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Original Research Article

Prediction of successful vaginal birth after caesarean section based on Flamm and Geiger scoring system a prospective observational study

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ABSTRACT

Background: The aim of this study was to evaluate the adequacy of Flamm and Geiger scoring system in prediction of successful vaginal birth after caesarean section.

Methods: A prospective observational study was carried out on 75 pregnant women with previous one caesarean section in department of obstetrics and Gynecology, St Stephen's hospital, New Delhi over a period of one year.

Results: In the present study, out of 75 patients, 40% patients had successful VBAC and 60% patients had emergency LSCS. Among successful VBAC 70% patients had spontaneous vaginal delivery, while 23.3% patients had vacuum assisted and 6.7% had forceps assisted vaginal delivery. Most of the patients with total Flamm and Geiger score < 3 at the time of admission had emergency caesarean section while most of the patients with score >4 had successful VBAC. There were 53.3%, 75%, 85.7% and 100% probabilities of Successful VBAC with total score 4,5,6 and >8 respectively. Mean score for successful VBAC was 5 ± 1.66 and for emergency caesarean was 2.97 ± 0.83 .

Conclusions: As total Flamm and Geiger score increases, a chance of successful VBAC increases. Application of Flamm and Geiger scoring gives fair judgment of successful vaginal birth in TOLAC and reduces the rate of failed trial leading to emergency caesarean section, thus improving outcome in a trial of labor.

Keywords: Scar tenderness, Successful VBAC, TOLAC, Trial of labour

INTRODUCTION

Caesarean section is the most common operation in modern day obstetrics. Births by caesarean, many of them unnecessary, have started to increase globally. This rising rate is an issue of particular concern in the global maternity care field, due to the increased adverse maternal and neonatal outcomes associated with caesarean section.¹⁻⁴ If rates continue to rise at the same pace as in recent years, the overall rate of caesarean is projected to be 56% by 2020.⁵

According to WHO, though there is no ideal rate of caesarean section, but the rates above 10-15% does not confer additional health benefits in terms of foetal and

maternal morbidity and mortality. Because of rise in primary caesarean sections, there is a proportionate rise in repeat sections as well.⁶ The overall rate of caesarean needs to be reduced and this can be achieved to a small extent by avoiding primary caesarean done without explicit indications and more importantly by resorting to a Trial of Labour after a Caesarean (TOLAC) which is safe for both foetus and mother.⁷ But, patients who fail a trial of labour are more likely for complications than who have a successful vaginal birth after caesarean (VBAC) or elective repeat caesarean.^{8,9} Appropriate clinical settings and properly selected group of patients can make TOLAC safe and effective. Large multicenter studies have demonstrated that trial of labour after previous CS is a reasonable option for many women. However, the same

studies determine a failure rate of up to 25% of trial of labour.^{10,11} In VBAC there is less blood loss, shorter duration of stay in hospital, less intrapartum and postpartum infections and it further decreases the economic burden on society and the individuals.¹²

To predict a successful TOLAC, there are various tools which assess the multiple factors predicting VBAC. FLAMM and GEIGER Scoring System is among the popular ones. This scoring model provides reasonable predictability for VBAC and also consistent ability to identify women at risk for failed trial of labour. This scoring system includes following criteria-age of patient, history of previous vaginal delivery, indication of previous caesarean section, cervical dilatation, and cervical effacement at time of admission (Table 1).¹³

Table 1: Flamm and Geiger scoring system.

Parameter	Finding	Points
Woman's age	<40 years	2
	>40 years	0
Vaginal birth history	Before and after first caesarean section	4
	After first caesarean section	2
	Before first caesarean section	1
	None	0
Reason for first CS	Failure to progress	0
	Other reason	1
Cervical effacement on admission	>75%	2
	25-75%	1
	<25%	0
Cervical dilatation on admission	>4cm	1
	≤4cm	0

METHODS

A prospective study was carried out on 75 pregnant women with previous one caesarean section in the department of obstetrics and gynecology, St Stephen Hospital, Delhi.

Inclusion criteria

- Women with previous one caesarean section.
- Women with term pregnancy.
- Women with singleton pregnancy.
- With vertex presentation of fetus.

