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Clinical Article

Safety of vaginal birth after cesarean delivery

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Abstract

Objective

To compare the outcomes of labor induction in women with a history of 1 cesarean section (CS) who undergo trial of labor.

Methods

A prospective observational study of 702 pregnant women who had 1 previous CS was conducted at Women's Hospital, Hamad Medical Corporation, Doha, Qatar, between April 2003 and April 2004. Those with no history of vaginal delivery were assigned to one group and those with a history of vaginal delivery were assigned to another group, and the latter group was then divided into 2 subgroups according to the results of trial of labor.

Results

Of these 702 women with a history of 1 CS, 62.4% also had a history of vaginal delivery. After trial of labor, vaginal delivery occurred more often among women with no history of vaginal delivery (64.8%). Moreover, trial of labor resulted in a vaginal delivery more often in women who were delivered only once and by CS (87.7%) than in women who also had a history of vaginal delivery (79.2%).

Conclusion

These findings indicate that women who have had a CS should strongly consider natural delivery for subsequent pregnancies.

Keywords: Effects of induction; Augmentation of labor; Vaginal birth; Cesarean delivery

Article Outline

1. Introduction

The literature about vaginal birth after cesarean (VBAC) reports widely different rates of successful vaginal delivery (45%–79%) after labor induction or augmentation [1], [2] and [3]. In 1992, Troyer and Parisi [4] established a system to rate VBAC results, and reported that labor induction was associated with a lower rate of vaginal delivery. Although this finding was later validated by Vinueza and colleagues [5], other studies have not found an association between induction of labor and increased rates of cesarean section (CS). And although many studies have documented increased morbidity after failed attempts at VBAC, relatively few have investigated the potential maternal and neonatal complications associated with labor induction. Reports on the use of misoprostol in patients with a uterine scar [6] have suggested that induction of labor may be associated with a much greater risk than had been previously observed in women with a history of CS.

The aim of the present study was to determine the effect of labor induction or augmentation on the safety and success rate of vaginal birth among women with 1 prior CS.

2. Methods

During the study period (April 2003–April 2004), 99.9% of the 12,597 deliveries occurring in Doha took place at Women's Hospital. All pregnant women with 1 previous CS who intended to have a trial of labor were prospectively examined. To be considered for the study, their scar status had to be found satisfactory by the clinical obstetrician according to the American College of Obstetricians and Gynecologists guidelines for VBAC candidates [7].

Admission criteria included the following: no more than 1 previous low-transverse or low-vertical uterine incision; no previous additional surgical intervention to the uterus (e.g., myomectomy); fetus in cephalic presentation; no active herpes infection; and adequate pelvis.

The women were first assigned to 2 main risk groups on the basis of their delivery history. In group 1 the women had no history of vaginal delivery and in group 2 the women had previously been delivered vaginally. The women in group 2 were further divided into 2 risk subgroups, those who had been delivered vaginally before undergoing their CS (group 2a) and those who had been delivered vaginally after undergoing their CS (group 2b). With respect to management of labor, the 4 comparison groups were defined as spontaneous onset of labor; induced onset of labor; induced and augmented labor; and induced but unaugmented labor. The rates of successful VBAC and maternal morbidity were compared between the risk groups.

Socio-demographics, age, medical history, obstetric history, parity, number of previous vaginal deliveries, type of and indication for previous CS, Bishop score before previous CS, gestational age at delivery, Bishop score on admission to labor room, duration of labor, use of epidural analgesia, birth weight, 1- and 5-min Apgar scores, complications, and any treatment received were recorded. The use of oxytocin for labor augmentation also noted, as was the method for inducing trial of labor in 3 of the comparison groups. The main induction agent used was prostaglandin E_2 in vaginal tablets.

Data were expressed as mean ± S.D. unless otherwise indicated. The *t* test was used to determine the significance of differences between mean values of 2 continuous

variables. Fisher's exact test and the χ^2 test were used to determine the significance of differences in proportions of categorical variables between 2 or more groups. $P < 0.05$ was considered statistically significant.

