Research Article

Analytical study of factors determining success rate of trial of scar (TOS)

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Abstract

Background: Cesarean section (CS) is the most commonly performed operation in modern obstetrics. To combat the increasing CS rates without facing any medicolegal controversies, one must be aware of the factors influencing the mode of delivery, intrapartum behavior, and associated maternal and fetal morbidity in these patients. This study is aimed for better understanding of these aspects, which would help in better patient selection during decision-making for mode of delivery.

Objectives: To study the different factors affecting the mode of delivery including the indication of previous CS, success rate of trail of scar (TOS) in patients with previous CS.

Materials and Methods: A prospective cohort study was carried out in the Department of Obsterics and Gyanecology, Shree Sayaji General (SSG) Hospital, Vadodara, India, from May 2011 to April 2012. All patients with previous lower segment CS admitted to SSGH (labor room and ward) were evaluated according to the protocol and pro forma of the study. Patients before 37 completed weeks of gestation with severe preeclampsia and ecalmpsia, severe anemia, and medical disorders (e.g., diabetes, heart disease) were excluded.

Result: Of the 280 patients selected for the study, 165 delivered by a repeat CS and 115 had a vaginal birth after cesarean delivery (VBAC). Thus, incidence of VBAC was 41.07%. TOS was given to 160 patients (57.14%) with a success rate of 71.87%. While studying previous vaginal delivery, nonrecurrent indication of previous CS, dilation on admission >3 cm, adequate pelvis, faster average dilatation rate, augmentation of labor ($p < 0.0001$), and birth weight ($p < 0.0001$) were the factors found to be statistically significant responsible for successful vaginal delivery.

Conclusion: Proper selection of patients, appropriate facilities to run TOS, and timely intervention to prevent maternal and fetal morbidity are necessary. Overall success rate of TOS can be improved by proper selection of patient by considering factors that significantly affect the process.

KEY WORDS: TOS, vaginal birth after cesarean delivery, fetal distress, lower segment cesarean section

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Introduction

Cesarean delivery is a surgical operation to deliver a baby through an incision in the uterus. Its rate varies internationally from 10% to 25%.[1,2] When uterine rupture occur with a previous lower segment cesarean section (LSCS), it is not as disastrous event as with upper segment cesarean section (USCS). These observations heralded the era of the trail of scar (TOS) or vaginal birth after cesarean delivery (VBAC). LSCS is the most common operation in modern obstetrics. The reason for stimulus for interest in vaginal birth after

cesarean section (CS) was probably the progressive rise in CS rate. Patients with previous CS now present a relatively large proportion of the obstetric population.

Patients with prior cesarean delivery need special management antenatally and in labor and delivery.[3] Intensive intranatal surveillance is required while managing patients with previous CS. We know that many women can safely and successfully have a VBAC. The decision of mode of delivery must be carefully taken depending on various factors. The old Cragin dictum of "Once a caesarean always a cesarean" does not hold true anymore. The number of previous CS is a very important factor while making a decision. The prime reason for this being the increased risk of scar dehiscence and rupture with subsequent increased maternal and neonatal morbidity and mortality. The advantages of TOS are many. There is lower maternal morbidity such as anesthetic complications, pyrexia, infections, urinary tract infection and thromboembolism, and lower mortality rate. Lower expenditure, lesser hospital stay, earlier resumption of work are some other major advantages.

The major disadvantage of TOS is the risk of scar dehiscence and rupture with subsequent increased maternal and neonatal morbidity and mortality. Thus, it should only be attempted in institutions where appropriate equipment and personnel for extensive intranatal maternal and fetal surveillance, operation theater, and an anesthetist and pediatrician are available.[4,5] Above all, proper patient selection for TOS is very important.

To combat the increasing CS rates without facing any medicolegal controversies, one must be aware of the factors influencing the mode of delivery, intrapartum behavior, and associated maternal and fetal morbidity in these patients. In this study, we aim for better understanding of these aspects, which would help in better patient selection during decision-making.

Materials and Methods

Prospective cohort study was carried out in the Department of Obstetrics and Gyanecology, Shree Sayaji General Hospital, Vadodara, from May 2011 to April 2012. All patients with previous LSCS admitted to SSGH (labor room and ward) were evaluated according to the protocol and pro forma of the study.

Exclusion criteria were patients before 37 complete weeks of gestation, severe preeclampsia and ecalmpsia, severe anaemia, and medical disorders (e.g., diabetes, heart disease).

Prerequisites for TOS are previous lower segment transverse incision (although in many, type of previous incision is not documented and patients were not excluded from TOS), clinically adequate pelvis, no other uterine scars, or previous rupture, availability of resident throughout labor for close monitoring, facilities for emergency CS, availability of an anesthetist and no additional indication for CS in current pregnancy.

