

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20222462>

Original Research Article

A study to evaluate feto-maternal outcome of trial of labour in previous cesarean patients: a prospective observational study at a tertiary care centre in India

Sanjaykumar G. Tambe, Ameya S. Mulay*

Department of Obstetrics and Gynaecology, Byramjee Jeejeebhoy Government Medical College, Pune, Maharashtra, India

Received: 01 August 2022

Accepted: 05 September 2022

***Correspondence:**

Dr. Ameya S. Mulay,

E-mail: ameyamulays@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Vaginal birth after cesarean section (VBAC) is associated with shorter maternal hospitalizations, less blood loss and fewer transfusions, and fewer thrombo-embolic events than cesarean section (C-section). A 60 to 70% success rate of vaginal birth after previous C-section has been reported by many authors if the primary cesarean was done for nonrecurring indications the subsequent pregnancy

Methods: A prospective observational study was conducted at Sassoon general hospital, Pune, India. The 100 patients who fulfilled the inclusion criteria were studied. Maternal and fetal outcomes were analysed.

Results: Out of the total 100 cases with previous C-section, successful vaginal delivery was possible in 65% cases. Most common reason for failed attempt to vaginal delivery was failure of labour to progress (40%) followed by failure of induction (28.6%) and non-reassuring FHR (22.9%). Out of the total 35 cases with gestation age over 40 weeks, 51.4% underwent C-section delivery as compared to 26.2% with gestation age of less than 40 weeks ($p < 0.01$). Scar rupture was observed in only a single case out of 65 vaginal deliveries (1.5%).

Conclusions: Our study demonstrates that the attempt at the trial of vaginal delivery following a previous C-section, has an good success rate. The risk of unsuccessful attempt is increased by body mass index (BMI) > 25 , gestation ≥ 40 weeks and history of previous emergency CS while high success rate was seen with history of any vaginal deliveries. We thus recommend that pregnant woman with history of C-section should be given the option of trial of labour after caesarean (TOLAC), unless contraindicated.

Keywords: Vaginal birth, Scar, Rupture

INTRODUCTION

Vaginal birth after cesarean section (VBAC) is the term applied to women who undergo a vaginal delivery following cesarean delivery in prior pregnancy. Due to increased risk of maternal complications with repeat C-section and safety of vaginal birth after caesarean section, a trial of labour for selected group of patients with a previous scar has become a preferred strategy.

VBAC is associated with shorter maternal hospitalizations, less blood loss and fewer transfusions,

and fewer thrombo-embolic events than C-section. Several reports have indicated that the absolute risk of uterine rupture attributable to a trial of labour is around 1 per 1000.¹

A 60 to 70% success rate of vaginal birth after previous C-section has been reported by many authors if the primary cesarean was done for nonrecurring indications.¹

There is a considerable variation in the proportion of women who are offered and attempt a TOLAC across centres. British figures indicate that among women with a

prior C-section, 34% will successfully achieve a vaginal birth in the subsequent pregnancy.² The leading indications for the repeat C-sections were: failure to progress, scar tenderness and foetal distress. There were no maternal and no foetal complications. They, thus concluded that TOLAC is a safe practice.

Encouraging women with a prior cesarean delivery to attempt vaginal birth in subsequent pregnancies is the strategy that has been employed to address rising rates of a C-section. There is a need to understand variables in previous and present pregnancy to predict the success of TOLAC and to evaluate maternal and fetal outcomes associated with it.

Aims and Objectives of this study were to study the fetomaternal outcome after trial of labour after cesarean, to study the risk of scar rupture and scar dehiscence after a VBAC, to study the number of cases who have a second lower segment C-section (LSCS) after a previous LSCS after failure of TOLAC and to estimate the incidence of the vaginal birth after the previous lower segment C-section.

METHODS

This observational prospective study was conducted in a tertiary care teaching hospital in the department of obstetrics and gynaecology.

Various studies have shown the success of VBAC around 65%. The exact prevalence in our study area is not known hence we calculated the sample size for the prevalence of 65%. The sample size obtained was 88. So, after covering for 10% attrition errors and rounding off, we decided to take a sample of 100 cases.