3. Results

Table 1 shows the demographic and pregnancy characteristics of the 702 women who underwent trial of labor with a history of 1 CS. Of these, 62.4% also had history of vaginal delivery. Of the 438 women who had a successful vaginal delivery in this study, 90.4% had a spontaneous onset of labor; moreover, 64.8% of the women older than 30 years had a successful vaginal delivery whereas 74.6% of those younger than 30 years had a CS after trial of labor.

Table 1.

Distribution of demographic and pregnancy characteristics of 702 women with or without a history of vaginal delivery who underwent trial of labor after 1 previous CS[a]

Characteristic	History of vaginal delivery (Group 1, *n* = 438)	No history of vaginal delivery (Group 2, *n* = 264)	*P* value
Maternal age (years)	32.55 ± 5.7	27.67 ± 4.7	< 0.001
< 25	42 (9.6)	69 (26.1)	< 0.001
25–29	112 (25.6)	128 (48.5)	
30–34	124 (28.3)	46 (17.4)	
≥ 35	160 (36.5)	21 (8.0)	
Nationality			
Qatari	236 (53.9)	99 (37.5)	<0.001
Non-Qatari	202 (46.1)	165 (62.5)	
Previous CS type			
Emergency	266 (60.7)	176 (66.7)	NS
Elective	172 (39.3)	88 (33.3)	
Duration of first stage (h)			
< 6	298 (68.0)	104 (39.4)	< 0.001
6–12	132 (30.1)	142 (53.8)	
> 12	8 (1.8)	18 (16.8)	
Duration of second stage (h)			
≤ 1	428 (97.7)	240 (90.9)	< 0.001
> 1	10 (2.3)	24 (9.1)	
Pregnancy duration (years)			
≤ 37	54 (12.3)	24 (9.1)	NS
> 37	384 (87.7)	240 (90.9)	
Spontaneous onset of labor			
Yes	396 (90.4)	229 (86.7)	NS
No	42 (9.6)	35 (13.3)	
Augmentation with oxytocin			
Yes	95 (21.7)	64 (24.2)	NS
No	343 (78.3)	200 (75.8)	
Epidural anesthesia			
Yes	14 (3.2)	25 (9.5)	< 0.001

No	424 (96.8)	239 (90.5)	
Successful of trial of labor			
Yes	371 (84.7)	168 (63.6)	< 0.001
No	67 (15.3)	96 (36.4)	
Birth weight (g)	3331.6 ± 509.5	3259.4±429.2	0.045
< 3000	102 (23.3)	71 (26.9)	0.044
3000–4000	299 (68.3)	183 (69.3)	
> 4000	37 (8.4)	10 (3.8)	

CS = cesarean section, NS = not significant.
[a] Values are given as mean ± S.D. or number (%) unless otherwise indicated.

Table 2 shows the demographic and pregnancy characteristics of women who were previously delivered vaginally before or after their CS. In this study, trial of labor was more often successful in women who had their CS before (87.7%) than in those who had their CS after (79.2%) a vaginal delivery. The rate of labor augmentation with oxytocin was higher in women who had a vaginal delivery before a CS (24%) than in those who had a vaginal delivery after their CS (20.4%).

Table 2.

