Comparative study of maternal and fetal outcome in patients with Vaginal Birth after caesarean section and elective repeat caesarean section

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ABSTRACT

Women after delivering her first baby by caesarean section have a choice about mode of delivery for her second baby. The study was planned to compare maternal and perinatal outcome between VBAC and repeat elective LSCS in patients with prior one LSCS and their complications. A prospective observational study was carried out in department of obstetrics and gynaecology. Total 180 cases of previous LSCS who were eligible for vaginal delivery were recruited 90 in each group as per consent given by them. Group 1: Vaginal Birth after caesarean section Group 2: elective repeat caesarean section. It was observed that majority of the patients group 1(51.1%) and group 2 (47.8%) were in age group of 25 to 30 years. More than 25kg/m2 BMI was found in 18(20%) cases of VBAC group and 30(33.3%) cases of LSCS group .Inter pregnancy interval was significantly lower in LSCS group compared to VBAC group. Mean birth weight was 2.832 kg to 2.917kg in both group. However with improved maternal care, close fetal monitoring and institutional delivery for a previous one caesarean section, VBAC is considered safer than repeat elective caesarean section in carefully selected patient.

INTRODUCTION

Caesarean section is one of the oldest operation in surgery with its origin lost in ancient mythology. Literatures and reports suggests gradual and steady rise in rate in caesarean sections worldwide. In the recent years, change in type of uterine incision along with technologies that allows accurate fetal and maternal monitoring VBAC appears to be most productive approach to lower the caesarean rate. Major risk in TOLAC (trial of labor after caesarean section) is danger uterine rupture. Review of literature is full of studies that clearly shows the incidence of rupture of lower uterine scar is very low 0.3%.when TOLAC is successful, it is associated with less morbidity than elective repeat caesarean section. Advantages includes avoidance of one more major surgery and anaesthesia, fewer or no blood transfusions, fever, post partum infections, shorter hospital stay, more economical. Patients of Failed TOLAC and infants born by emergency caesarean section due to failed TOLAC are at increased risk of infection and morbidity. A huge awareness is required regarding decision of primary caesarean section.Caesarean section is one of the most frequently executed major surgical technique (Birara and Gebrehiwot, 2013). In last three decades, there is increase in caesarean section (CS) rate worldwide. It has been the reason for worry. Although, difference exists in proportions of caesarean delivery across all the countries; presently the rate ranges from 10 to 40 percent (Cunningham et al., 2010). In national capital of India, New Delhi caesarean sec-
Cesarean section (CS) rate in tertiary care hospitals presently ranges between 19 to 35 percent. This high cesarean section rate leads to load on national, individual and family economies.

Due to increasing rates of cesarean section, many recommendations were made that vaginal birth after cesarean section (VBAC) might help in decreasing the rates of CS (Mafatlal and Narendrabhai, 2009). Due to augmented risk of maternal complications with repeat lower segment cesarean section (LSCS) and comparative safety of VBAC, trial of labour for a number of group of patients with previous scar has turn out to be a favoured strategy (Birara and Gebrehiwot, 2013). Trial of labour is a safe substitute for those patients having only single lower uterine segment scar. Patients who have a repeated indication for primary cesarean section should be delimitated from experiencing a trial of labour (Stovall et al., 1987). A trial of labour is usually not given after two cesarean sections because multiple cesarean sections are related with numerous problems like placental complication and scar integrity (Tahseen and Griffiths, 2010).

**Aim and Objective**

To study maternal and fetal outcomes in patients with vaginal birth after cesarean section and elective repeat cesarean section.

**MATERIALS AND METHODS**

Study was undertaken in department of obstetrics and gynaecology at KIMS karad. total 180 cases of previous LSCS who were eligible for vaginal delivery were divided into two groups.(group 1- VBAC and group 2- Elective repeat cesarean section) each group was having 90 patients and prospective study was performed.

On admission detailed antenatal history was taken, ANC records were evaluated. Detailed general and obstetric examination was carried out and written informed consent was taken from all patients.

**Group 1 (VBAC)**

Labor was monitored by partograph and electronic fetal heart rate monitoring. Maternal pulse, BP, per vaginal bleeding was checked intervally. Termination of vaginal birth trial was based on partograph, signs of fetal distress (FHS< 110 OR >160 bpm), or suspected scar dehiscence or rupture on clinical examination (maternal tachycardia, scar tenderness, fresh PV bleeding), or non-progress of labor. second stage cut shorted by use of prophylactic vacuum. Third stage was actively managed(AMTSL) according to WHO guidelines.

