Outcome of vaginal birth after caesarean section in women with one previous section and spontaneous onset of labour

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نتائج الولادة المهبلية التالية للقيصرية، في نساء أُجريَتْ لهن قيصرية واحدة وبدأ المخاض عندهن تلقائياً

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الخلاصة: تتضارب معطيات السلامة للولادة المهبلية التالية لولادة سابقة بالجراحة القيصرية. وقد أجرى الباحثان هذه الدراسة في مستشفى إحالة في مدينة صنعاء في اليمن، فاستقصيا نتائج الولادة المهبلية التالية لجراحة قيصرية لدى 357 امرأة سَبَق أن أجرَيْنَ قيصرية واحدة، وأدخلن إلى المستشفى في تمام أوان الولادة وفي مخاض بدأ تلقائياً. وقد اختار الباحثان مجموعة من الشواهد (عددهن 155) من نساء لم يلدن بالقيصرية من قبل. وقد بلغ معدل نجاح الولادة المهبلية التالية لجراحة قيصرية 357/ 311 (87.1٪). وكان متوسط مدتي المرحلتين الأولى والثانية من الولادة في مجموعة الدراسة 146.2 دقيقة و30.7 دقيقة، ولم يختلفا اختلافاً يُعْتَدُّ به إحصائياً عنهما في مجموعة الشواهد (146.7 دقيقة و29.8 دقيقة). ولم تُصادَفْ مضاعفات تُذكَر، اللهم إلا امرأة واحدة (0.3٪) أصيبت بتمزق في الرحم، وثلاث نساء عانيْن من تفزُّر الرحم. بالإضافة إلى إملاص واحد (وليد وُلِدَ ميتاً) بعد تمزق الرحم. ولم تحد أيَّة وفيات بين الأمهات.

ABSTRACT The data about the safety of vaginal birth after caesarean section are conflicting. This study in a referral hospital in Sana'a, Yemen investigated the outcome of vaginal birth after caesarean section in 357 women who had one prior caesarean section and were admitted to hospital at term with spontaneous onset of labour. A control group (*n* = 155) was matched from women without previous caesarean section. The success rate of vaginal birth after caesarean section was 311/357 (87.1%). The mean duration of the first and second stages of labour were not significantly different in the study group (146.2 and 30.7 min respectively) compared with the control group (146.7 and 29.8 min). There were infrequent complications; only 1 woman (0.3%) had ruptured uterus and 3 women (1.0%) suffered uterine dehiscence. There was 1 stillbirth after the uterine rupture but no maternal deaths.

Résultats de l'accouchement par voie basse après déclenchement spontané du travail chez des femmes ayant eu une première césarienne

RÉSUMÉ Les données concernant la sécurité d'un accouchement par voie basse après une première césarienne sont discordantes. La présente étude réalisée dans un hôpital de recours à Sanaa (Yémen) a consisté à analyser les résultats des accouchements par voie basse de 357 femmes ayant eu une première césarienne et admises à l'hôpital à terme après le déclenchement spontané du travail. Un groupe témoin de femmes (*n* = 155) n'ayant jamais eu de césarienne a été apparié. Le taux de réussite d'un accouchement par voie basse après une première césarienne était de 87,1 % (311 sur 357). La durée moyenne de la première et deuxième phases du travail n'était pas très différente entre le groupe de l'étude (146,2 et 30,7 minutes respectivement) et le groupe témoin (146,7 et 29,8 minutes). Les complications étaient rares ; seule une femme (0,3 %) a souffert d'une rupture utérine et trois femmes (1,0 %) ont présenté une déhiscence utérine. Une mortinaissance a été observée après une rupture utérine mais aucun décès maternel n'a été déploré.

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Introduction

Trial of labour for vaginal birth after caesarean section (VBAC) is a well-established standard practice of care [1]. The success rates for VBAC range between 60%–80% after one previous lower segment caesarean incision [2,3]. Factors associated with successful vaginal birth in a trial of labour include age < 40 years, prior history of vaginal birth, any indication for previous caesarean section except failure to progress in the first birth, cervical effacement greater than 75% on admission, and cervical dilatation 4 cm or more on admission [1]. However, not every woman with a previous caesarean scar is a candidate for VBAC as the trial could likely result in major maternal as well as fetal complications.