Distribution of demographic and pregnancy characteristics of 438 women who had a vaginal delivery before or after 1 CS[a]

Characteristic	**Vaginal delivery before CS (Group 2a)**	**Vaginal delivery after CS (Group 2b)**	***P* value**
Frequency	154	284	
Maternal age (years)	33.44 ± 6.14	32.07 ± 5.40	0.016
< 25	15 (9.7)	27 (9.5)	0.023
25–29	26 (16.9)	86 (30.3)	
30–34	47 (30.5)	77 (27.1)	
≥ 35	66 (42.9)	94 (33.1)	
Nationality			
Qatari	83 (53.9)	153 (53.9)	NS
Non-Qatari	71 (46.1)	131 (46.1)	
Previous CS type			
Emergency	96 (62.3)	170 (59.9)	NS
Elective	58 (37.7)	114 (40.1)	
Duration of first stage (h)			
< 6	98 (63.6)	200 (70.4)	NS
6–12	53 (34.4)	79 (27.8)	
> 12	3 (1.9)	5 (1.8)	
Duration of second stage (h)			
≥ 1	151 (98.1)	277 (97.5)	NS
> 1	3 (1.9)	7 (2.5)	
Gestational age (years)			
≥ 37	22 (14.3)	32 (11.3)	NS

> 37	132 (85.7)	252 (88.7)	
Augmentation with oxytocin			
Yes	37 (24.0)	58 (20.4)	NS
No	117 (76.0)	226 (79.6)	
Epidural anesthesia			
Yes	7 (4.5)	7 (2.5)	NS
No	147 (95.5)	277 (97.5)	
Successful of trial of labor			
Yes	122 (79.2)	249 (87.7)	0.019
No	32 (20.8)	35 (12.3)	
Birth weight (g)	3303.7 ± 5.17.3	3346.8 ± 505.6	NS
< 3000	41 (26.6)	61 (21.5)	NS
3000–4000	99 (64.3)	200 (70.4)	
> 4000	14 (9.1)	23 (8.1)	

CS = cesarean section, NS = not significant.

[a] Values are given as mean ± S.D. or number (%) unless otherwise indicated.

4. Discussion

The CS rate has risen from 5% to 25% in the USA and other Western countries over the past 2 decades, with repeated CSs accounting for as much as 50% of the increase in abdominal deliveries [8].

Before the 1970s, when a woman was delivered by CS, her future deliveries automatically were by CS, reflecting a concern that uterine scar tissue might rupture during labor. As physicians attempted to reduce the CS rate in the 1990s, vaginal births after cesarean (VBAC) became more common. By the late 1990s, however, experts determined that certain risk factors increase the risk of uterine rupture, and that some women should not attempt VBAC.

In 1995, less than 28% of women with a previous CS attempted a VBAC [9]. Most authorities now agree that many more should be attempting VBAC to decrease the risks associated with surgical delivery.

The present study examined the effect of induction of labor in women with a previous CS, and compared outcomes among women with a previous vaginal delivery and women who had never been delivered vaginally. Of the 702 studied women, 438 (62.4%) had a history vaginal delivery. Among these 438 women, vaginal delivery was achieved more often in those who underwent a previous CS (64.8%) than in those who had a vaginal delivery. These results are in agreement with a study conducted in Singapore on trial of labor after 1 CS [10]. In that study, 305 women with a previous lower-segment CS scar were admitted over a 28-month period and 207 were allowed a trial of labor. Successful trial of labor was achieved in 63.3% of the women. More surprisingly, the rate of successful vaginal delivery after CS a was even higher in a study conducted in the USA, in which vaginal delivery was successful in 76% of the 242 women who underwent trial of labor after CS.

A prospective questionnaire-based study [11] over 8 months following delivery indicated that maternal satisfaction with vaginal delivery was very high. Those who have experienced both modes of delivery would prefer a vaginal birth in the future. These findings are reassuring for women contemplating vaginal delivery.

Furthermore, as shown in these studies, the practice of always performing CS in women who have had a first CS has gradually changed in recent years, after the publication of numerous studies [2], [3], [4], [5], [6], [7], [8], [9], [10] and [11] that have substantiated the efficacy and safety of attempting VBAC.

5. Conclusion

In this study, vaginal delivery was achieved more often in women who only had 1 CS than in those who also experienced vaginal delivery. Women who have had a CS should strongly consider vaginal delivery for subsequent pregnancies.

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