Inclusion criteria

Pregnant women with 34 weeks or more period of gestation with previous one LSCS having no contraindications for vaginal delivery and not having any other high-risk factors (as Anemia, gestational hypertension, gestational diabetes mellitus) were included in the study.

Exclusion criteria

Recurrent indication of LSCS and inter pregnancy interval ≤ 12 months at time of recruitment were excluded from, the study.

Methodology

Study included 100 pregnant patients with previous one LSCS presenting in antenatal clinic that fulfilled the inclusion criteria and delivered in the department of obstetrics and gynaecology from December 2018 to November 2020 at B. J. government medical college and Sasoon general hospital, Pune. Institute ethical committee

clearance and certification was obtained before the study is begun. Informed consent was also obtained from all eligible patients before including them in the study. Procedure involved and the implication of the study was explained to the patients in the language that they can understand before obtaining consent.

The plan for delivery i.e., spontaneous or induction and the method of cervical ripening was decided. The patients were monitored in labour room by intermittent auscultation of FHR and vital charting for presence or absence of signs of scar dehiscence.

The details of mode of delivery and neonatal outcome was studied. The indications and intra-op details of recruited patients undergoing lower segment C-section were recorded. The post-partum complications of the patients were also noted.

Statistical analysis

The quantitative data was represented as their mean \pm SD. The Categorical and the nominal data was expressed as percentage. The t-test was used for analysing the quantitative data, or else non parametric data was analyzed by the Mann Whitney test and categorical data was analyzed by using the chi-square test. Pearson correlation co-efficient was used for computing correlation between quantitative variables. The significance threshold of $p < 0.05$. All the analysis was carried out by using the SPSS software version 21.

RESULTS

Out of the total 100 cases with previous caesarean section, successful vaginal delivery was possible in 65% cases.

Table 1: Distribution of study cases as per successful vaginal birth after caesarean section.

TOLAC	N	Total (%)
Successful (VBAC)	65	65
Not successful (CS)	35	35
Total	100	100

Table 2: Distribution of study cases as per indication of caesarean delivery.

Indication for CS	N	Total (%)
Failed to progress	14	40
Failure of induction	10	28.6
Non reassuring FHR	8	22.9
Change of mind	3	8.6
Total	35	100

Most common reason for failed attempt to vaginal delivery was failure of labour to progress (40%) followed by failure of induction (28.6%) and non-reassuring FHR (22.9%). A total of 3 females (8.6%) changed their mind and went for elective LSCS.

Predictors of increased success include a nonrecurring indication for prior caesarean delivery (e.g., breech presentation, placenta previa) and prior vaginal delivery. A history of cephalopelvic disproportion (CPD), failure to progress, no prior vaginal deliveries, or a prior caesarean delivery performed in the second stage of labor are negative predictors of success in a subsequent trial of labor.

Several studies have examined indications for prior caesarean delivery as a predictor of outcome in subsequent TOLAC.³ In all studies, CPD had the lowest VBAC success rate (60-65%). Fetal distress (e.g., non-reassuring fetal testing) had the second lowest success rate of VBAC (69-73%). Nonrecurrent indications, such as breech birth, herpes, and placenta previa, were associated with the highest rates of success (77-89%).

Failure to progress, CPD, or dystocia as indications for prior caesarean delivery are also associated with a higher proportion of patients not attempting a trial of labor after caesarean birth.

Women with a successful VBAC have a higher success rate in a subsequent trial of labor compared with women whose vaginal delivery was prior to caesarean delivery.⁴

In an unadjusted comparison, patients with 1 prior vaginal delivery had an 89% VBAC success rate compared with a 70% success rate in patients without a prior vaginal delivery. In comparable comparisons controlling for confounding factors, odds ratios of 0.3-0.5 for rate of caesarean delivery are found. Among patients with a prior VBAC, the success rate is 93%, compared with 85% in patients with a vaginal delivery prior to their caesarean birth but no prior VBAC.⁵

Only 1 study carefully examines cervical dilation at prior caesarean delivery. In this study, the degree of cervical dilation in the prior delivery is directly associated with the likelihood of success in a subsequent trial of labor.⁶ For example, 67% of patients who were dilated 5 cm or less at the time of their delivery had a successful VBAC, compared with 73% of patients who were dilated 6-9 cm.

