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Original Research Article

Vaginal delivery at term with previous one cesarean section: is it safe?

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ABSTRACT

Background: Post cesarean pregnancies are high risk pregnancy and main concern is uterine scar rupture with increasing maternal and perinatal risks, for vaginal birth after cesarean delivery (VBAC). Objective of this study is to know neonatal and maternal outcome at term who attempt vaginal delivery with previous one cesarean section presenting in active stage of labor.
Methods: A total of 277 pregnant women with single live fetus at term, cephalic presentation with previous one cesarean section, underwent a trial of labor and outcome of successful and failed vaginal birth were noted.
Results: Trial of labor was successful in 52.3% and failed in 47.7% (p=0.269). VBAC was successful where the previous cesarean section indications were fetal distress (79% versus 21%, p=0.000), pregnancy induced hypertension (77.3% versus 22.7%, p=0.000) and fetal growth restriction (81.8% versus 18.2%, p=0.000), when compared with failed trial of labor who required emergency cesarean section in pre-labor rupture of the membranes (8.3% versus 91.7%, p=0.000) and dystocia (3.3% versus 96.7%, p=0.000). VBAC was successful at gestational age of 37 0/7-38 6/7 weeks (p=0.000). In the failed VBAC women who required emergency cesarean section there was significant early neonatal death (p=0.025). Scar dehiscence and hospital stay with or without complications were more in the failed VBAC group.
Conclusions: Early neonatal death and duration of hospital stay were significantly more in the failed VBAC, who were posted for emergency cesarean delivery. Scar dehiscence occurred in the failed VBAC group. Women presenting at 37 0/7 to 38 6/7 weeks of gestation with cephalic presentation in active stage of labor who had previous cesarean section done for fetal distress, pregnancy induced hypertension and fetal growth restriction with inter pregnancy interval of > 24 months can be planned and counselled for VBAC trial of labor.

Keywords: Cesarean section, Neonatal and maternal outcome, Scar dehiscence, VBAC at term

INTRODUCTION

Pregnancy with prior cesarean delivery is quite prevalent in present day obstetric practice, these cases are loosely called 'post cesarean pregnancy'.

Women undergoing a trial of labour after caesarean experienced a uterine rupture of 0.2%-0.3%.[1] Perinatal morbidity was found not significant in a carefully selected cases for trial of labor after cesarean.[2] Scar tenderness has been a major cause of repeat sections. All women who have experienced a prior cesarean birth should be counselled about the maternal and perinatal risk, and benefits of planned vaginal birth after cesarean (VBAC) and elective repeat cesarean section (ERCS) when deciding the mode of birth. Main objective of this clinical study is to analyse neonatal and maternal outcome at term, who attempt vaginal delivery with previous one cesarean section presenting with cephalic presentation in active stage of labor.

METHODS

This observational study was undertaken in the department of obstetrics and gynaecology for a period of one year and six months in collaboration with department of paediatrics, anaesthesia and critical care unit. Authors have blood bank facility, HDU and neonatal intensive care unit in present hospital. Authors have considered women for VBAC trial who went into spontaneous labor at term with cervical dilatation of 4 cm or above and outcome of both mother and baby were noted. Women were counselled nearing at term for intended VBAC trial. Inclusion criteria were single live fetus at term with previous one cesarean section and on admission who has no evidence of scar tenderness, cephalic presentation and in active stage of labor likely to deliver vaginally. Exclusion criteria were gestational age <37 weeks and ≥42 weeks, ≥2 previous cesarean section, intra uterine fetal death, history of rupture uterus, multiple uterine surgery, classical cesarean section, primary indication of cesarean section was placenta previa and contracted pelvis and other contraindication for vaginal delivery and who are not willing to participate in the study and not giving consent. On admission detailed information regarding antenatal check-up, age, parity, literacy, socio economic status was noted. Clinical, abdominal and pelvic examination were done. Antenatal investigations like ABO grouping and RH typing, complete hemogram, blood sugar, VDRL, hepatitis B surface antigen, human immunodeficiency virus rapid test, routine and microscopic examination of urine and ultrasonography for feto-placenta profile were noted. A total of 277 pregnant women at term who fulfil the study criteria and gave consent are put in the VBAC trial of labor. Women were closely supervised by obstetrician and trained nursing staff with record of all vitals and progress of labor. Blood was arranged after proper grouping and cross matching for women with anemia or if cesarean section was contemplated. During post-partum period the condition of the mother and baby were observed.