The risks of a failed trial, including uterine rupture, hysterectomy and long-term urinary incontinence, have been reported previously [2]. Nevertheless, the dictum "once a caesarean, always a caesarean" began changing approximately 30 years ago as improvements in obstetric care made a trial of labour after a previous caesarean delivery safer for both the mother and the infant [4]. It has been replaced by "once a caesarean, always a hospital delivery" [5]. Trial of delivery after one prior caesarean section is therefore considered a key method of reducing the overall caesarean section rate.

The existing data, however, about which route of delivery is most appropriate and safe for these women—VBAC or elective repeat caesarean delivery—are complex and conflicting [6]. Although neither route is risk-free, the crucial issue is to ensure better maternal and perinatal outcomes. In a trial of VBAC, the main adverse outcome is uterine rupture. Deciding when to attempt VBAC is a major decision and should be based on careful selection of patients after thorough counselling, estimation of patient's risk of uterine rupture and strict adherence to the most recent guidelines for managing labour in units where there are facilities for immediate access to surgery if complications arise. The purpose of this study in Yemen was to test the outcome of VBAC trial in women with one prior lower transverse caesarean and spontaneous onset of labour.

Methods

Sample and setting

This prospective controlled clinical study was carried out at Al-Thawra general hospital, Sana'a over a 1-year period (1 January to 31 December 2008). The criteria for selection of women to undergo trail of VBAC in this hospital are similar to the American Congress of Obstetricians and Gynecologists (ACOG) guidelines [4]. However, induction of labour using prostaglandins is totally avoided and oxytocin for augmentation of labour is occasionally given in small doses and under careful observation.

For this study, we selected women who had only one previous caesarean section and were considered candidates for trail of VBAC. We further selected the women to include only those who were at term (defined as 37 completed weeks up to 40 weeks), determined by the last menstrual period and/or first trimester ultrasonography, and who had spontaneous onset of labour (defined as cervical dilatation of > 4 cm, with regular uterine contractions of 3+ per 10 min lasting 40 s or more). Those who did not have spontaneous onset of labour, did not reach term or had other obstetric or medical indications for caesarean section were excluded from the study. There were no post-date pregnancies noted in this study.

During the study period there were 636 women who had undergone previous caesarean section. Out of them, 357 women (65.1%) fulfilled our criteria and were included in the study. A matched control group of 158 women without previous uterine incision was selected. They were matched for age, parity, gestational age, birth weight, Apgar score, use of oxytocin and mode of delivery. Three cases in the control group developed intrapartum fetal distress and were restored to the operating theatre for abdominal delivery, leaving 155 control women who completed the study.

Informed consent for participation in the study was taken from each participant and hospital ethical committee clearance was obtained.

Data collection

Every participant received a thorough history, clinical and obstetric examination. The data retrieved included: maternal age, parity, gestational age, indications for previous caesarean section, circumstances surrounding the previous delivery, type of uterine incision, interval since the previous caesarean and previous vaginal delivery before or after the caesarean section. We always assess pelvic adequacy using digital pelvimetry.

During the trial of labour, the senior physician responsible for the labour room was informed about the case. An intravenous line was established and maintained and intravenous infusion of 5% dextrose in water was given. At least 1 unit of blood was typed and cross-matched for each woman. For those women in both groups who presented early in the first stage (cervical dilatation > 4 but < 7 cm) the partogram was established and the fetal and maternal conditions were assessed and plotted regularly. For the other women, fetal cardiac activity, maternal vital signs and uterine contractions were assessed every 30 min in the first stage and 15 min in the second stage. The uterine scar was assessed every 30 min by noting maternal tachycardia, scar tenderness, fetal tachycardia, haematuria, vaginal bleeding and loss of the presenting part on vaginal examination. The progress of labour was assessed by abdominal and/or vaginal examination 4 hourly in the first stage and more frequently in the

second stage or when membranes were ruptured or bleeding ensued. This monitoring was continued throughout the trial of labour. Our policy to augment women with oxytocin during VBAC attempt is to infuse oxytocin 2.5 units in 500 mL of dextrose (or normal saline) at 10 drops/min (2.5 mIU/min) and increase the infusion rate by 10 drops/min every 30 min until a good uterine contractions pattern is established. All the women in our study responded to the first dose without further increment. All women had cardiotocography monitoring. Pain relief was given on the form of intramuscular injection of tramadol hydrochloride. Epidural analgesia was not available.

The outcome measures were the duration of first and second stage of labour, intrapartum complications, Apgar score, birth weight, postpartum haemorrhage, uterine separation, need for blood transfusion and length of hospital stay.