**Group 2 (Elective repeat cesarean delivery)**

In this group elective cesarean section was planned at completed 38 weeks. operation was done under spinal or general anaesthesia. lower segment cesarean section was done in all cases. Pre operative antibiotic was given to all patients 30 min before surgery.

All patients post delivery were monitored for two hours for pulse ,BP, PV bleeding and urination.

Neonatal outcome were monitored by measuring birth weight, APGAR score at 1min and 5 min. Need of resuscitation and NICU admission.

Perinatal outcome was measured for incidence of RDS and mortality rate.

Maternal outcomes were measured in terms of mode of delivery (VBAC, Emergency cesarean section or elective repeat cesarean section), occurrence of scar dehiscence, scar rupture, PPH, blood transfusion, obstetric hysterectomy, wound sepsis.

**Inclusion Criteria**

Patient with previous one LSCS, with single live fetus at full term with cephalic presentation with adequate pelvis and interpregnancy interval >18 months with indication of previous LSCS being non recurrent.

**Exclusion Criteria**

Patient with more than one LSCS or any other uterine surgery like myomectomy, previous classical or inverted T incision on uterus, current twin pregnancy, scar thickness less than 2mm. malpresentation, pregnancy associated with APH, PIH, GDM or other medical conditions and cephalopelvic disproportion(CPD).

**RESULTS AND DISCUSSION**

The present study was conducted among 180 women having history of previous LSCS to study the maternal and fetal outcome in patients with vaginal delivery and elective cesarean section.

In this study, the Table 1 reveals that in both the group highest cases were from 25-30-year age group, 51.1% and 47.8% respectively in Successful VBAC and LSCS group. Mean age in VBAC was 28.1 year and in LSCS group was 27.3 year. However, the difference in mean age between two group was statistically not significant (p>0.05). In the contrary, in the study done by Bangal VB et al., the most common age group of study participants was 21 to 25 years (39.71%) and mean age of study participants.
Table 1: Comparison of age between VBAC group and LSCS group

| Age (yrs) | Successful VBAC (n=90) | LSCS (n=90) | P value |
|-----------|------------------------|-------------|---------|
|           | Cases | %       | Cases | %       |         |
| <25       | 12    | 13.3%   | 14    | 15.6%   |         |
| 25-30     | 46    | 51.1%   | 43    | 47.8%   |         |
| >30       | 32    | 35.6%   | 33    | 36.7%   |         |
| Total     | 90    | 100.0%  | 90    | 100.0%  |         |
| Mean      | 28.1±3.2 |         | 27.3±2.9 | 0.081   |         |

Table 2: Comparison of BMI between VBAC group and LSCS group

| BMI (kg/m²) | Successful VBAC (n=90) | LSCS (n=90) | P value |
|-------------|------------------------|-------------|---------|
|             | Cases | %       | Cases | %       |         |
| >25 kg/m²   | 18    | 20.0%   | 30    | 33.3%   | 0.043   |
| <=25kg/m²   | 72    | 80.0%   | 60    | 66.7%   |         |
| Total       | 90    | 100.0%  | 90    | 100.0%  |         |

Table 3: Comparison of gestational age in VBAC group and LSCS group

| Gestational Age (wk) on admission | Successful VBAC (n=90) | LSCS (n=90) | P value |
|-----------------------------------|------------------------|-------------|---------|
|                                   | Cases | %       | Cases | %       |         |
| >40 wks                           | 8     | 8.9%    | 18    | 20.0%   | 0.018   |
| <40 weeks                         | 90    | 100.0%  | 72    | 80.0%   |         |
| Total                             | 98    | 108.9%  | 90    | 100.0%  |         |

Table 4: Comparison of inter delivery interval between VBAC group and LSCS group

| Inter-delivery interval | Successful VBAC (n=90) | LSCS (n=90) | P value |
|-------------------------|------------------------|-------------|---------|
|                        | Cases | %       | Cases | %       |         |
| <2 years                | 10    | 11.1%   | 21    | 23.3%   | 0.03    |
| >=2 years               | 80    | 88.9%   | 69    | 76.7%   |         |
| Total                   | 90    | 100.0%  | 90    | 100.0%  |         |

Table 5: Comparison of Bishops score between VBAC group and LSCS group

| Bishop's score | Successful VBAC (n=90) | LSCS (n=90) | P value |
|----------------|------------------------|-------------|---------|
|                | Cases | %       | Cases | %       |         |
| 6 to 9         | 46    | 51.1%   | 81    | 90.0%   | <0.001  |
| 10 to 13       | 44    | 48.9%   | 9     | 10.0%   |         |
| Total          | 90    | 100.0%  | 90    | 100.0%  |         |

