

COMPARISON BETWEEN OUTCOMES OF VAGINAL BIRTH WITH TRIAL OF LABOR VERSUS REPEAT CESAREAN SECTION IN FEMALES PRESENTING WITH PREVIOUS ONE CESAREAN SECTION

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ABSTRACT

The increasing rate of cesarean section has become a major concern worldwide, and women with a previous cesarean delivery contribute significantly to repeat cesarean procedures. Trial of labor after cesarean section (TOLAC) provides an option for vaginal birth after cesarean (VBAC), whereas repeat cesarean section remains a commonly preferred mode of delivery. However, differences in maternal and neonatal outcomes between these two approaches require further evaluation, especially in local healthcare settings. This study aims to compare the outcomes of vaginal birth with trial of labor versus repeat cesarean section in females presenting with previous one cesarean section. A quasi-experimental non-randomized trial is conducted at the Department of Obstetrics and Gynecology, Shaikh Zaid Women Hospital, Larkana, involving 264 females divided into two groups: those undergoing trial of labor and those undergoing repeat cesarean section. Participants fulfilling the selection criteria are enrolled through non-probability consecutive sampling after ethical approval and informed consent. Demographic and clinical characteristics including age, gestational age, parity, BMI, booking status, Bishop score, cervical length, and previous vaginal delivery history are recorded. Maternal outcomes including uterine rupture and postpartum hemorrhage, along with neonatal outcomes including neonatal depression, Apgar score, and NICU admission, are assessed. Data analysis is performed using SPSS version 26.0, with comparison between groups using appropriate statistical tests and p -value ≤ 0.05 considered statistically significant. The study provides evidence regarding the maternal and neonatal outcomes associated with trial of labor and repeat cesarean section after one previous cesarean delivery. The findings help in improving counseling strategies and supporting evidence-based decisions regarding the mode of

delivery in women with previous cesarean section.

Introduction

Cesarean section is one of the most common operations in obstetric practice. Rates of cesarean delivery are increasing worldwide. There are many reasons for this trend. One is the rising use of electronic fetal monitoring. The use of operative vaginal delivery has also decreased. There have also been changes in obstetric management. Women with a previous cesarean delivery are an increasing number of these cases, resulting in a greater need for repeated cesarean delivery in many health care settings (Uno et al., 2020). The Pakistan Demographic and Health Survey 2017-2018 shows that the rate of cesarean section deliveries in Pakistan was around 22%. Due to the increase in cesarean deliveries, there is an increased need to identify optimal modes of delivery for women who have previously had cesarean deliveries (Khowaja et al., 2021).

Women with a prior cesarean section have two options for their next delivery. The first option is Trial of Labor after Cesarean (TOLAC), which leads to Vaginal Birth after Cesarean (VBAC). The second option is to have an elective repeat cesarean delivery. TOLAC has the benefit of successful delivery through the vagina, thus decreasing the risk of morbidity from repeated abdominal surgery. However, there is the risk of uterine rupture and other adverse neonatal outcomes. Elective repeat cesarean delivery avoids the morbidity of labor, but increases the risk of complications of surgery and other adverse outcomes (Lennon et al., 2023).

Although various factors favor TOLAC, numerous studies show that there is a continued need for exploration on the safety of this practice. Successful vaginal birth after cesarean section (VBAC) is associated with decreased maternal morbidity and shorter recovery when compared to cesarean delivery. However, an unsuccessful trial of labor can increase the risk to the maternal and neonatal unit. A thorough assessment of the maternal characteristics, previous obstetric history, cervical status, as well as the clinical situation should be taken into consideration when determining the mode of delivery (Yu et al.,

2024). In circumstances of a previous cesarean section, the mode of delivery is typically decided on with the understanding of the benefits and risks by both the healthcare provider and the expectant mother (Yu et al., 2024).

Studies have shown varying results between a trial of labor and cesarean delivery. One study conducted by Studsgaard et al. (2013), researched the outcomes of women who had prior cesarean sections and showed that women who attempted a trial of labor had a high rate of successful vaginal deliveries. Differences were found between the groups concerning maternal outcomes including uterine rupture and postpartum hemorrhage as well as neonatal outcomes including depression and admission to the NICU. Horgan et al. (2022), evaluated trial of labor after cesarean section and showed that labor management and adequate patient selection can reduce the risks to the maternal and neonatal unit. Maternal outcomes, such as uterine rupture and postpartum hemorrhage, continue to be a concern with trial of labor after cesarean delivery. The labor of a patient with a history of cesarean delivery is at risk for uterine rupture due to separation of the cesarean scar. In the event of hemorrhage, blood transfusion is needed and other interventions including surgical measures may be necessary. Neonatal outcomes including Apgar score less than 7, need for resuscitation, and admission to the NICU are also outcomes to consider when reviewing the various modes of delivery (Studsgaard et al., 2013).