Statistical analysis

Data were analysed using *Stata*, version 10. The data were presented as mean and standard deviation (SD) and percentages when appropriate. Differences in means were tested by Student *t*-test. Chi-squared tests were used to compare frequencies. Fisher exact test was used when appropriate. Statistical significance was taken as P value < 0.05.

Results

In the study group, 311 out of 357 women were delivered vaginally, giving a VBAC success rate of 87.1%. The remaining 46 women (12.9%) were delivered by repeat caesarean section, mainly due to intrapartum fetal distress. Of the women who successfully delivered vaginally, 224 (72.0%) were admitted during the first stage of labour and 67 women (22.0%) in the second stage versus 122 (78.7%) and 33 (21.3%) respectively in the control group. There were no significant differences between the study group and control group in terms of age, parity, gestational age or obstetric and medical history (Table 1) ($P > 0.5$).

Oxytocin was used to augment labour in 31 cases (10.0%) (Table 1) but there was no uterine rupture recorded in these cases. Overall there were 3 cases (1.0%) of uterine dehiscence and 1 case

Table 1 Maternal characteristics and outcome measures for the case group of women with trial of vaginal birth after caesarean section and the control group

Variable	Case group (n = 311)		Control group (n = 155)		P-value[a]
	Mean	SD	Mean	SD	
Age (years)	23.3	5.3	23.1	8.7	NS
Parity	2.9	1.0	2.8	1.2	NS
Gestational age (weeks)	38.4	3.1	38.7	0.5	NS
	No.	%	No.	%	
Oxytocin					< 0.001
No	280	90.0	74	47.7	
Yes	31	10.0	81	52.3	
Birth weight (g)					NS
≤ 2500	63	20.3	21	13.5	
> 2500–3500	239	76.8	123	79.4	
> 3500	9	2.9	11	7.1	
Apgar score					NS
< 6	18	5.8	7	4.5	
6–8	161	51.8	78	50.3	
> 8	131	42.1	70	45.2	
Postpartum complications					NS
Dehiscence	3	1.0	0	0.0	
Uterine rupture	1	0.3	0	0.0	
Blood transfusion	2	0.6	0	0.0	
Length of hospital stay (hours)					NS[b]
2	287	92.3	148	95.5	
> 2–4	17	5.5	0	0.0	
> 4	7	2.3	7	4.5	

[a] χ^2 test; [b] Fisher exact test.
SD = standard deviation; NS = not significant.

(0.3%) of uterine rupture among the VBAC group. There were no maternal deaths and only 1 stillbirth after the case of uterine rupture. There was no significant difference between the groups in Apgar scores; 5.8% of neonates in the VBAC trial group had Apgar score < 6 compared with 4.5% in the control group ($P > 0.05$). We found 9 neonates (2.9%) weighed > 3500 g but < 4000 g in the VBAC group.

The mean duration of the first and second stages of labour in the study group were 146.2 (SD 74.9) and 30.7 (SD 6.3) min respectively (Table 2). In the control group the mean duration of the first and second stages of labour were 146.7 (SD 68.7) and 29.8 (SD 7.4) min respectively. These differences were not statistically significant ($P > 0.5$).

There were 67 women (21.5%) in the study group who had already experienced at least one vaginal delivery after their first caesarean section; 63 delivered vaginally, giving a VBAC success rate of 94.0%. The mean duration of the first and second stages of labour in these women were 110.5 (SD 63.3) and 16.1 (SD 4.6) min respectively.

Discussion

Al-Thawra general hospital is the biggest public hospital in Yemen. It is a university-affiliated tertiary care level facility. The labour ward in the hospital accepts both booked and unbooked pregnant women and many complicated and mismanaged cases are referred to us.

The majority of women referred suffer various complications in their first delivery with caesarean section, such as obstructed labour, neglected transverse lie with hand prolapse, obstetric haemorrhage, prolonged rupture of membranes (> 24 hours), infection, fetal distress and prolonged labour. These women had been refereed directly from a local primary health unit in rural areas, often unbooked, or they had been mismanaged by untrained birth attendants and were given high doses of oxytocin at home. In these situations, they are often managed in hospital by primary caesarean section. In subsequent pregnancies, these women may seek early booking and special management both antenatally and in labour and delivery. These women are often very young and poorly educated. When they come again to the hospital with one previous lower segment transverse caesarean section, a trial of VBAC is offered, depending on the selection criteria, after proper counselling and assessment.