Table 6: Type of onset of labor

| Type of Delivery | Successful VBAC (n=90) |
|------------------|------------------------|
|                  | Cases | %       |
| Spontaneous      | 62    | 68.9%   |
| Induced          | 28    | 31.1%   |
| Total            | 90    | 100.0%  |

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Table 7: Duration of active stage of labor

| Duration of active stage of labor (h) | Successful VBAC (n=90) | LSCS (n=90) | P value |
|--------------------------------------|-------------------------|-------------|---------|
|                                      | Cases       | %          | Cases   | %          |            |
| >7hr                                 | 11          | 12.2%      | 22      | 24.4%      | 0.034      |
| <=7hr                                | 79          | 87.8%      | 68      | 75.6%      |            |
| Total                                | 90          | 100.0%     | 90      | 100.0%     |            |

Table 8: Comparison of prior history of vaginal birth between VBAC group and LSCS group

| Prior vaginal birth | Successful VBAC (n=90) | LSCS (n=90) | P value |
|---------------------|-------------------------|-------------|---------|
|                     | cases       | %          | cases   | %          |            |
| Yes                 | 30          | 33.3%      | 18      | 20%        | 0.043      |
| No                  | 60          | 67.7%      | 72      | 80%        |            |
| Total               | 90          | 100%       | 90      | 100%       |            |

Table 9: Comparison of feedback of patients between Successful VABC group and LSCS

| Satisfaction Level     | Successful VBAC (n=90) | LSCS (n=90) | P value |
|------------------------|-------------------------|-------------|---------|
|                       | Cases       | %          | Cases   | %          |            |
| Positive feedback      | 62          | 68.9%      | 52      | 57.8%      | 0.292      |
| Neutral feed back      | 20          | 22.2%      | 26      | 28.9%      |            |
| Negative feed back     | 8           | 8.9%       | 12      | 13.3%      |            |
| Total                  | 90          | 100.0%     | 90      | 100.0%     |            |

was 24.04±3.91 years. This shows that our study has age on higher side compared to them.

In Table 2, more than 25 kg/m2 BMI was found in 18 (20%) cases in successful VBAC group and 30 (33.3%) in LSCS group. The difference between both the group was statistically significant (p<0.05) which indicates that overweight and obesity were significantly higher in LSCS group compared VBAC group. In a study done by Sakiyeva KZ et al. (Abdelazim et al., 2018), mean body mass index was significantly lower in successful VBAC compared with LSCS group (26.6 ± 2.3 versus 26.8 ± 2.1 kg/m², respectively). In the study done by Abdelazim et al., (Landon et al., 2005) they established that the BMI >25 kg/m² was linked with failed trial of labor after previous LSCS. Landon et al. (Landon et al., 2005) testified significantly decreased success rate of VBAC (68.4%) in obese (BMI ≥ 30) than in non-obese (76.9%) women. In their study, Juhasz et al. (Juhasz et al., 2005) established declining probabilities of effective VBAC with increasing BMI. In a study done by Tessmer-Tuck et al., (Tessmer-Tuck et al., 2014) they concluded that VBAC success was individually associated with BMI more than 30, maternal age more than 30 years, prior vaginal delivery and prior VBAC.

In this study Table 3 showed that, more than 40 weeks was found in 8 (8.9%) cases in successful VBAC group and 18 (20%) in LSCS group. The difference between both the group was statistically significant (p<0.05) which indicates that gestational age was significantly higher in LSCS group compared VBAC group. In the study done by Smith et al., (Smith et al., 2005) they concluded that VBAC is likely to be failed at 41–42 gestational weeks compared at 40 weeks. While Coassolo et al. (Coassolo et al., 2005) described 31.3% VBAC failure at 40 gestational weeks or beyond against 22% in less than 40 gestational weeks.