Background of the Study

Over the last few decades, the rate of cesarean sections has increased worldwide. Some of the factors attributed to this increase are improved fetal monitoring, less vaginal operative deliveries, change in obstetrician's decision-making, and increased women's preference for cesarean deliveries. Women with a history of cesarean delivery account for a large percentage of repeat cesarean deliveries. This creates a challenge for health care practitioners regarding the management of subsequent pregnancies (Uno et al., 2020).

Rising rates of cesarean deliveries pose a threat to the health care system due to increased costs, surgical workload, and potential negative consequences of repeated abdominal wall surgeries. In the developing countries like Pakistan, increasing cesarean delivery rates have become one of the major public health concerns. As per the Pakistan Demographic and Health Survey 2017-2018, the country's cesarean delivery rate was approximately 22%, highlighting the need to evaluate other safe means of childbirth following a previous cesarean delivery (Khowaja et al., 2021).

When there has been 1 previous cesarean delivery, the healthcare team and patient decide between the risks and benefits of a trial of labor (TOLAB) vs. planned (repetitive) cesarean delivery. A successful trial of labor will result in a vaginal delivery, which has a faster maternal recovery time, as compared to repeat cesarean deliveries. Repeat cesarean deliveries will avoid the potential risks of labor and deliveries, and will expose the mother to the risks of a surgical delivery. Therefore, it is important to understand the maternal and neonatal outcomes for both of the alternatives for evidence-based practice (Yu et al., 2024).

Global Trends of Cesarean Section Rates

Rising cesarean section rates have been observed globally and have been a focus of maternal health research. Some factors that contribute to the increasing rates include the following: change in obstetric practices, improved access to surgical facilities, increasing age of mothers, and changes in patient preferences. Cesarean sections are essential to prevent maternal and fetal adverse outcomes. However, if performed unnecessarily, there will delivery.

be an increased health care burden and exposure of the mother to unnecessary surgical complications (Chen & Mi, 2024).

The increasing rates of cesarean sections have also increased the number of women requiring a decision regarding mode of delivery after previous cesarean birth. For women with one previous cesarean birth, the decision for mode of delivery will depend on the potential risks for the mother and the neonate. Repeat cesarean deliveries are performed due to concerns for the mother regarding uterine rupture. Evidence has shown that with appropriate selection, women can have successful vaginal births after cesarean (Lennon et al., 2023).

Cases of cesarean delivery have increased globally. This is particularly true in low- and middle-income countries. As a result, the costs and strains on already resource constrained health care systems have increased (Khowaja et al., 2021). In this regard, Pakistan is no exception, and appropriate methods for selecting delivery modes following prior cesarean section are needed (Khowaja et al., 2021).

Previous Cesarean Section and Mode of Delivery

Women who have had a prior cesarean delivery are at an increased risk of obstetric complications and often require delivery by cesarean section. This is especially the case if the previous delivery was also by cesarean section. Traditionally, it has been thought that labor should be attempted in women with a previous cesarean delivery, as a repeat cesarean delivery increases the risk of numerous complications associated with a cesarean

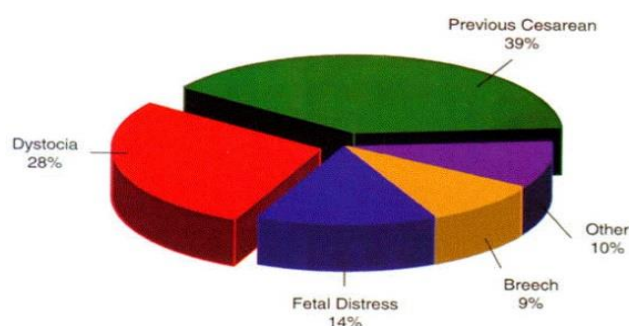


Fig 1.1 Previous Cesarean Section and Mode of Delivery

Recent thinking, however, has suggested that a woman should make a fully informed decision regarding obstetric risks and the potential risks of subsequent cesarean deliveries based on multiple factors (Yu et al., 2024).