Table 1: Indication of previous CS

Indication	Repeat CS	%	VBAC	%	Total
Recurrent					
CPD	67	40.6	10	0.86	77
Obstructed labor	03	1.8	00	0.0	03
Nonrecurrent					
Fetal distress	07	4.24	12	10.43	34
Breech	13	7.87	5	4.34	18
Transverse lie	11	6.66	01	0.86	12
Oblique lie	02	1.21	01	0.86	03
DTA	01	0.60	01	0.86	02
Nonprogressive 1st stage	19	11.51	11	9.56	30
Severe oligohydramnios	03	1.8	04	3.47	07
PROM	05	3.03	03	2.60	08
Placenta praevia	03	1.8	01	0.86	02
Twins	01	0.60	1	0.86	2
Severe PET/eclampsia	04	2.42	05	4.34	09
Postdatism	01	0.60	01	0.86	02
Failed induction	01	0.60	02	1.73	02
Cord prolapsed	02	1.21	02	1.73	03
Not known	26	15.75	54		51
Total	165		115		280
Recurrent	70	87.5	10	12.5	80
Nonrecurrent	69	57.5	51	42.5	120
Total	139		61		200

Table 2: Previous vaginal delivery

Previous vaginal delivery	Repeat CS	%	VBAC	%	Total
Yes	46	53.4	40	46.5	86
No	110	59.78	74	40.21	184
Total	156		114		270

Contraindications for TOS are known previous classical T/J-shaped incision, ≥2 previous LSC, past history of rupture uterus, cephalopelvic disproportion, and abnormal presentation. Relative contraindications are breech, previous low vertical uterine incision, multiple gestation, severe anemia, and severe preeclampsia/eclampsia. Epidural analgesia is not considered as a contraindication. After thorough assessment all patients eligible for TOS (TOS) were subjected to the same, after proper counseling and consent.

Results

Study was carried out from May 2011 to April 2012. The total number of confinements was 4292 in that duration and that of patients with previous CS was 353. Among them, 280 patients were selected for the study. Incidence of previous CS was found to be 8.22%.

Table 1 shows that 87.5% of patients with recurrent indication had a repeat CS whereas 57.5% of patients with

Table 3: Pelvis

	Repeat CS	%	VBAC	%	Total
Adequate	85	50.2	84	49.8	169
Inadequate	15	100	00	00	15
Borderline	65	67.7	31	32.2	96
Total	165		115		279

Table 4: Dilation on admission

	Repeat CS	%	VBAC	%	Total
≤3 cm	107	71.3	43	28.6	150
4–5 cm	39	59.0	27	40.9	66
≥6 cm	19	29.6	45	70.3	64
Total	165		115		280

For dilatation ≤3 and >3.

Table 5: For induction of labor

	Repeat CS (%)	VBAC (%)	Total
Induction	5 (62.5)	3 (37.5)	8
No induction	40 (26.31)	112 (73.6)	152
Total	45	115	160
For Augmentation			
Augmentation	18 (22.5)	62 (77.5)	80
No intervention	49 (68.05)	23 (31.9)	72
Total	67	85	152

Table 6: Birthweight of neonate

Birthweight (kg)	Repeat CS (%)	VBAC (%)	Total
≤2	3 (23.07)	10 (76.9)	13
2–2.5	42 (42.85)	56 (57.14)	98
2.6–3.0	65 (58.03)	47 (41.9)	112
>3.0	55 (96.4)	2 (3.5)	57
	165	115	280

nonrecurrent indication had repeat CS (highly significant $p < 0.001$ with Yates correction; χ^2-test = 18.99, odds ratio = 5.17). But even among the patients with nonrecurrent indication more patients had a repeat CS compared to VBAC, indicating the high CS rate in the patients with previous CS. Patients with recurrent indication had 10 times higher chance of a repeat CS. Ten patients with previous LSCS for CPD were given TOS and delivered vaginally.

According to Table 2, the CS rate was much higher in study group compared to those without previous CS. It can been seen that 53.4% patients of those with previous vaginal delivery delivered by repeat CS, which is six times higher than CS rate in normal multipara.

But while comparing the difference in VBAC rate among these two groups, 46.5% patients with a history of previous vaginal delivery had a successful vaginal birth whereas 40.4% with no previous vaginal delivery delivered vaginally in current pregnancy. This difference was statistically significant at 95% CI ($p < 0.0001$; χ^2 test = 12.931).

Table 3 shows about half of the patients with adequate pelvis delivered vaginally. All the patients with inadequate pelvis were immediately subjected to CS if in active labor, but in some patients there was undiagnosed CPD in whom trial of labor was given but required CS subsequently. In one patients of major degree placenta praevia Per Vaginal Examination was not performed (χ^2-test = 18.17). Inadequate pelvis is an important factor associated with repeat CS ($p < 0.001$ highly significant, with Yates correction).

Table 4 shows that 53.57% patients had dilatation on admission ≤3 cm, of whom only 28.6% delivered vaginally; 46.42% patients had dilation >3 cm, of whom 62.6% delivered vaginally ($p < 0.001$, highly significant; c^2-test = 32.48). If dilation was ≥6 cm on admission, almost two-thirds of them had VBAC.