The success rate is much lower for patients whose labor arrested in the second stage: only 13% of patients who were fully dilated at the time of their prior delivery had a successful VBAC. In a similar study, patients who had their prior caesarean delivery in the first stage of labor had a lower rate of caesarean delivery than those who had their prior caesarean delivery in the second stage of labor.⁷ However, in this study, 66% of patients who had a caesarean delivery for dystocia in the second stage had a successful VBAC. In present study, most common reason for failed attempt to vaginal delivery was failure of labour to progress (40%) followed by failure of induction (28.6%) and non-reassuring FHR (22.9%). A total of 3 females (8.6%) changed their mind and went for elective LSCS.

Table 3: Association of gestation age with mode of delivery.

Gestation age (Weeks)	Mode of delivery		Total
	CS	Vaginal	
≤40	17	48	65
	26.2%	73.8%	100%
>40	18	17	35
	51.4%	48.6%	100%
Total	35	65	100
	35%	65%	100%

P<0.01.

Out of the total 35 cases with gestation age over 40 weeks, 51.4% underwent caesarean delivery as compared to 26.2% with gestation age of less than 40 weeks (p<0.01).

Increasing gestational age is associated with a decreased rate of successful VBAC. Three potential factors are related to the association of increasing gestational age with an increased rate of caesarean delivery: increasing birth weight, increased risk of fetal intolerance of labor, and increased need for induction of labor. However, in a recent study that controlled for both birth weight and induction/augmentation of labor, gestational age of greater than 41 weeks was still associated with failed VBAC.⁸

Table 4: Association of BMI with mode of delivery.

BMI (kg/m ²)	Mode of delivery		Total
	CS	Vaginal	
≤25	21	49	70
	30%	70%	100%
> 25	14	15	29
	48.3%	51.7%	100%
Total	35	64	99
	35.4%	64.6%	100%

P=0.046.

Out of the total 29 cases with pre-pregnancy BMI over 25 weeks, 48.3% underwent caesarean delivery as compared to 30% with BMI less than 25 kg/m² (p<0.01).

Table 5: Association of previous vaginal delivery with mode of delivery in present pregnancy.

Previous vaginal delivery	Mode of Delivery		Total
	CS	Vaginal	
No	31	49	80
	38.8%	61.3%	100%
Yes	4	16	20
	20%	80%	100%
Total	35	65	100
	35%	65%	100%

P=0.03.

History of vaginal delivery was given by 20 cases. Out of these 20 cases, vaginal delivery in present pregnancy was possible in 16 cases (80%), which is significantly higher

than cases with no previous vaginal delivery (61.3%). Prior vaginal delivery appears to be protective for subsequent uterine rupture. A 2000 study by Zelop et al demonstrated that patients with a prior vaginal delivery had a 0.2% rate of rupture compared with 1.1% for patients with no prior vaginal delivery. An adjusted odds ratio controlling for confounding factors was 6.2.⁹

Association of type of caesarean section in last pregnancy and mode of delivery in present pregnancy

A significant association was observed between history of elective CS in the last pregnancy and successful vaginal birth in present pregnancy. Percentage of successful vaginal birth in elective cases was 75% as compared to 43.8% in emergency cases (p<0.01).

Table 6: Association of scar rupture and mode of delivery in present pregnancy.

Scar dehiscence or rupture	Mode of delivery		Total
	CS	Vaginal	
No	35	64	99
	100%	98.5%	99%
Yes	0	1	1
	0%	1.5%	1%
Total	35	65	100
	100%	100%	100%

P=0.46.

Scar rupture was observed in only a single case out of 65 vaginal deliveries (1.5%). One of the most significant risks women face when considering a trial of labour is that of a uterine rupture. This potentially fatal event may have significant maternal and neonatal consequences. A threshold of acceptable risk has been established between the risk reported in women with one prior C-section (0.5-1%) and that seen in women with a history of a prior classic C-section (6-12%).