Trial of Labor After Cesarean Section (TOLAC)

This means that a woman who has had a prior cesarean delivery is allowed to attempt to achieve vaginal delivery. The TOLAC approach allows the woman to avoid repeat abdominal surgery, as well as, achieve a vaginal birth after cesarean (VBAC). A successful TOLAC is accompanied by a shorter hospital stay, faster recovery, and fewer maternal complications compared to a repeated cesarean section (Yu et al., 2024).

Vaginal Birth After Cesarean Section (VBAC)

Vaginal birth after cesarean (VBAC) refers to the achievement of a vaginal delivery following a prior cesarean delivery. VBAC is viewed as an achievement of TOLAC, as it avoids repeat surgery and potentially decreases the maternal complications associated with cesarean delivery. There are numerous benefits of a successful VBAC, including, less pain and a shorter recovery time, less surgical complications, and improved maternal satisfaction. It is important to note, a failed TOLAC and the ensuing cesarean delivery increases maternal and neonatal risks, compared to a planned repeat cesarean section (Studsgaard et al., 2013). There are multiple factors that contribute to the success of a VBAC. The factors vary from the age of the mother, the reason for the prior cesarean delivery, and the prior vaginal delivery history. Therefore, individual assessment and judgment is important when considering TOLAC.

Repeat Cesarean Section

Repeat cesarean section is defined as the delivery of a fetus through a surgical incision of the abdomen and uterus in a woman who has had prior cesarean deliveries. It is most commonly performed as an elective procedure, due to a variety of maternal and obstetric factors, such as, prior adverse obstetric history,

placental conditions, and other factors (Deng et al., 2021).

Maternal Outcomes Associated with TOLAC and Repeat Cesarean Section

Major maternal complications include uterine rupture, postpartum hemorrhage, and infection and surgical morbidity. Uterine rupture is a serious complication of trial of labor after cesarean. It requires immediate diagnosis and management (Studsgaard et al., 2013).

Postpartum hemorrhage is also a major complication of labor and birth. Some studies have shown a difference in the amount of blood loss associated with vaginal birth and cesarean delivery. Studsgaard et al. (2013) found variations in rates of postpartum hemorrhage among women in trial of labor and in the repeat cesarean section group. The evaluation of maternal and neonatal outcomes assists in determination of safety and informed choice of delivery method after cesarean.

Neonatal Outcomes Associated with Different Delivery Modes

When considering neonatal outcomes with the different delivery methods, the Apgar score and neonatal depression are considerations, along with the need for resuscitation and NICU admission. There is a potential that an unsuccessful trial of labor leads to an emergency cesarean delivery, which negatively affects neonatal outcomes. In contrast, a successful VBAC may give neonatal outcomes comparable to a planned repeat cesarean delivery (Horgan et al., 2022). Studies have reported that neonatal outcomes in the TOLAC group are similar to those of the repeat cesarean section group and further emphasize the need for effective management during labor (Studsgaard et al., 2013).

Rationale of the Study

Women are increasingly experiencing repeat cesarean sections. Limited evidence in Rwanda describes what happens during childbirth after a previous cesarean section. There is a high likelihood that women undergo repeated cesarean delivery because of the lack of information about the benefits and risks of a

trial of labor. Variability in studies on maternal and neonatal outcomes calls for an assessment in the local setting.

This research presents evidence regarding a comparison of vaginal birth after a trial of labor and a repeat cesarean section in women with one prior cesarean section. The results can be used by health care practitioners to counsel women on the benefits and risks of different delivery methods and make an informed decision regarding the type of delivery for women with one previous cesarean section.

Objective of the Study

This study aims to compare the outcomes of vaginal birth after a trial of labor to those of a repeat cesarean section in women with one prior cesarean delivery. The study evaluates maternal outcomes such as uterine rupture and postpartum hemorrhage as well as neonatal outcomes such as neonatal depression, Apgar score, and length of stay in the Neonatal Intensive Care Unit (NICU).

REVIEW OF LITERATURE

More women are seeking deliveries with a previous cesarean section (PCS) as cesarean section rates have increased worldwide. Many factors influence the decision regarding mode of delivery for women with a previous cesarean section, including counseling on the risks and benefits of both options. Ultimately, the aim of the healthcare team is to optimize the outcomes for both the mother and child. Uno et al. (2020) examined the factors influencing women's mode of delivery decisions for women with a previous cesarean section and found the women's perception of the previous cesarean section was one of the most influential factors on the decision-making process and the success of trial of labor. Women often report that they feel better prepared to engage in the decision-making process regarding mode of delivery when they are provided with a thorough explanation of the available options. Lennon et al. (2023) also examined the decision-making process for women when faced with a choice between a TOLAC and VBAC and also found that women with a previous lower segment cesarean section consider numerous factors and often rely on their healthcare provider to help

