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Optimising pregnancy outcome for mother with previous caesarean section-VBAC versus repeat Caesarean: A decision analysis for clinical practice

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Abstract
Introduction: Caesarean section has evolved from it being done in desperate situations as a post-mortem surgery to save the unborn child to present times where one of the commonest indications is previous caesarean birth. VBAC is associated with decreased rate of caesarean section as well as prevents the woman to subject themselves to major surgical procedure with all the inherent risks associated with it. The aim is to study the outcome of labour in post caesarean pregnancy and to study the clinical condition of previous caesarean scar
Materials and methods: This study was done among 100 women at Sri Siddhartha Medical College between January to December 2024. Inclusion criteria were all term pregnant women with history of single uncomplicated lower segment caesarean section done for non-recurrent indication. Before an attempted trial of labour patients were explained risks, benefits and alternatives to the procedure. Signs of scar dehiscence were watched for and Intrapartum foetal monitoring was done with the help of Cardiotocography
Results: This study included 100 patients. The commonest indication of primary section was cephalo pelvic disproportion (29%) followed by foetal distress (15%), Pregnancy induced hypertension (13%) and non-progress of labour (10%).Among 100 cases studied 80 has undergone caesarean section, 20 was delivered vaginally. 65 cases were taken directly for repeat emergency caesarean section without any trial for vaginal delivery due to various obstetrical risk factors, 35 cases were given TOLAC.
Conclusion: VBAC is a safer alternative to conducting ERCS in the developing countries like ours. Repeat CS and planned VBAC are both associated with benefits and harms. To reduce overall caesarean section rates & prevent repeat CS, vaginal delivery should be anticipated, but only in favourable cases with meticulous monitoring. The outcome of VBAC is not associated with increased morbidity and mortality for both babies and mother.

Keywords: Vaginal birth after cesarean section (VBAC), elective repeat caesarean section (ERCS), caesarean section (CS), emergency repeat caesarean section (EMRCS)

Introduction
Caesarean section (CS) procedure has evolved from it being done in desperate situations as a post-mortem surgery to save the unborn child to present times where one of the commonest indications for caesarean delivery is previous caesarean birth. The prevalence of Caesarean section across India increased from 17.2% to 21.5% in five years leading up to 2021. In private sector, these numbers stand at 43.1% (2016) and 49.7% (2021), meaning that nearly one in two deliveries in the private sector is Caesarean section [1].
In 1916, 'Edward Cregin' made his famous quote "Once a Caesarean, Always a Caesarean." It Continues to be a subject of debate till today.[4] This Cregin's statement must be abandoned and Replaced by "Once a Caesarean, Always Hospital Delivery" [3]. Vaginal birth after Caesarean Section (VBAC) is associated with decreased rate of caesarean section as well as prevents the woman to subject themselves to major surgical procedure with all the inherent risks associated with it [2].
Rupture of lower segment scar is much less common. It is evident that the uterine scar ruptures are more frequently seen following cases who has undergone trial of labour than in non-trial cases. The maternal risk is also greater after repeat caesarean-section, hospital stay will be longer along with higher morbidity & foetal loss. Timing of caesarean-section is also important factor for further successful outcome.

Elective Repeat Caesarean Section (ERCS) before labour will increase the incidence of prematurity. A previous classical scar, multiple pregnancies, more than one caesarean-section and abnormal presentation are contraindicated for Trial of Labour after Caesarean Section (TOLAC). Repeat caesarean-section should be permitted after 3 years of last caesarean section or at the onset of labour in cases of previous caesarean-section to avoid prematurity.

A trial of labour after previous caesarean delivery is safe for patients who are managed in hospital with the capacity to conduct increased surveillance and accomplished emergency caesarean deliveries and exploratory laparotomies if necessary [2].

Caesarean section does involve certain risks, but the operation is much safer than previous years.

Increased awareness of complication of the VBAC and increase in women dissatisfaction with long hours of labour have resulted in obstetrician having a lower threshold for advising delivery by repeat caesarean section [2].

VBAC is associated with decreased rate of caesarean section as well as prevents the woman to subject themselves to major surgical procedure with all the inherent risks associated with it [2].

Materials and Methods: The study was a cross sectional study conducted among 100 women admitted in the labour room in the Department of obstetrics & gynaecology of Sri Siddhartha Medical College & Hospital between January 2024 to December 2024. Inclusion criteria were all term pregnant women with previous history of single uncomplicated lower segment caesarean section done for non-recurrent indications with spontaneous onset of labour. Exclusion criteria included.