Exclusion criteria:

- Women with two or more previous caesarean section.
- Women with previous classical caesarean section.
- Any previous uterine surgery (example myomectomy).
- Fetal malpresentation.
- Multiple pregnancy.

- Indication for elective repeat caesarean section.
- Women not willing for VBAC Trial.

Pre-structured proforma was used to record the demographic variables of the patients and Flamm and Geiger score was calculated on the basis of history and clinical examination at the time of admission. Standard hospital protocols for induction, augmentation and delivery of patients with Previous one caesarean section were followed. Labour was monitored by strict recording of vital parameters, continuous electronic fetal monitoring by cardiotocography, monitoring of uterine contractions, partograph, and close watch for the early recognition of scar dehiscence and uterine rupture. Patients were provisionally kept prepared for emergency caesarean and the TOLAC was continued till the progress of labour was satisfactory. Operative vaginal delivery was conducted if indicated. An attempt at vaginal delivery was abandoned if there was any suspicion of scar dehiscence or sign of fetal distress or unsatisfactory progress of labor. If the trial ended in emergency CS, then indication for caesarean was included in study.

Statistical analysis

Descriptive and inferential statistical analysis was carried out. Results on continuous measurements were presented on mean±SD (min-max) and results on categorical measurements were presented in number (%). Significance was assessed at 5 % level of significance.

The statistical software namely SPSS 18.0, and R environment ver.3.2.2 were used for the analysis of the data and Microsoft Word and Excel were used to generate graphs, tables etc.

RESULTS

In the present study, 75 patients had undergone trial of labour after caesarean. 40 % patients had successful vaginal delivery whereas 60% had emergency caesarean section (Figure 1).

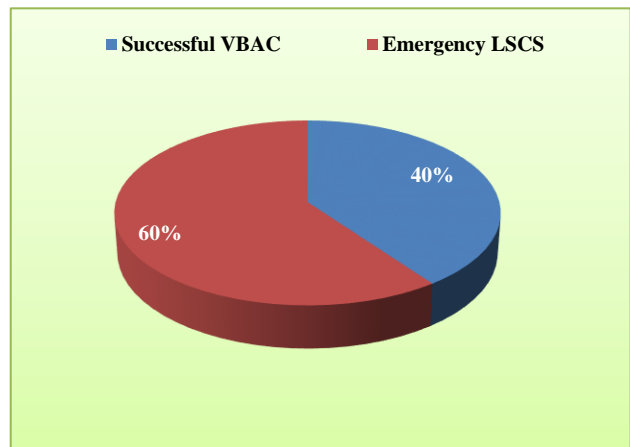


Figure 1: Outcome of patients undergoing TOLAC.

When outcome of TOLAC was studied in relation to previous vaginal birth history, it was found that all patients with history of vaginal delivery both before and after the previous caesarean had successful VBAC (100%), while patients with history of vaginal delivery after the previous caesarean and before the previous

caesarean had successful VBAC in 83.3% and 50% cases respectively. only 31.7% patients had successful VBAC with no history of previous vaginal delivery. This difference was found statistically strongly significant (p=0.006) (Table 2).

Table 2: Distribution of patients studied according to vaginal birth history in relation to outcome of TOLAC.

Outcome	Before and after previous CS	After previous CS	Before previous CS	None	Total
Successful VBAC	3 (100%)	5 (83.3%)	3 (50%)	19 (31.7%)	30
Emergency LSCS	0 (0%)	1 (16.7%)	3 (50%)	41 (68.3%)	45
Total	3 (100%)	6 (100%)	6 (100%)	60 (100%)	75

P=0.006**, significant, Fisher Exact test

Table 3: Distribution of patients studied according to cervical effacement in relation to outcome of TOLAC.

Outcome	Cervical effacement			Total
	>75%	25-75%	<25%	
Successful VBAC	6 (85.7%)	22 (84.6%)	2 (4.8%)	30 (40%)
Emergency LSCS	1 (14.3%)	4 (15.4%)	40 (95.2%)	45 (60%)
Total	7 (100%)	26 (100%)	42 (100%)	75 (100%)

P<0.001**, significant, Fisher Exact test

Among patients with cervical effacement >75% and 25-75 % at the time of admission, had successful VBAC in 85.7 % and 84.6% cases, while patients with cervical effacement <25% at the time of admission had successful VBAC in only 4.8 % cases and emergency caesarean in 95.2% cases. This difference was found strongly significant (P<0.001) (Table 3).