Table 5 shows that 11.11% patients with repeat CS had induced labor (i.e., 2.6% of VBAC group). Although more number of induced patients underwent a repeat CS, this was not statistically significant ($p = 0.06$, Yates correction; χ^2-test = 3.295). Most patients were induced by PGE2 gel intravaginally.[6–8] Only one patient had intravaginal misoprostol (50 mg) induction. She had a successful VBAC without any complications.

Of patients with augmentation of labor (ARM, oxytocin, or both), 77.5% delivered vaginally as compared to 31.9% where no intervention was done. ($p < 0.001$, highly significant; χ^2-test = 30.083).

In Table 6, it can be seen that the chances of VBAC decrease with weight >3.0 kg (3.5% vs. 57.14%) compared to weight ≤2 kg but overall difference in weight was statistically highly significant ($p < 0.0001$; χ^2-test = 50.62).

Discussion

Total number of confinements in study period was 4292, of which 353 patients had previous CS giving the incidence as 8.15%. Of the 280 patients selected for the study, 165 delivered by a repeat CS and 115 had a VBAC. Thus, incidence of VBAC was 41.07%. Of the 280 patients, TOS was given to 160 patients (57.14%) with a success rate of 71.87% (115/160).

Eleven patients (24.4%) with undiagnosed CPD had to be taken for CS after TOS. Fetal distress was the reason for termination of trial in 34.2% of patients. Interestingly, in none of the patient TOS was terminated for threatened scar rupture, and in one patient in whom TOS was terminated for fetal distress there was partial scar dehiscence intraoperatively. One patient had rupture uterus, which was detected by sudden loss of uterine contractions and Fetal Heart Sounds. Immediate laparotomy was taken followed by suturing of rent. Nonprogressive first stage (20), big baby (2.22%), incoordinate uterine contractions (2.22%), unfavorable cervix (2.22%), failed induction (2.22%), rupture uterus (2.22%) were other reasons for the termination of TOS.

While studying the factors responsible for successful vaginal delivery, factors such as previous vaginal delivery,

nonrecurrent indication of previous CS, dilation on admission >3 cm, adequate pelvis, augmentation of labor, and birth weight of neonate were found to be statistically significant.

	Primary CS for CPD			Primary CS for other indication			*P*-Value
	TOS	VBAC	%	TOS	VBAC	%	
Weinstein[27]	22	9	40.9	21	17	90	<0.05
Lawrence[28]	321	79	24.6	167	116	69.5	<0.001
Teich[29]	81	49	60.9	113	107	82	<0.001
Present series	35	6	17.1	100	64	64	<0.001

Regarding the indication of previous CS, many studies have shown that women with previous CS for CPD compared to other nonrecurrent indications have less success rate for subsequent VBAC although a substantial number of these can be expected to deliver vaginally.[9–14]

Statistically significant difference at 95% CI ($p < 0.0001$) was found between patients with a history of previous vaginal delivery (46.5%) and those without a history of previous vaginal delivery (40.4%). No significant difference in VBAC rate was found whether it was CS followed by vaginal or vaginal followed by CS.[15,16]

Augmentation of labor (ARM, oxytocin, or both) has been found to be highly significant, that is, 77.5% of VBAC ($p < 0.001$) as compared to the group (31.9%) where no intervention was done. Oxytocin augmentation has been proven to be safe, but most of the studies have shown lower VBAC success rates with oxytocin.[17–19]

Most obstetricians defer induction of labor in patients with previous CS due to the higher incidence of uterine rupture and lower VBAC success rate, as proven by several studies.[20]

Some other studies have shown no difference in VBAC success with induction and no increased rupture. Most of these studies have proven safety of PGE2 for induction but use of misoprostol is still under scrutiny. Most studies do not recommend use of misoprostol in patients with previous CS.[7,8]

Although birthweight is a factor to be considered for predicting successful VBAC, more important factors are a previous vaginal delivery, adequacy of pelvis, or dilation and station on admission.

Most foreign studies take cutoff as 4000 g, but in Indian set up due to lower birth weights, shorter maternal stature, poor nutrition and socioeconomic status, and smaller maternal pelvis, we took 3.0 kg as the cutoff.[21–26]

Conclusion

TOS after CS should be considered in women who have no contraindications after appropriate discussion. The efficacy and safety of a TOS after cesarean in appropriately selected patients should be taken where CS facilities are available and neonatal care is well supported. Close monitoring of patient and her fetus for signs of complications is a must. Augmentation of labor with oxytocin is safe. Induction of labor may be provided when the indication for induction is compelling and proper counseling and consent of woman is done. Suspected macrosomia is not contraindicated for TOS. Overall success rate of TOS can be improved by proper selection of patient and considering factors significantly affecting the process. There always should be a fine balance between continuing and abandoning the trial without compromising maternal and fetal morbidity.

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