Women with any previous uterine scar due to myomectomy, hysterotomy operation and previous classical caesarean section, or scar due to previous rupture uterus repair, preterm premature rupture of membrane (PPROM), sepsis or chorioamnionitis, intrauterine deaths, previous two or more lower segment caesarean section, induced labour, multiple pregnancies. After an informed and a written consent is obtained from all the women selected for this study, women were assigned to either go for trial of labour or repeat emergency caesarean section depending upon the criteria's fulfilled for both the mode of deliveries. To determine the number of cases undergoing repeat caesarean section or trial of scar for VBAC and also to see for the outcome of labour in both the mode of deliveries.

A detailed history, past obstetric history, complete physical examination, Scar tenderness was elicited on admission, Pelvis adequacy was checked for prior to counselling for TOLAC. Before an attempted trial of labour patients were explained risks, benefits and alternatives to trial of labour. Early signs of scar dehiscence were watched for and Intrapartum foetal monitoring was carried out with the help of Cardiotocography and after delivery the patients were monitored for 2 hours following vaginal delivery and required period following repeat emergency caesarean section and subsequent complications and condition of the mother and baby till discharge from the hospital were studied.

Results and Observations

This study included all 100 cases who had one previous caesarean section. Majority in the age group of 26-30 years (68%). 91% cases were having Parity one. The commonest indication of primary section was cephalo pelvic disproportion (29%) followed by foetal distress (15%), Pregnancy induced hypertension (13%) and non-progress of labour (10%). Primary caesarean section of 53% of cases were done at non-government hospital. After repeat emergency caesarean section 5% patient suffered from wound sepsis, 15% from urinary tract infection, 25% of patient had puerperal pyrexia. Among the 100 cases studied 80 (80%) has undergone caesarean section, 20 (20%) was delivered vaginally. 65 (65%) cases were taken directly for repeat emergency caesarean section without any trial for vaginal delivery due to various other obstetrical high risk factors, 35 (35%) cases were given trial of labour after caesarean section (TOLAC). Among the 20 cases delivered vaginally forceps were applied in 8 cases and rest 12 delivered vaginally with minimal aids. Incidence of vaginal delivery was higher among those who had previous history of vaginal birth (60%) than those who did not have it (40%).

Major cause of repeat section in the present series was foetal distress (62.5%) followed by threatened scar rupture (48.75%). Incidence of vaginal delivery was maximum (30%) among babies weighing between 2.3 to 2.9 Kgs. Incidence of maternal morbidity was no doubt higher among repeat emergency section group. Puerperal pyrexia was observed in 25% of emergency repeat caesarean section patients. No maternal death occurred in present study. A total of 65 patients were taken up for an emergency LSCS, without a trial for VBAC, 50 of which were for foetal distress, 9 for threatened scar rupture, 6 cases for CPD. Only 40% of the patients given a trial for VBAC had a history of prior vaginal deliveries and about 57.14% of them had a successful VBAC in the Present pregnancy. 15% of the patients had a repeat emergency caesarean section following failed trial for VBAC, the most common indications being foetal distress (60%). Maternal complications after a trial for VBAC/TOLAC were perineal tear seen in 10% of cases, cervical tear in 5% cases, episiotomy wound gaping in 5% cases and para urethral tear in 5% cases.

Discussion

In the present study we have compared and evaluated various indications of emergency repeat caesarean section (EmRCS) as well as various parameters associated with mode of delivery in cases of previous one caesarean section handled in our hospital and cases those were referred to us for management.

Table 1: Total no of delivery in hospital during present study (n=2430)

Total no of delivery in hospital during present study (n=2430)	Frequency
Normal vaginal delivery	1545
Number of total LSCS	885
Number of primary LSCS	347
Number of patients in labour	867
Caesarean section in Post LSCS cases	80

Table 2: Showing indications of primary LSCS in present cases

Indications of primary LSCS	Frequency	Percentage%
Ante partum haemorrhage	2	2%
Big baby	3	3%
Breech delivery	8	8%
Cephalo pelvic disproportion(CPD)	29	29%
Foetal distress	15	15%
Failed induction	5	5%
Mal presentation	5	5%
Non-progress of labour	10	10%
Post-dated pregnancy	2	2%
Pregnancy induced hypertension	13	13%
Placenta previa	1	1%
Pre mature rupture of membranes	7	7%
Total	100	100%

Table 3: Showing indications of emergency repeat LSCS in present pregnancy (n=80)