Statistical analysis

After completion of the study all the data of maternal and neonatal outcome of both successful and failed trial of labor group who required emergency cesarean section were entered in MS Excel 2007 software after thorough verification and cleaning. Data analysis was done using SPSS software package (18 version). Comparison of proportion between the two groups were assessed by chi-square test and that of mean were done by t test. For all statistical purposes, $p<0.05$ was taken as statistically significant. In some cells, values are <5; thus, Yate's correction done.

RESULTS

There were 17105 deliveries during the study period out of which 1280 were post cesarean pregnancy. Among them a total of 277 post cesarean pregnant women who fulfil the study criteria with singleton pregnancy at term underwent a trial of labor, of which 145 women had successful VBAC (52.3%) and 132 women had failed VBAC (47.7%) who required emergency cesarean delivery (p=0.269).

Table 1: Present mode of delivery in relation to previous cesarean delivery indications.

Indications for previous cesarean delivery	Mode of delivery		χ^2value	P-value
	Vaginal delivery (n=145)	Emergency cesarean delivery (n=132)		
Fetal distress (62)	49 (79%)	13 (21%)	41.81	0.000
Breech (54)	28 (51.9%)	26 (48.1%)	0.148	0.700
Pregnancy induced hypertension (44)	34 (77.3%)	10 (22.7%)	26.18	0.000
Fetal growth restriction (22)	18 (81.8%)	4 (18.2%)	15.36	0.000*
Elderly primi (4) #	0	4 (100%)		
Post-dated (28)	12 (42.9%)	16 (57.1%)	1.14	0.285
Dystocia (30)	1 (3.3%)	29 (96.7%)	48.6	0.000*
Prelabor rupture of the membranes (24)	2 (8.3%)	22 (91.7%)	30.08	0.000*
Transverse lie (1) #	0	1 (100%)		
Oblique lie (8)	2 (25%)	6 (75%)	2.25	0.134*
Total (277)	145 (52.3%)	132 (47.7%)	1.22	0.269

*Yate's corrected P value; #χ^2 not valid

For successful VBAC, non-recurrent indication of previous cesarean delivery had more favourable outcome in the present study (Table 1). The percentage of successful VBAC women in the present study (Table 1) was significant (P=0.000) where the previous cesarean delivery indications were fetal distress, pregnancy induced hypertension and fetal growth restriction. And the percentage of failed VBAC women who required

emergency cesarean delivery in the present study was significant (P=0.000), where the previous cesarean done for pre-labor rupture of the membranes and dystocia as shown in the Table 1.

Table 2 shows VBAC was successful at gestational age of 37 0/7 to 38 6/7weeks (p=0.000), whereas the percentage of failed VBAC was significant when compared with successful VBAC at gestational age of 39 0/7 to 40 6/7weeks (p=0.007) and 41 0/7 to 41 6/7 weeks(p=0.000).

Table 2: VBAC in relation to gestational age (n=277).

Gestational age (weeks)	Successful VBAC (n=145)	Failed VBAC (n=132)	P-value
37 0/7-38 6/7	102 (70.3%)	41 (31.1%)	0.000
39 0/7-40 6/7	38 (26.2%)	55 (41.7%)	0.007
41 0/7-41 6/7	5 (3.5%)	36 (27.3%)	0.000

Of all trial of labor women,7.9% (22/277) had 24 months or less interval between previous cesarean delivery and present pregnancy, whereas 92.1% (255/277) women had interval of more than 24 months in the present study (Table 3). An inter-delivery interval of ≤24 months of gestation was associated with a rate of uterine scar dehiscence of 18.18% (4/22) found at cesarean section, compared to 3.13% (8/255) at interval of >24 months gestation (p=0.005).

Table 3: Inter-delivery interval and scar dehiscence.

Interval (months)	Number (n=277)	Scar dehiscence (n=12) #	P-value*
≤24	22 (7.94%)	4 (33.33%)	0.013
25-36	88 (31.76%)	3 (25%)	0.860
37-48	135 (48.74%)	3 (25%)	0.188
>48	32 (11.55%)	2 (16.67%)	0.936

#Scar dehiscence in the failed VBAC women; *Yate's corrected p value

Early neonatal death was significant in the failed VBAC women who required emergency surgical intervention to deliver the fetus when compared with successful VBAC (p=0.025). Number of other neonatal morbidities in both the groups were shown in the Table 4.

Table 4: Neonatal outcome in present pregnancy.

