty three multiparous women had ≥ 2 previous vaginal deliveries before cesarean delivery. Four hundred-sixteen fulfilled the inclusion criteria for the study and attempted VBAC. There were one hundred-forty nine (35.8 %) multiparous women with no previous VBAC during the current pregnancy (group 1) and 267 (64.2 %) women with previous ≥ 1 successful VBAC before the index pregnancy (group 2). The number and % of women with previous successful VBAC are presented in Table 1.

Table 1. Previous number's of successful VBAC in-Group 2

Number of attempt	(N=267) %
One	136 (51%)
Two	67 (25.1%)
Three	32 (12%)
Four	15 (5.6%)
Five	10 (3.7%)
Six	4 (1.5%)
Seven	3 (1.1%)

Table 2. Maternal characteristics of the study population with previous vaginal delivery

Variable	Group 1 No previous VBAC (N = 149) %	Group 2 Previous VBAC (n = 267) %	*P. Value*
DM	8 (5.4%)	14 (5.2%)	NS
PIH	4 (2.7%)	3 (1.1%)	NS
Age	31.3 ±5.0	31.5 ±5.0	NS
G. Age	39.0 ±1.4	39.0 ±1.2	NS
Gravidity	5.5 ±2.5	6.1 ±2.6	NS
Parity	4.0 ±2.2	4.5 ±2.2	NS
M. Height	153.4 ±7.0	153.0 ±6.3	NS
M. Weight	74.0 ±13.4	74.0 ±14	NS
Previous indication Of cesarean delivery:			NS
Failure to progress	34 (23%)	70 (26.2%)	
Non recurrent causes	115 (77.2%)	197 (74%)	

DM = diabetes mellitus, PIH = pregnancy induced hypertension

The demographic maternal characteristics with respect to diabetes mellitus (DM), pregnancy induced hypertension (PIH), age, gestational age, gravidity, parity, maternal height and weight and previous indications of cesarean delivery between the two groups were statistically not different (Table 2). We found that in women whose previous indication for cesarean delivery was failure to progress, the rate of cesarean delivery was 6 (9%) versus 8 (24%) in groups 2 and 1 respectively (P= 0.04). The indications of induction in women between the two groups were not significantly different (Table 3). The maternal and fetal outcomes are presented in Table 4. Therefore, in group 2 the success rate of trial of vaginal delivery was higher (95.5 % versus 86 %) than in group 1 [(*P*=0.001), Odds ratio (O.R) 0.9, 95 % Confidence interval (CI) 0.84-0.97]. The augmentation with oxytocin, labor duration, fetal weight, macrosomic infants > 4 kg, Apgar score < 7 at five minute and admission to (NICU) were also statistically not significant. There were three stillbirths, 1 with major congenital anomaly and 2 due to massive placental abruption. There was no uterine rupture or dehiscence in both groups.

Table 3. Indications of induction

Variable	Group 1 No previous VBAC (N = 149) %	Group 2 Previous VBAC (n = 267) %	*P. Value*
Post date	11(7.4%)	6(2.3%)	NS
PIH	4 (2.7%)	3 (1.1%)	NS
DM	1 (0.7%)	2 (0.75%)	NS
PROM	3 (2%)	-	
Others	2 (1.3%)	1 (0.4%)	NS

PIH = pregnancy induced hypertension, DM = diabetes mellitus, PROM = premature rupture of membranes

Table 4. Maternal and perinatal Outcome

Variable	Group 1 No previous VBAC (N = 149) %	Group 2 Previous VBAC (N= 267) %	*P. Value*
PG E2 induction	21 (14.1%)	12 (4.5%)	0.001
Augmentation With oxytocin	15 (10.1%)	17 (6.4%)	NS
Labor duration	6.0 ±3.0	6.0 ±2.5	NS
Mode of delivery:			0.001
Vaginal delivery	128 (86%)	255 (95.5%)	
Cesarean section	21 (14.1%)	12 (4.5%)	
Instrumental delivery:			
Vacuum	1 (0.7%)	2 (0.8%)	NS
Fetal weight	3276 ±430	3297 ±558	NS
Fetal macrosomia (> 4000 g)	8 (5.4%)	16 (6%)	NS
Apgar Ascore < 7 (at 5-minutes)	5 (3.4%)	5 (2%)	NS
NICU admission	1 (0.7%)	1 (0.4)	NS
Fetal deaths	1 (0.7%)	2 (0.7%)	NS

The maternal morbidity with respect to postpartum hemorrhage (PPH), and fever was statistically not different (Table 5). Two patients needed blood transfusion (group 2) and 1 had bowel injury (group1). The duration of hospital stay was prolonged in group 1 and was statistically significant (*P*=0.02).