In this study Table 4 showed that, less than 2-year gap was found in 10 (11.1%) cases in successful VBAC group and 21 (23.3%) in LSCS group. The difference between both the group was statistically significant (p<0.05) which indicates that inter-delivery interval was significantly lower in LSCS group compared VBAC group. In a study done by Sakiyeva KZ et al. (Abdelazim et al., 2018), less than 2-year gap was found in 51 (19.8%) cases in successful VBAC group and 73 (12.7%) in LSCS group. The number of women with inter-delivery interval less than 2 years was statistically high in unsuccessful VBAC in comparison with successful VBAC group.
Table 5 reveals that Bishop's score between 6 to 9 was found in 46 (51.1%) cases in successful VBAC group and 81 (90%) in LSCS group. Bishop's score between 10 to 13 was found in 44 (48.9%) cases in successful VBAC group and 9 (10%) in LSCS group. The difference between both the group was statistically significant (p<0.05) which indicates that successful VBAC was associated with better Bishop's score while poor Bishop's score was significantly associated with LSCS. The rate of vaginal delivery was significantly higher in women having Bishop's score between 10 to 13 (94.64%) in comparison to 6 to 9 (61.25%) Raja et al. (Raja et al., 2013) included 100 women in their study and they were studied according to gestational age, Bishop's score, vaginal birth history, indication of the previous caesarean and BMI. They established that the rates of successful VBAC was 38% in women having a score of 0 to 3 while it was 58% in women having a score of 4 to 6. Success rate with a score of 7 to 9 and 10 to 12 were 71 and 86% correspondingly. Raja et al. (Raja et al., 2013) established that higher scores correlated with the higher possibility of VBAC and they also established that score on admission is useful in recommending women with earlier caesarean section for the choice of repeat caesarean delivery or induction of labour.

Table 6 reveals that the Spontaneous labour occurred in 62 cases which contribute 68.9%. In remaining 28 (31.1%) cases labour was induced. Similar observations were made by Bangal et al. They concluded that women with spontaneous onset of labour had more successful VBAC in comparison to women with augmentation of labour.

Spontaneous onset of labour and cautious choice of induction and augmentation of labour in women with previous LSCS raise the accomplishment of VBAC. In a study done by Hochler et al. (Hochler et al., 2014), they concluded that risk of uterine rupture was 0.3% and in their retrospective study to estimate the safety of trial of labour after lower segment caesarean section in multiparous women, two cases resulted in hysterectomy. They established that augmentation or induction of labour increased the risk of uterine rupture and VBAC resulted in a higher risk for hysterectomy. Smith et al. (Smith et al., 2005) established that women with unsuccessful VBAC are at higher risk of perinatal death and uterine rupture.

Belihu et al. (Belihu et al., 2017) found that there are differences in successful VBAC between Australian-born women and Eastern African origin women. Failed VBAC attempt is more common among Eastern African immigrants in comparison to Australian immigrants, signifying the necessity for enhanced strategies to choose and maintain probable contenders for vaginal birth after CS amid these immigrants. There is also need to diminish possible complications related with unsuccessful VBAC attempt.

Minsart et al. (Minsart et al., 2017) studied the Australian and North American women's cohort who delivered in Shanghai. They concluded that they have lesser rates of trial of labour after LSCS and VBAC, whereas the European origin women had the maximum rate of trial of labour after LSCS, trailed by Chinese origin women.

Seffah and Adu-Bonsaffoh from Ghana recommended that satisfactory education and counselling to pregnant women and his family with appropriate choice of patient for labour trial after CS remains the keystone to attain higher VBAC achievement rate with minimal antagonistic outcomes in low-resource settings (Seffah and Adu-Bonsaffoh, 2014).

Mu et al. (Mu et al., 2018) recommended that national guidelines and policies on VBAC are desired to safeguard the protection of the mothers and their new-borns.

Torigoe et al. (Torigoe et al., 2016) concluded that the official policies and practices for VBAC differ broadly in Japan and established that approaches as well as health care providers to pregnant women should support women to consider VBAC as a conceivable birth option after LSCS.

In Table 7, more than 7 hours was found in 11 (12.2%) cases in successful VBAC group and 22 (24.4%) cases in LSCS group. The difference between both the group was statistically significant (p<0.05) which indicates that duration of active stage of labour was significantly higher in LSCS group compared VBAC group. Similar findings were found in a study done by Sakiyeva KZ et al (Abdelazim et al., 2018). In their study, the number of women admitted with duration of active phase of labor >7 hours and cervical dilatation <4 cm was statistically significant on higher side in failed VBAC group compared with successful group. Additionally, Odd’s ratio and logistic analysis of the study participant women showed that the duration of labor ≤7 hours and cervical dilatation ≥4 cm were significantly associated with successful VBAC. While Durnwald et al (Durnwald and Mercer, 2004). Reported increased chances of successful VBAC in women admitted with cervical dilatation ≥1 cm.

Table 8 shows comparison of prior history of vaginal birth between VBAC group and LSCS group. Prior history of vaginal birth was found in 30 (33.3%)
cases in VBAC group and 18 (20%) cases in LSCS group. The difference between both the group was statistically significant (p < 0.05) which indicates that successful VBAC was associated with prior history of vaginal birth.