Nature of morbidity and mortality#	Successful VBAC (n=145)	Failed VBAC (n=132)	χ^2value	P-value*
Apgar scores at 1 minute<7	3 (2.07%)	6 (4.55%)	0.675	0.411
Hypoxic ischemic encephalopathy	3 (2.07%)	6 (4.55%)	0.675	0.411
Birth injury	4 (2.76%)	0		
Jaundice	2 (1.38%)	4 (3.03%)	0.28	0.596
Sepsis	1 (0.69%)	2 (1.52%)	0.007	0.935
Respiratory infections	1 (0.69%)	0		
Congenital anomaly	1 (0.69%)	0		
Early neonatal death	2 (1.38%)	10 (7.58%)	4.99	0.025
Total	17 (11.72%)	28 (21.21%)		

#Morbidity and mortality are not mutually exclusive; *Yate's corrected P value

Table 5: Maternal morbidity in VBAC trial of labor.

Maternal morbidity (n=277)	Successful VBAC (n=145)	Failed VBAC (n=132)	P-value
Post-partum haemorrhage	4 (2.76%)	0	
Scar dehiscence	0	12 (9.09%)	
Sepsis	0	2 (1.52%)	
Adherent placentae	1 (0.69%)	0	
Chorioamnionitis	1 (0.69%)	0	
Pyrexia	4 (2.76%)	2 (1.52%)	0.767
Secondary suturing	0	0	
Respiratory tract infections	1 (0.69%)	1 (0.76%)	1.000
Abdominal distension	1 (0.69%)	0	
Hysterectomy	0	2 (1.52%)	
Blood transfusion	4 (2.76%)	4 (3.03%)	1.000
Mean duration of hospital stay in days			
With complication	3.2± (0.6)	9.9± (1.4)	0.000
Without complication	2.5± (0.9)	7.1± (0.9)	0.000

Table 5 shows maternal morbidity in the present study. All cases of scar dehiscence occurred in the failed VBAC group, who has undergone emergency caesarean delivery (12/132). Post-partum haemorrhage occurred in the 4 women of successful VBAC trial group and all required blood transfusion. In the failed VBAC women blood transfusion required for preexisting anemia. Duration of hospital stay with or without complication was significant in the present study, when successful VBAC compared with failed VBAC who has undergone surgical intervention (t=50.89, p=0.000 and t=51.88, p=0.000).

DISCUSSION

The American College of Obstetricians and Gynecologists (ACOG) has published recommendations for a trial of labor in low-risk patients in the appropriate settings.[3] The bulletin states that candidate for VBAC should have no more than one prior lower segment cesarean delivery, a clinically adequate pelvis and no other uterine scars or previous rupture. RCOG recommended, Green-top guideline no. 45 October 2015 states that planned VBAC is a clinically safe choice for the majority of women with a singleton pregnancy of cephalic presentation at 37+0 weeks or beyond with a single previous lower segment caesarean delivery.[4] Gestational age>40 weeks alone does not preclude 'TOLAC' as per ACOG 2017 guidelines. Tessmer et al concluded that VBAC success was independently associated with age <30 years.[5] In the present study authors also found that maximum women (163/277, 58.8%) were belonged to age group of 26 to 30 years. Majority (240/277, 86.6%) women were para 1. Most (156/277, 56.3%) women belonged to low socio-economic status. Table 1 shows indication of previous cesarean section was one of the most important factor in deciding the mode of delivery in present pregnancy. Out of 277 pregnancy, the common indication of previous cesarean sections was fetal distress (62/277, 22.38%), breech (54/277, 19.49%), pregnancy induced hypertension (44/277, 15.88%), dystocia (30/277, 10.83%) and postdated (28/277, 10.10%).