Association of fetal heart rate with mode of delivery in present pregnancy

Non reassuring fetal heart rate was one of the common reasons (8/35; 22.9%) for caesarean section in present study. Out of the total 13 cases with non-reassuring FHR, 8 (61.5%) underwent C-section.

Mean birth weight was slightly higher among babies delivered via caesarean section as compared to vaginally born babies (2.62 vs 2.54 kg; p=0.08) while no difference was observed among babies with respect to APGAR score at 1 and 5 mins (p>0.05).

Prevalence of low birth weight was 46.2% among cases of vaginal delivery while it was 37.1% in cases delivered via C-section (p=0.37).

Birth weight greater than 4000 gm is associated with an almost 4-fold higher risk of caesarean birth among

nulliparous women. Several studies have demonstrated a difference in VBAC rates between patients with a birth weight greater than 4000 gm and those with a lower birth weight. In accordance with these findings, several studies have demonstrated a higher failure of a trial of labor with increasing birth weight.¹⁰

Table 7: Mean birth weight and APGAR comparison among cases with and without successful vaginal delivery.

Variables	Mode of delivery	N	Mean	SD	P
Birth weight	Vaginal	65	2.54	0.33	0.08
	CS	35	2.62	0.29	
APGAR 1	Vaginal	65	7.88	0.83	0.22
	CS	35	8.11	0.50	
APGAR 5	Vaginal	65	8.89	0.97	0.19
	CS	35	9.06	0.76	

Table 8: Association of birth weight and mode of delivery in present pregnancy.

Birth weight (Kg)	Mode of delivery		Total
	CS	Vaginal	
<2.5	13	30	43
	37.1%	46.2%	43.0%
≥ 2.5	22	35	57
	62.9%	53.8%	57.0%
Total	35	65	100
	100%	100%	100%

P=0.37

Association of neonatal complications with mode of delivery in present pregnancy

Incidence of meconium staining of liquor (9.2% vs 0%), IUGR (7.7% vs 2.9%) and requirement of NICU admission (12.3% vs 2.9%) was slightly higher in cases delivered vaginally as compared to cases undergoing C-section, the difference was however non-significant (p>0.05).

DISCUSSION

Present hospital based observational study aimed to evaluate the success rate of trial of labor after caesarean section (TOLAC) and to find out the fetal and maternal outcome associated with success or failure of the trial. Study included 100 pregnant women with 34 weeks or more period of gestation with previous one LSCS and having no contraindications for vaginal delivery nor have any other high-risk factors (as Anemia, gestational hypertension, gestational diabetes mellitus).

Success rate of VBAC

ACOG 2010 quoted success rate of VBAC of 60-80% while studies by various other authors observed the

prevalence ranging from 40% to 90% [56-80]. In present study, out of the total 100 cases with previous C-section, successful vaginal delivery was possible in 65% cases.

Vaginal birth after caesarean (VBAC)

The 45-50% of women attempted VBAC in 1996, as few as 22% of patients with a prior cesarean delivery attempted the trial of labor in 2002.¹¹ This number is drifting down toward the 10% mark with fewer than 8% of women achieving successful VBAC in 2004.¹² Despite the known risks (0.5-1% rate of a uterine rupture), TOLAC remains an attractive option for many patients and leads to a successful outcome in a high proportion of patients.¹³

ACOG guidelines

The 2010 guidelines, based on consensus and expert opinion, recommend that a TOLAC should be undertaken at facilities capable of emergency deliveries. Because of the risks associated with TOLAC and complications such as uterine rupture that may be unpredictable, ACOG recommends that a TOLAC be undertaken in facilities with the staff immediately available to provide emergency care.^{14,15} However, when the resources for immediate cesarean delivery are not available, the health care providers and patients considering TOLAC should discuss the hospital's resources and availability of the obstetric, paediatric, anaesthetic, and operating room staffs. Recognizing that the TOLAC was decreasing at community level and more rural hospitals, ACOG revised these recommendations in 2017 with an apparent goal in softening the recommendation for immediate availability of surgical teams.¹⁶ On the basis of level A evidence, the 2017 ACOG guidelines make following recommendations: Most women with one prior C-section with a low transverse incision are candidates for VBAC and should be offered a TOLAC; Epidural anesthesia may be used as part of a TOLAC. Misoprostol should not be used for patients who have had a prior C-section or major uterine surgery.