Mean APGAR score at 1 min was 7.6 and 7.1 in successful VBAC group and LSCS group respectively. The difference between both the group was statistically significant (p < 0.05) which indicates that APGAR score at 1 min was significantly better in VBAC group. Similarly mean APGAR score at 5 min was significantly better in VBAC group compared to LSCS group (p < 0.01).

In this study, one still birth was observed in Successful VBAC group while there was no still birth occurred in LSCS group. In a study done by Bangal et al., out of 136 deliveries, 135 (99.26%) resulted in live birth while perinatal mortality in the form of one foetal still birth was noted.

Mean birth weight was 2832 gram in successful VBAC group and Mean birth weight was 2917 gram in LSCS group. The difference between both the group was statistically not significant (p > 0.05) which indicates that there is no significant difference in birth weight in both the groups. In a study done by Bangal et al., maximum number of the babies’ weight were between 2.500 to 2.999 Kg (60.29%).

Table 9 shows comparison of requirement of Blood Transfusion between Successful VABC group and LSCS group. Blood Transfusion was required in 8 (8.9%) cases in successful VBAC group and 14 (14.4%) in LSCS group. Blood Transfusion was not required in 82 (91.1%) cases in successful VBAC group and 76 (85.6%) in LSCS group. The difference between both the group was statistically not significant (p > 0.05) which indicates that successful VABC was not associated with blood transfusion requirement compared to elective CS after previous LSCS case. Blood Transfusion is an important factor in decision-making for mode of delivery after one cesarean (Gholitarb et al., 2011). Dilemma still exist around the risk of transfusion following VBAC compared to undergoing ERCS at term (Gardner et al., 2014). One review of published VBAC literature found rates of transfusion and hemorrhage did not significantly differ for women who had a trial of vaginal birth compared with an ERCS at the birth after cesarean (Guise et al., 2010). Another found that VBAC at term was associated with twice the rate of transfusion (2% vs 1%) compared with ERCS at term (Hammad et al., 2014). A Danish population-based study found women whose first birth was by caesarean and who intended VBAC, had higher rates of transfusion compared with ERCS (3.2% vs 2.2%) at their second birth (Holm et al., 2012). However, few exclusions when identifying women eligible for VBAC (contraindications such as blood disorders, breech presentations, multiple or preterm births and women with previous uterine surgery were included) and there were no adjusted analyses for the impact of previous obstetric history or other factors associated with transfusion risk following intended VBAC vs ERCS. Similarly, a US cohort study found increased transfusion risk following trial of labor but did not take into account maternal and pregnancy characteristics (Landon et al., 2004).

Scar dehiscence, fever and PPH were found in 2.2%, 6.7% and 2.2% cases respectively in VBAC group while the same was 3.3%, 8.9% and 1.1% respectively in LSCS group. Wound infection was not found in any case in VBAC group while it was found in 3 cases in LASC group. However, occurrence in individual complication was statistically not significant (p > 0.05) between both groups.

In a study done by Bangal et al., 2017 (Bangal et al., 2017) most common maternal complication was fever (7.35%). Other maternal complications were scar dehiscence (3.68%), wound infection (2.21%) and PPH (1.47%). In the study done by Sakiyeva KZ et al. (Abdelazim et al., 2018). Impending rupture of uterus and scar dehiscence was found in 0.38% (1/258) case each among unsuccessful VBAC group in comparison to successful group (P value 0.08).

The comparison of mean hospital stay of mother between Successful VABC group and LSCS group. Mean hospital stay was 2.92 days in Successful VABC group and 6.97 in LSCS group respectively (Abdelazim et al., 2014). The difference between both the group was statistically significant (p < 0.001) which indicates that hospital stay was significantly higher in LSCS compared to VBAC group. (p < 0.01).

Table 9 shows comparison of feedback of patients between Successful VABC group and LSCS group. 62 women give positive feedback in VABC group while 8.9% gave negative feedback. These rate were 57.8 % and 13.3 % respectively in LSCS group. Thus higher number of at inets gave positive feedback for VBAC compared to LASC. However, this difference was statistically non-significant (p < 0.05).

CONCLUSIONS

From present study it can be concluded that in properly selected patients, a trial of vaginal delivery after previous one caesarean section constitutes the best obstetrical management. The significance of vaginal delivery is emphasized because of its minimum
post-partum morbidity, anaesthetic and operative risks. With proper selection, appropriate timing and close supervision trial of vaginal birth eliminates the need for a large proportion of repeat caesarean section.

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**Conflict of Interest**

The authors declare that they have no conflict of interest for this study.

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