All 8 patients with cervical dilatation >4 cm at the time of admission had successful VBAC (100 %), while only 32.8% patients had successful VBAC with cervical dilatation of <4cm. This difference was found strongly significant among two groups (P<0.001) (Table 4).

Table 4: Distribution of patients studied according to cervical dilatation in relation to outcome of TOLAC.

Outcome	<4cm	≥4cm	Total
Successful VBAC	22 (32.8%)	8 (100%)	30 (40%)
Emergency LSCS	45 (67.2%)	0 (0%)	45 (60%)
Total	67 (100%)	8 (100%)	75 (100%)

P<0.001**, significant, Chi-Square test

Mean score for successful VBAC was 5±1.66 and for emergency caesarean was 2.97±0.83. The percentage of successful VBAC was increased with increasing the total score values: with the score of ≤2, chances for successful vaginal birth after caesarean section were only 9%; with a score of 3, it was 16.7%, with a score of 4, it was 53.3%, with a score of 5, it was 75%, with a score of 6, it was

85.7%, and with score ≥8 , it was almost 100% (Figure 2).

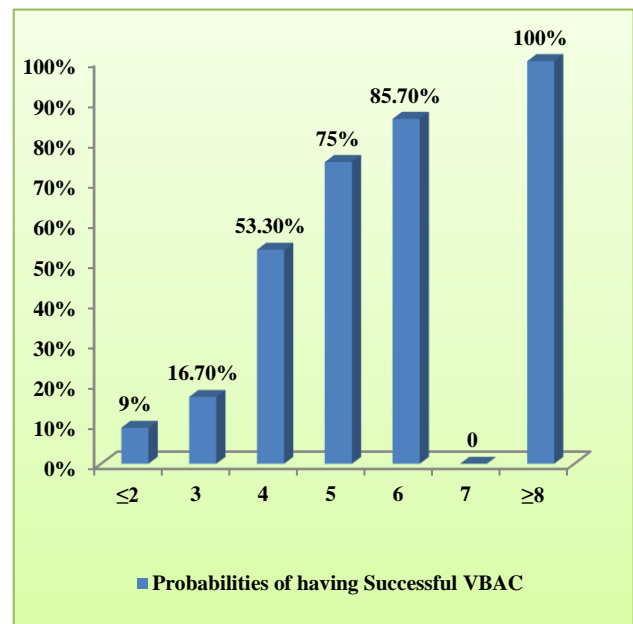


Figure 2: Successful VBAC rate according to Flamm Geiger score value in patients.

Most of the patients with total Flamm and Geiger score <3 at the time of admission had emergency caesarean section while most of the patients with score >4 had successful VBAC (Figure 3). Distribution of each score was found statistically significant.

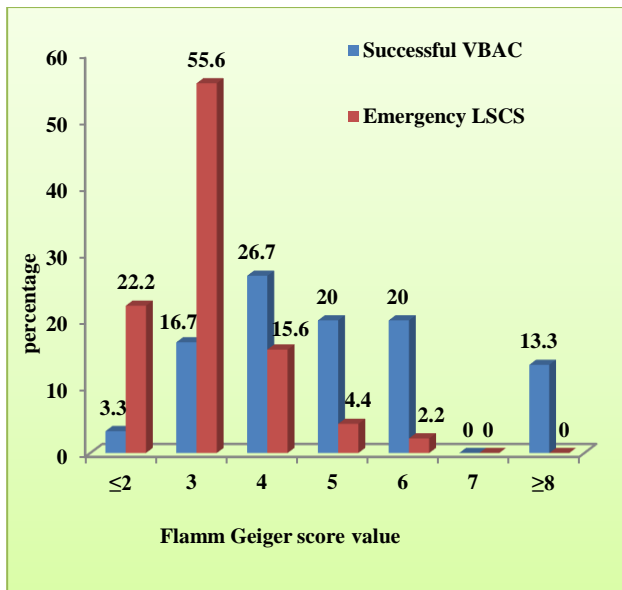


Figure 3: Distribution of patients studied according to total Flamm and Geiger score and its relation with outcome.