Indications of Emergency repeat LSCS	Frequency	Percentage%
Foetal distress	50	62.5
Threatened scar rupture (TSR)	39	48.75
CPD (cephalo pelvic disproportion)	15	18.75
Pregnancy induced hypertension (PIH)	7	8.75
Cervical dystocia	1	1.25
Gestational diabetes mellitus (GDM)	2	2.5
In coordinate uterine action	2	2.5
Bad obstetric history (BOH)	2	2.5
Post-dated pregnancy	1	1.25
Total	80	100

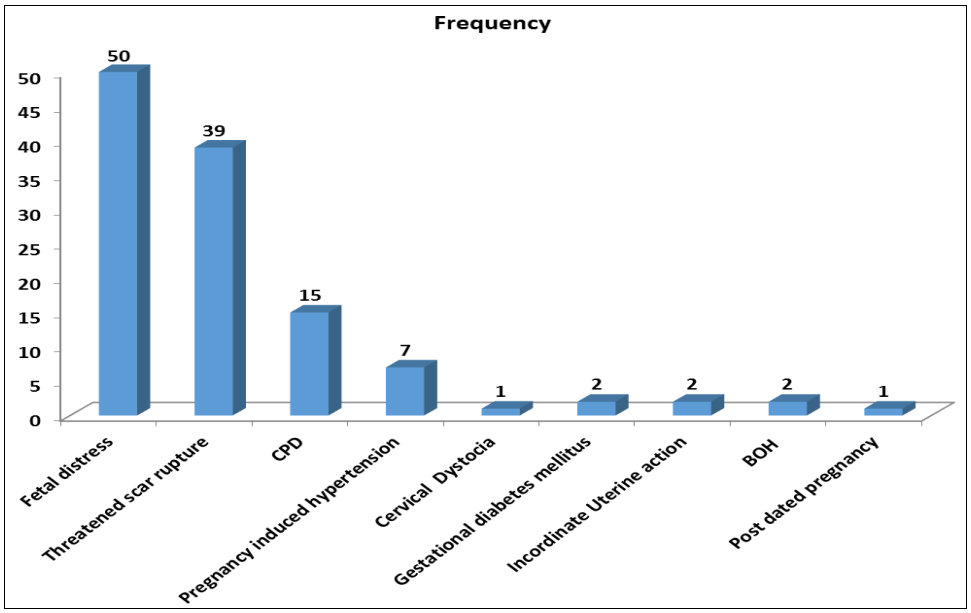

Fig 1: Showing indications of emergency repeat LSCS in present pregnancy (n=80)

Table 4: Showing result of trial of labour after caesarean section (tolac) in present study

Outcome of trial of labour	No of cases	Percentages%
Successful TOLAC (VBAC)	20	57.14
Unsuccessful TOLAC (VBAC)	15	42.86
Total	35	100

Table 5: Showing indications of termination of trial of labour after caesarean section (tolac)

Indications of Termination of Tolac	Number n=15	Percentage%
Foetal distress	3	20%
Non-progress of labour	4	26%
Cervical dystocia	1	6.6%
Threatened scar rupture	6	40%
In coordinate uterine action	1	6.6%

From the various studies done on post caesarean pregnancy conclusion made so far is that cases with post caesarean pregnancy has increased in recent times in. One of the important reasons may be that it's more liberalized for maternal as well as foetal interest.

Pregnant women with a prior section may be offered either a trial for VBAC or an elective or emergency repeat caesarean section.

The proportion of women, that decline trial for VBAC, is in turn, a significant determinant of overall rising rates of caesarean birth in all over world.

New evidence is emerging to indicate that VBAC may not be as safe as originally thought [9, 11]. But reports are conflicting and these factors along with medico legal concerns have led to a decline in clinicians offering and women accepting trial for VBAC in various parts of the world [5, 12].

In present study which was conducted in one of the tertiary referral centre of Tumkur, 100 cases of previous one caesarean section were studied, 52% cases were booked at antenatal clinic and 48% cases were unbooked in our hospital.

Out of 2430 patients who delivered in our hospital during the present study period of one and half years, 80 term patients had a history of a prior one LSCS, accounting for 5.17% of the total number of patients. This incidence is comparable to the recent study by *Gonen* and colleagues, in which 5.8% of the total number of patients who delivered had a history of prior caesarean delivery [10].

Sagar and associates, in 1983, reported an incidence of 4.53%**[13]**. *Flamm* and colleagues reported an incidence of 8.6% and *Pickhardt* reported an incidence of 11.7% [14, 15].