On the basis of level B evidence, TOLAC may be considered for following patients: Women with 1 previous C-section with a low transverse incision who are otherwise appropriate candidates for twin vaginal delivery; Women with 1 previous C-section of unknown incision type, unless clinical suspicion of a previous classical uterine incision is high; Women with 1 previous cesarean delivery who are otherwise appropriate candidates for twin vaginal delivery.

Level B evidence was also found for the following: Induction of labor during TOLAC is not a contraindication.; in women with one prior low transverse uterine incision who are at low risk for adverse maternal or neonatal outcomes from external cephalic version and TOLAC, external cephalic version for breech presentation is not contraindicated. Continuous fetal heart rate monitoring is recommended during TOLAC.¹⁷

Table 9: Predictors of VBAC success or failure.¹⁸

Increased chance of success	Decreased chance of success
Prior vaginal delivery	Maternal obesity
Prior VBAC	Short stature
Spontaneous labour	Macrosomia
Favourable cervix	Increased maternal age
Preterm delivery	Prolonged labour
Non recurrent indication (Breech, placenta previa)	Induction of labour
	Gestational age >41 weeks

Induction of labour

Patients who undergo induction of labour are at a higher risk of C-section than women who experience spontaneous labour.

Cervical examination on admission¹⁹

Patients who present to labor and delivery with advanced cervical examination findings have greater success rate of a vaginal birth. Several components of the cervical examination have been investigated, which includes cervical dilation and cervical effacement.

Inter-pregnancy interval

In 1 analysis, women who had an interpregnancy interval of more than 18 months had an 88% chance of VBAC success, while women whose interpregnancy interval was less than 18 months had a VBAC success rate of 78%.

Many studies have demonstrated that the smaller the amount of time between the cesarean delivery and the subsequent delivery, the higher the rate of uterine rupture.²⁰

Gestational or pre-gestational diabetes

One study demonstrated that patients with either gestational DM or pregestational DM had a lower rate of a successful trial of labor.

Labour

While labour appears to be a risk factor for uterine rupture, many patients experience a uterine rupture prior to onset of labour. In a large study by using birth certificate data, one study found that the rate of uterus rupture before the onset of labor was 0.5%. Patients at greatest risk are with prior classical hysterotomies.²¹

Induction of labour

Induction of labour as a risk factor for uterus rupture has been examined over only in the past 5 years. One large

study, demonstrated that a uterine rupture rate of 2.3% seen in patients who had experienced induced labour.^{22,23}

Limitations

No significant association was observed between parity and mode of delivery among study cases. No difference was observed among babies with respect to APGAR score at 1 and 5 mins among the study cases.