DISCUSSION

This study was conducted in a tertiary care setting with the objective to evaluate the success rate of attempted VBAC trial after one previous caesarean delivery based on Flamm and Geiger scoring system. This scoring model provides reasonable predictability for VBAC and also consistent ability to identify women at risk for failed trial of labor. Out of the total 75 patients who underwent TOLAC in this study, 40% patients delivered vaginally, and 60% patients had emergency LSCS which is comparable to Panchal A et al study.¹⁴

In the present study, all patients with history of vaginal delivery both before and after the previous caesarean had successful VBAC (100%), while patients with history of vaginal delivery after the previous caesarean and before the previous caesarean had successful VBAC in 83.3% and 50% cases respectively. Only 31.7% patients had successful VBAC with no history of previous vaginal delivery ($P=0.006$). So, the present study revealed that a chance of successful VBAC in women with prior vaginal delivery, particularly vaginal delivery after the previous caesarean section (history of previous VBAC), was higher, compared to women with no history of prior vaginal delivery. This result is similar to Panchal et al study and Narang H et al study.^{14,15}

The present study showed that the most common indication of emergency Caesarean Section in patients undergoing TOLAC was scar tenderness (42.2%) which is similar to Ray P et al and Rahman R et al study.^{16,17} Cervical factors, in terms of dilatation and effacement have been studied individually in this study and found to be useful in predicting vaginal birth. Patients with successful VBAC outcome were significantly more likely

to have favourable Bishop Score at time of admission and found comparable to Tater A et al study 2016.¹² In the present study, out of the 30 patients with successful VBAC, 66.7% patients had favourable Bishops score (≥ 6) at the time of admission ($P<0.001$). So, women with successful VBAC outcome were significantly more likely to have Bishop Score ≥ 6 . This result is similar to Haresh UD et al study and Guise JM et al study.^{18,19} Most of the patients with total Flamm and Geiger score ≤ 3 at the time of admission had emergency caesarean section while most of the patients with score ≥ 4 had successful VBAC. A chance of successful VBAC was increased with increasing total Flamm and Geiger score. This result is comparable to Zaitoun et al and Patel RM study.^{13,20} Mean score for successful VBAC was 5 ± 1.66 and for emergency caesarean was 2.97 ± 0.83 in this study which is comparable to Patel RM et al study.¹³

The morbidity associated with successful vaginal birth is about one-fifth that of elective caesarean. But perinatal risk is more after a failed trial of labour compared to elective repeat caesarean section without labour. Failed trials of labour, with subsequent caesarean section involve almost twice the morbidity of elective section.^{21,22} The information is important for counseling women about their choices of delivery after a previous caesarean section. The information is important for counseling women about their choices of delivery after a previous caesarean section. There is no such rule that the patient can be delivered vaginally or should go for elective repeat caesarean section after primary caesarean. The use of such a scoring system may enable the obstetricians and midwives to predict the chances for success in individual patient and to evaluate the risk and benefits, thus improving the outcome of TOLAC.

CONCLUSION

VBAC remains a safe option provided patients are correctly selected and monitored. For VBAC trial, each and every patient should be evaluated, and line of treatment should be individualized. Application of Flamm and Geiger scoring gives fair judgment of successful vaginal birth in TOLAC in the individual patient and reduces the rate of failed trial leading to emergency caesarean section, thus improving outcome in a trial of labor. As the total Flamm and Geiger score increases, the chance of successful VBAC increases.

The present study showed that appropriate clinical settings and properly selected group of patients can make the trial of labour after caesarean safe and effective. There always should be a fine balance between continuing and abandoning the trial without compromising maternal and fetal morbidity. Practice of protocol of applying this score and monitoring by partogram will reduce the rate of repeat caesarean section in previous one caesarean section patients. Although this scoring system gives fair judgment of successful vaginal birth in TOLAC, further

studies are needed to identify other factors which have an impact on women accepting or declining trial of VBAC.

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