The overall rate of vaginal delivery following previous caesarean delivery, as reported in literature, varies from 28% to 51%. *Landon et al.* reported an incidence of 28.57% vaginal deliveries.**[9]**

Our study is comparable to this study, with 20% of the patients delivering vaginally. However, *Gonen* and colleagues in their study reported 51.22% of patients delivering vaginally. *Chattopadhyay* and colleagues reported an incidence of 40% and *Pickhardt* reported an incidence of 42% [15, 16].

The probable reasons for the low rate of vaginal deliveries in our study were that, about 65% of the patients were taken up for an EmRCS directly due to other obstetrical high risk factors and only 35% of the patients who had a TOLAC, 57.14% underwent successful trial after caesarean section and delivered vaginally.

Out of the 100 patients in our study, 35% were given a trial for VBAC, as 39.90% of the patients in the study by *Landon et al.* and 64% of the patients in the study by *Gonen* and Colleagues [9, 10].

Results in present study are comparable with *Shailesh kore* having 50.85% of vaginal delivery after TOLAC. Outcome of trial of labour in present pregnancy in present study out of 100 cases, 57.14% cases had successful TOLAC from which 60% delivered spontaneously and 40% by instrumental delivery among 20 cases. Instrumental delivery conducted to cut short second stage & reduce maternal exhaustion in present study in cases.

Among women with one prior caesarean delivery undergoing a subsequent trial of labour, those with a prior vaginal delivery were at substantially lower risk of threatened scar rupture (0.2%) than with women without a previous vaginal delivery (1.1%), *Carolyn Zelop et al.*.

57.14% of patients had a successful VBAC in the present study, which is lower than that in other studies. Landon and associates reported a success rate for vaginal delivery of 73.41% and *Gonen et al.* reported a success rate of 79.66% [9, 10]. *Cowen* and colleagues reported a successful VBAC of 81% [8]. The probable reasons for a low rate of successful VBAC in our study were that:

1. Only 15% of the patients who underwent trial for VBAC had a history of prior vaginal deliveries as compared to 50% of the patients in the study by *Landon* and colleagues and 42.20% of the patients in the study by *Gonen et al.*. [9, 10].
2. About 43% of the patient's, that had an unsuccessful TOLAC, were taken up for a EmRCS in view fetal distress, early in labour.

In the present study, 20% of the patients who delivered vaginally, 40% underwent instrumental (either ventouse or forceps assisted) vaginal delivery. *Allahabadia* and colleagues reported use of forceps in 21.30% of their patients [17].

Mc Garry reported an incidence of 24.30% [18]. *Graham* and colleagues used ventouse assistance in 10.8% of patients in their study and *Kala et al.* reported 12.10% ventouse assisted deliveries in their study [19, 20].

In the present study, foetal distress was the sole indication for instrumental delivery and both forceps and ventouse were not applied prophylactically.

In the present study only 42.85% of the patients among those in whom trial for VBAC was given, had a history of prior vaginal deliveries in the past, as comparable to 42.20% of the patients with a similar history in the study by Gonen and colleagues and 50% of patients in the study by *Landon et al.* and [9, 10] 60% of patients with a history of prior vaginal delivery delivered vaginally in the present pregnancy.

About 90% of the patients, who had a history of previous vaginal delivery in the study by *Gonen* and Colleagues, had a successful VBAC [10]. This indicates that women with a previous vaginal delivery had a better chance for successful VBAC, and the study by *Landon et al.* also concluded that, women with a prior vaginal delivery were more likely to undergo a trial for VBAC in their present pregnancy with a good rate of success [9].

65% of the patients that had a repeat emergency LSCS in the present study, were taken up directly for EmRCS for various other obstetrical indications among which foetal distress was the most common one followed by threatened scar rupture.

In the present study, the most common indications for a repeat emergency LSCS was foetal distress and threatened scar rupture & non-progress of labour, together constituting about 80% of the total number of repeat emergency LSCS. This is comparable to other studies [9, 10].

Scar dehiscence, defined as a disruption of the uterine muscle with intact serosa, was seen in 6 patients (7.5%) out of all 80 who underwent EmRCS in the present study. This is not comparable to the incidence quoted by *Paul et al.*, which was 2.35% in their study**[21]** and *Landon* and colleagues however reported an incidence of only 0.67% which is more lower than that in the present study [9].

The reason for this may have been the large sample size of the *Landon et al.* study and its multicentre design.