CONCLUSION

Our study demonstrates that the attempt at the trial of vaginal delivery following a previous C-section, has a good success rate. The risk of unsuccessful attempt is increased by BMI >25, gestation \geq 40 weeks and history of previous emergency CS while high success rate was seen with history of any vaginal deliveries. This anticipation should be utilized in counseling women when offering the trial of labor after cesarean, and making appropriate and timely decision in their labor. No difference was observed between the successful and unsuccessful cases regarding maternal and neonatal complications. We thus recommend that pregnant woman with history of C-section should be given the option of TOLAC, unless contraindicated.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Joseph, Gilvaz S. A Comparative Study on Intra Operative Problems during Primary versus Repeat cesarean Sections. *Sch J App Med Sci.* 2016;4(2A):303-10.
- Souza J, Gulmezoglu A, Lumbiganon P. Cesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO global survey on maternal and perinatal health. *BMC Med.* 2010;8:71.
- World Health Organization. WHO Statement on Cesarean Section Rates. 2015. Available at: http://apps.who.int/iris/bitstream/10665/161442/1/WHO_RHR_15.02_eng.pdf. Accessed on 25 March, 2022.
- World Health Organization Appropriate technology for birth. *Lancet.* 1985;2:436-7.
- Neuman M, Alcock G, Azad K, Kuddus A, Osrin D, More NS et al. Prevalence and determinants of cesarean section in private and public health facilities in underserved south Asian communities: cross-sectional analysis of data from Bangladesh, India and Nepal. *BMJ Open.* 2014;4(12):e005982.
- Ronsmans C, De Brouwere V, Dubourg D. Measuring the need for life-saving obstetric surgery in developing countries. *BJOG.* 2004;111:1027-30.
- Betrán AP, Ye J, Moller AB, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in cesarean section rates: global, regional and national estimates: 1990-2014. *PLoS One.* 2016;11(2):e0148343.
- District level household & facility survey (DLHS-3). Mumbai: International Institute for Population Sciences. Available at: <http://rchiips.org/PRCH-3.html>. Accessed on 20 April, 2022.
- District level household and facility survey (DLHS-4). Mumbai: International Institute for Population Sciences. Available from: <http://rchiips.org/DLHS-4.html>. Accessed on 25 March, 2022.
- Ghosh S, James KS. Levels and Trends in cesarean Births: Cause for Concern? *Economic Political Weekly EPW.* 2010;5.
- Yoshioka-Maeda K, Ota E, Ganchimeg T, Kuroda M, Mori R. Cesarean section by maternal age group among singleton deliveries and primiparous Japanese women: a secondary analysis of the WHO global survey on maternal and perinatal health. *BMC Pregnancy Childbirth.* 2016;16(1):39.
- Feng XL, Xu L, Guo Y, Ronsmans C. Factors influencing rising cesarean section rates in China between 1988 and 2008. *Bull World Health Organ.* 2012;90(1):30-39A.
- Behague DP, Victora CG, Barros FC. Consumer demand for cesarean sections in Brazil: informed decision making, patient choice, or social inequality? A population-based birth cohort study linking ethnographic and epidemiological methods. *BMJ.* 2002;324(7343):942.
- Oliveira RR, Melo EC, Novaes ES, Ferracioli PL, Mathias TA. Factors associated to cesarean delivery in public and private health care systems. *Revista da Escola de Enfermagem da USP.* 2016;50(5):733-40.
- Nielson TF, Høkgard KH. Post-operative cesarean section morbidity. *Am J Obstet Gynaecol.* 1983;146:911-15.
- Dutta DC. Pregnancy with history of previous cesarean section. *Textbook of obstetrics including perinatology and contraception.* 6th ed. 2005;8794:345-46.
- American College of Obstetricians and Gynecologists (ACOG) ACOG Practice Bulletin: vaginal birth after previous cesarean delivery: Clinical management guidelines. *Int J Gynecol Obstet.* 2004;54:197-204.
- Williams Obstetrics. Prior Cesarean Delivery, Chapter 26. 22. McGraw-Hills. 2007.
- Ugwumadu A. Does the maxim “once a cesarean, always a cesarean” still hold true? *PLoS Med.* 2005;2(9):e3053.
- What is Vaginal Birth after Cesarean Section? Healthwise® Knowledgebase. P.O. Box 1989, Boise, Idaho 83701: Health wise, Incorporated. 1995-2005.
- Jodie MD, Caroline AC, Janet EH, Ross RH, Jeffery SR. Vaginal birth after cesarean. *BMC Childbirth Pregnancy.* 2007;7:17.
- Taj G, Sohail N, Cheema SZ, Zahid N, Rizwan S. Review of Study of Vaginal Birth After cesarean Section (VBAC) *Annals.* 2008;14(1):13-6.

23. Maria RT, Betran AP, Souza JP, Widmer M. Classifications for Cesarean Section: A Systematic Review. *PLoS ONE.* 2011;6(1):e14566.
24. Pickrell KL. An Inquiry Into the History of Cesarean Section. *Bull Soc Med. Hist (Chicago).* 1935;4:414.
25. European Perinatal Health Report: Health and care of pregnant women and babies in Europe. 2010.

(www.europeristat.com/reports/europeanperinatal-health-report-2010.html). Accessed on 02 May, 2022.

Cite this article as: Tambe SG, Mulay AS. A study to evaluate fetomaternal outcome of trial of labour in previous cesarean patients: a prospective observational study at a tertiary care centre in India. *Int J Reprod Contracept Obstet Gynecol* 2022;11:2680-6.