Among previous indications, malpresentation was associated with a high trial of labor success rate (74.51%), whereas previous caesarean for fetal distress resulted in success in 67.34% cases.[2] In present study women with prior cesarean for fetal distress, pregnancy induced hypertension and fetal growth restriction had significant success for trial of vaginal delivery (Table 1), though in the above mentioned study by Balachandran et al recorded that no significant association was found between the indication for previous caesarean and the outcome of trial of scar.[2] Previous indication as failure to progress resulted in lower success rates (46.15%) in the trial of labor as recorded by Balachandran et al.[2] The percentage of women who has undergone emergency cesarean section in present pregnancy, in relation to previous cesarean section indication were elderly primi (4/4, 100%), transverse lie (1/1, 100%), dystocia (29/30, 96.66%), prelabor rupture of the membranes (22/24, 91.7%), oblique lie (6/8, 75%), postdated (16/28, 57.14%), breech (26/54, 48.1%), pregnancy induced hypertension (10/44, 22.72%), fetal distress (13/62, 21%) and fetal growth restriction (4/22, 18.2%). Of all attempting VBAC, 24.5% will fail as reported in the study.[6] Another study by Ugwu GO et al recorded that 50% successful vaginal birth rate after caesarean section and 50% failure rate.[7] In the present study, 52.3% (145/277) women who attempt to deliver vaginally after one previous cesarean section was successful and 47.7% (132/277) women required emergency cesarean section which is almost similar to the study mentioned above. Abdelazim IA et al recorded that mean gestational age was significantly lower in the successful TOLAC (trial of labor after caesarean section) group compared to the unsuccessful group (37±0.04 versus 38.5±0.03).[8] In the present study authors also found that VBAC was successful at gestational age of 37-38 weeks compared to ≥39weeks (Table 2). An inter-delivery interval of ≤24 months was associated with scar dehiscence which was more compared with inter-delivery interval of>24 months (4/22,18.18% versus 8/255, 3.13%, p=0.005) in the present study. Scar dehiscence was diagnosed during cesarean section. Per vaginal check for scar integrity done after successful vaginal delivery and symptomatic dehiscence was nil. The number of women with an inter-delivery interval <2 years was significantly higher in the unsuccessful TOLAC group compared to successful group, as mentioned by Abdelazim IA et al.[8] RCOG Recommended, Green-top guideline no.45 October 2015 states that women delivering within 18 to 24 months of a caesarean section should be counselled about an increased risk of uterine rupture in labour.[4] Upper segment uterine scar, improper apposition with tight uterine margin suturing, infection, poor nutritional status and short inter delivery interval are the factors for poor healing of uterine scar.

Among the failed VBAC women, 12 cases of scar dehiscence were found at cesarean section of which 7 had baby weight more than 3 kg (3.32±0.14) and 5 had less than 3 kg (2.82±0.09) in the present study. Abdelazim IA et al et al recorded that an estimated fetal weight≤3.5 kg was associated with successful trial of labor after caesarean.[8] Neonatal complications in the failed VBAC group were hypoxic-ischemic encephalopathy (6), jaundice (4), sepsis (2), early neonatal death (10) and low Apgar scores at 1 minute (6) in the present study which was more compared with successful VBAC. Early neonatal death was significantly more in the failed VBAC group in the present study (p=0.025). Two neonatal death in the successful VBAC group was due to sepsis (1) and respiratory infection (1). Four baby had birth injury in the successful VBAC group due to ventouse application.

Apgar scores less than 7 in the first minute were more frequent in those with failed VBAC than vaginal delivery (successful VBAC); however, the difference was not statistically significant as recorded by Ugwu GO et al.[7] In

the present study Apgar scores less than 7 in the first minute were not significant between the successful VBAC and failed VBAC group (p=0.411). Tan et al and Ball et al reported increases in risks of neonatal morbidities and hypoxic ischemic encephalopathy after an unsuccessful TOLAC.[9,10]

In another study by Abdelazim IA et al recorded that there was significant neonatal intensive care admission in the failed VBAC due to birth asphyxia, meconium aspiration and sepsis compared to the successful group.[8] In the present study there were two still birth in the failed VBAC group, one was associated with scar dehiscence and meconium stained liquor amnii and other one with pregnancy induced hypertension. Kok N et al reported birth trauma, Apgar scores <7, still birth and neonatal death were more in the second birth after caesarean in their study.[1] In present study, authors found that scar dehiscence and hypoxic-ischemic encephalopathy were more in the failed VBAC group. Of all 145 Successful VBAC, 84 (57.9%) delivered spontaneously and 61 (42.1%) women required ventouse application to cut short second stage of labor.

In the study by Gupta P et al found that incidence of scar dehiscence was significant following trial of labor than elective repeat LSCS (9.62% versus 1.62%, p=<0.005) which is almost similar to present study (9.09%) in the failed VBAC group.[11] They also noted that maternal morbidity in the form of fever, wound sepsis and blood transfusion were more in emergency LSCS following trial of labor which is also in accordance with the present study as shown in the Table 5. Ugwu GO et al recorded no cases of uterine rupture who attempt VBAC.[7] Though no uterine rupture was noted in the present study, in two cases extension of uterine injury occurred during delivery of the baby for which hysterectomy was done (Table 5). No induction of labor or augmentation with oxytocin was done in the present study. Tan PC et al recorded trial of labor was associated with shorter hospital stay.[9] In the present study authors also found that mean duration of hospital stay were significant in the failed VBAC compared to successful VBAC women.

CONCLUSION

Overall, women in active stage of labor at 37 0/7 to 38 6/7 weeks of gestation with cephalic presentation who had previous caesarean section done for fetal distress, pregnancy induced hypertension and fetal growth restriction with inter-pregnancy interval of more than24 months can be planned for VBAC trial. Scar dehiscence occurred in the failed VBAC. Early neonatal death and hospital stay were significant in the failed VBAC women.

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