During the study period the rate of caesarean section in the hospital was 17.1% for all 12 069 deliveries. The success rate of VBAC trial was 87.1%. It is comparable to other similar studies. For example, Flamm et al. demonstrated that patients presenting with dilation ≥ 4 cm had an 86% success rate of VBAC [1,7]. Although a high success rates indicates a better maternal outcome [7], these rates often apply to a selected population [8] and the overall outcome measures should include certain other delivery-related perinatal complications, such as hypoxic ischaemic encephalopathy.

The mean duration of the first and second stages of labour were similar in both groups, which indicates that the previous caesarean section did not prolong labour in the next pregnancy. This result is consistent with other study findings [9].

Oxytocin was used to augment labour in 10.0% of women and there were no cases of uterine rupture recorded in these women. No significant association has been reported between exposure to oxytocin and the risk of uterine rupture [1]. However, the relationship between oxytocin and uterine rupture is dose-dependent, and the ACOG has warned that excessive use of oxytocin raises the risk of uterine rupture [4].

For women who had already had a vaginal delivery after their first caesarean section the VBAC success rate was 94.0% and the duration of the first and second stages of labour was shorter than for women who had their first VBAC. These findings are consistent with most studies reviewed [10] and may encourage patients and obstetricians to choose VBAC trial with more confidence when other risk factors are excluded.

Uterine rupture is the most likely complication related to VBAC trial. Most studies report the incidence of uterine rupture as between 0.5%–1% in women with one prior transverse lower segment caesarean section [11]. However, the incidence is higher when the previous incision is classical, when there has been more one previous caesarean section, with induction of labour or with shorter interpregnancy intervals [4]. In

Table 2 Duration of first and second stages of labour for the case group of women with trial of vaginal birth after caesarean section and the control group

Stage of labour	Case group (n = 311)		Control group (n = 155)		P-value[a]
	No.	Mean (SD) duration (min)	No.	Mean (SD) duration (min)	
1st stage	224	146.2 (74.9)	122	146.7 (68.7)	NS
2nd stage	67	30.7 (6.3)	33	29.8 (7.4)	

[a] χ^2 test.
SD = standard deviation; NS = not significant.

our study, 3 cases (1.0%) were complicated by uterine dehiscence and 1 case (0.3%) suffered uterine rupture. The latter case was discovered intrapartum when the woman developed sudden acute lower abdominal pain, tenderness and fetal distress. Immediate caesarean section was performed and complete rupture was found along with the dead baby. The mother was managed by hysterectomy. All 3 cases whose delivery was complicated by uterine dehiscence were discovered postpartum during exploration of the uterus and managed by rent repair. It is useful to note that in the rupture case that we found no clear obstetric, medical or social factors that could be linked to uterine rupture. However, other risk factors may have been present and additional studies are required to investigate cases of uterine rupture.

The perinatal outcomes in our study showed 1 stillbirth (0.3%) in the VBAC group after the case of uterine rupture. However, 5.8% of neonates had Apger score < 6 compared with 4.5% in the control group, a difference which was not statistically significant. Our findings reinforce similar previous studies suggesting that vaginal delivery after one caesarean section is safe as regards neonatal outcomes [12].

We found 9 neonates (2.9%) weighed more than 3500 g but < 4000 g. This finding shows that the estimation of fetal weight at term is relatively inaccurate whether done clinically or radiologically. Moreover, since the exact birth weight is only known after the delivery has occurred, this could limit the usefulness of birth weight as a predictor in clinical decision-making. Thus, birth weight may only be helpful when other predictors collectively are taken into consideration. Nevertheless, it implies that a women with one prior caesarean section and estimated fetal weight of > 3500 g but < 4000 g can be strongly encouraged to undergo VBAC attempt [11].

There were no maternal deaths in either group. However, our results are based on data from a single setting for those women presenting to the hospital with previous one previous caesarean section and may not be generalizable to other locations.

Conclusion

On the basis of these results, we conclude that for selected cases with one prior lower segment caesarean section who present in spontaneous active labour, a trial of vaginal delivery may have a high success rate (> 85%) with no increased risk of maternal and fetal morbidity or mortality. The duration of labour for these women was similar to normal deliveries. Our findings may encourage obstetricians to tolerate VBAC and raise the threshold for recommending caesarean section if low-risk patients are carefully selected.

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