Table 5. Maternal morbidity

Variable	Group 1 No previous VBAC (N = 149) %	Group 2 Previous VBAC (N = 267) %	*P. Value*
PPH	2 (1.3%)	5 (2%)	NS
Blood transfusion	-	2 (0.8%)	
Pyrexia	5 (3.4%)	4 (1.5%)	NS
Bowel injury	1 (0.7%)	-	
Hospital stay	1.6 ±1.3	1.3 ±1.0	0.02

DISCUSSION

The indication of previous cesarean delivery is known to have an impact on the success rate of VBAC[6]. It been reported in the literature that, if previous indication of caesarean section was for failure to progress, then the rates of failed VBAC vary between 32-45% as compared to 13-22 % in "nonrecurring" indications, such as fetal distress or breech presentation[5,7-8]. In this study similar findings were noted among women with previous indication of "failure to progress" between our study groups 1 and 2 (34 versus 70 cases), the rate of cesarean delivery in women with no previous VBAC was 8 (24%) versus 6 (9 %) with previous successful VBAC (*P*. 0.04). Also, regardless of previous cesarean indications, the cesarean delivery rate was higher (14.1%) in women with no previous VBAC.

There was more than three fold increase in induction rate in group 1 compared with group 2 (O.R 3.14, 95% CI 1.6-6.2). Women undergoing induction tend to have lesser cervical dilatation than women having augmentation of labour[7]. Therefore, one would expect higher rate of caesareans among the inductions. The cesarean delivery analysis in our study did not confirm this observation. The two study groups showed that 6 of the 21 caesarean section patients were induced and 7 needed augmentation (in group 1) compared to 3 inductions and 2 augmentations out of 12 (in group 2). These differences were not statistically significant.

Our results were consistent with published data of Flamm et al and Caughey et al, which indicate that multiparous women at term, with previous vaginal delivery after cesarean section, appeared to be associated with lower repeat cesarean delivery rate in subsequent pregnancies as compared to pregnant women with no previous vaginal delivery after cesarean (4.5 % versus 14.1 %, O. R 3.1, 95 % CI 1.6-6.2) [9,1]. Although, both groups were similar, the lower cesarean and high vaginal delivery rates were not explained by the differences of maternal characteristics between the two study groups. Also, the difference persisted after controlling the associated confounding variables.

The mean ± SD of duration of labor between the two groups was statistically not different. The study was retrospective and patients were managed by different consultant practices and attitudes that could impact the results of cesarean delivery rate by early intervention. We also found no difference in duration of labor between the two groups of women undergoing cesarean delivery (7.5 ±5.1 vs 7.7 ±2.6).

In this study there were 64.2 % multiparous women with previous successful VBAC before the current pregnancy. Within this subgroup 136 had 1 previous successful VBAC, and 131 had ≥ 2 previous successful VBAC. The subsequent repeat cesarean delivery rate in women with 1 previous VBAC was double - 6.1% versus 3 % in patients with ≥ 2 previous VBAC. This difference however, was not statistically significant (*P*. 0.2, OR 2.2, 95 % CI 0.63-7.31). However, there was no uterine rupture or dehiscence in both groups, the maternal and fetal morbidity was not statistically different between the two groups (except the length of hospital stay).

CONCLUSION

Women with previous successful VBAC can be reassured and counseled that repeat trial of labor is safe, and have higher success rate of vaginal delivery.

REFERENCE

1. Caughey AB, Ship TD, Repke JT, et al. Trial of labor after cesarean delivery: The effect of previous vaginal delivery. Am J Obstet Gynecol 1998;179:938-41.
2. Zelop CM, Ship TD, Repke JT, et al. Effect of previous vaginal delivery on the risk of uterine rupture during a subsequent trial of labor. Am J Obstet Gynecol 2000;183:1184-6.
3. Blanchette H, Blanchette M, Mc Cabe J, et al. Is vaginal birth after cesarean section safe? Experience at a community hospital. Am J Obstet Gynecol 2001; 1478-87
4. Bedoya C, Bartha JL, Rodriguez I, et al. Trial of labor after cesarean section in patients with or without a prior vaginal delivery. Int J Gynecol Obstet, 1992;39: 285-9.
5. Troyer LR, Parisi VM. Obstetric parameters affecting success in a trial of labor: Designation of scoring system. Am J Obstet Gynecol 1992;167:11099-104.
6. Ship TD, Zelop CM, Repke JT, et al. Labor after previous cesarean: Influence of prior indication and parity. Obstet Gynecol 2000;95:913-6.
7. Silver RK, Gibbs RS. Predictors of vaginal delivery in patients with a previous cesarean section who require oxytocin. Am J Obstet Gynecol 1987;156:57-60.
8. Flamm BL, Newman LA, Thomas SJ, et al. Vaginal birth after cesarean delivery: results of a 5-year multicenter collaborative study. Obstet Gynecol 1990;76:750-4.
9. Flamm BL, Geiger AM. Vaginal birth after cesarean delivery: An admission scoring system. Obstet Gynecol 1997;90:907-10.