There was one case of uterine rupture in the present study which was referred to us from a very distant area and by the time she reached our hospital she had already developed signs of rupture uterus, however she was taken up for EmRCS immediately but intra operatively there was clear cut picture of rupture uterus, which was repaired further in two layers without much difficulty and complete hemostasis was achieved post operatively two units of fresh blood transfusion was done.

There was no neonatal mortality in the present study.

In the present study, maternal morbidity was noted in 16% of the patients who had an EmRCS and in only 8% of patients who had a trial for VBAC.

In the present study maternal morbidity in cases of repeat emergency caesarean section was in terms of puerperal pyrexia

(25%), and wound gaping (2%). Puerperal pyrexia was due to urinary tract infection (UTI) in 15% of the patients and LSCS wound infection in 3% of the patients that underwent EmRCS.
Blood transfusion was required in 3.40% of the patients that had a EmRCS and main indications were anaemia & intra operative bleeding during repeat emergency LSCS. Among EmRCS cases sub involution of uterus contributed to a significant proportion (34%) to the maternal morbidity.
It has generally been accepted that vaginal delivery is associated with lower maternal morbidity and mortality rates than emergency repeat caesarean section. Among VBAC cases perineal tear was noted in 10% cases only in those cases that underwent instrumental deliveries followed by episiotomy wound gaping, para urethral tear, cervical tear in 5% each out of 20 cases.
In the present study, there was no maternal mortality noted.
From various recent studies on the subject of birth after previous one caesarean delivery, it would be safe to conclude that a trial for VBAC after a prior LSCS constitutes a safe form of obstetrical management favourably in suitable cases.
Current recommendations of the RCOG and ACOG include offering the option of a planned VBAC to women with a prior history of one uncomplicated LSCS in an otherwise uncomplicated pregnancy at term, with no contraindication to vaginal delivery [6, 7].
A simple and pragmatic method or scoring system for quantifying the risk of emergency caesarean delivery and uterine rupture during attempted VBAC will help identify women at high risk for an unsuccessful VBAC and would thus help decision making considerably.
Majority of cases in our study group in emergency caesarean group were operated under spinal anaesthesia (80-90%) as compared to general anaesthesia (10-20%).
Our institution is a referral centre and we get a lots of referral cases from the peripheral health centres. Some of these cases were referred at such a point of time that we were not able to provide proper intrapartum care and had to intervene surgically in maximum cases (65%) by doing EmRCS directly to have better perinatal and maternal outcome.

Current guidelines and recommendations

RCOG 2023

- Planned VBAC is appropriate for and may be offered to the majority of women with a singleton pregnancy of cephalic presentation at 37 weeks or beyond who have had a single previous lower segment caesarean delivery, with or without a history of previous vaginal birth and with complicated uterine scars, caution should be exercised and decisions should be made by a senior obstetrician.
- Planned VBAC is contraindicated in women with previous uterine rupture or classical caesarean scar and in women who have other absolute contraindications to vaginal birth

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- The majority of women who have had a caesarean section in a previous delivery, who desire a vaginal birth in the current pregnancy, are good candidates for VBAC.
- The only absolute contraindications are previous uterine rupture, previous classical caesarean section and other absolute contraindications to vaginal birth e.g. Major placenta previa

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- Previous lower segment caesarean section (transverse uterine incision) with single, term, cephalic presentation, and adequate pelvis with no other high-risk factor, it is safe to wait till 40 weeks for spontaneous onset of labour as in other pregnant women without previous CS
- Women should be advised that planned VBAC should be conducted in adequately staffed and equipped facility with continuous intrapartum care and monitoring
- Abnormal CTG, usually in the form of prolonged deceleration, is the most consistent finding with urine rupture and is usually present in up to 75-80% cases

Conclusion

VBAC is a safer alternative to conducting ERCS in the developing countries like ours where inspite of efforts still couples opt for multiple children. Repeat CS and planned VBAC are both associated with benefits and harms, as observed from present study for the management of these high risk cases essential standards has to be set. Appropriate use of technology like ICU care, 24 hrs availability of medical personnel like obstetricians, anaesthetists, paediatricians & 24 hrs NICU, blood bank, operation theatre facilities.
To reduce overall caesarean section rates & prevent repeat caesarean section, vaginal delivery and VBAC should be anticipated, but only in favourable cases and at favourable places with meticulous monitoring. The outcome of VBAC is not associated with increased morbidity and mortality for both babies and mother.

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None

Conflicts of interest

None

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