interpret their risks and benefits of potential complications. C&M (2024) performed a meta-analysis looking at TOLAC vs. elective repeat CS. Different maternal and neonatal outcomes were noted for each group, highlighting the need for adequately choosing candidates for TOLAC. Both the possible benefits and risks for each mode of delivery need to be taken into account. Yu et al. (2024) conducted a systematic review with meta-analysis looking at SDM for mode of delivery after Cesarean section. It was noted that SDM increased the level of patient participation and helped understand the pros and cons of TOLAC and repeat CS. The study emphasized on the communication between healthcare professionals and the expecting mother in making an informed decision regarding mode of delivery.

The benefits of a successful TOLAC include a vaginal delivery and avoiding abdominal surgery. Achieving a successful VBAC shortens hospital stay and enhances maternal health. However, complete monitoring of labor is warranted to minimize the risk of uterine rupture. S (2013) compared the outcome of women who chose trial of labor vs. repeat CS, and noted that the group who opted for VBAC was able to achieve their goal in a significant number of cases. Fetal, neonatal, and maternal outcomes were taken into account.

Increasing rates of cesarean section are also a challenge in the developing countries including Pakistan. Khowaja et al. (2021) evaluated factors contributing to increasing cesarean section rates in Pakistan and mentioned several, including practices of healthcare workers, preferences of childbearing women, and limited knowledge of alternative delivery methods. The study advocated for evidence-based approaches to overcome the barriers of reducing unnecessary cesarean deliveries and maintaining the safety of the mother and fetus. Deng et al. (2021) evaluated factors contributing to the rise in cesarean deliveries and described that maternal request and influence of the health care worker and clinical indications were some of the contributing factors to the rising trend of cesarean deliveries. The study emphasized the importance of

considering both, maternal preferences and evidence-based recommendations.

Evidence Regarding TOLAC Success Rate

Vaginal birth after cesarean (VBAC) is the outcome of a successful trial of labor after cesarean (TOLAC). The success of TOLAC depends on the condition of the mother and the previous deliveries. For a mother to qualify for TOLAC, her previous delivery (cs) and the reason for the cs should be evaluated. Maternal age, cervical status, and gestational age should also be assessed.

Literature has reported favorable outcomes for TOLAC. It has also been reported that a high

number of women achieved a vaginal birth following a TOLAC. The studies also reported that TOLAC is a good option for mothers who qualify, and the necessary services and support are available. It should, however, be noted that the conditions in the available literature were favourable to TOLAC and may not always be the case elsewhere.

Chen and Mi (2024) performed a meta-analysis to evaluate maternal and neonatal outcomes for TOLAC vs elective repeat cesarean delivery. The authors noted the outcomes vary based on the selection of the TOLAC candidates and clinical management.

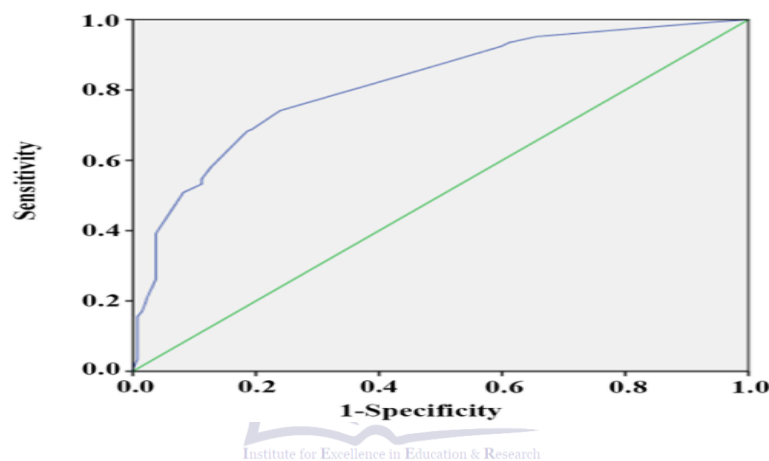


Fig 2.1 Evidence Regarding TOLAC Success Rate

According to Yu et al. (2024), the shared decision-making process between health care professionals and pregnant women improves the understanding of the benefits and risks of TOLAC, therefore women are able to make informed decisions regarding their delivery method.

Evidence Regarding Repeat Cesarean Sections

A planned cesarean section delivery is performed on women who have previously delivered by cesarean section. It is a commonly chosen delivery method due to the concerns for uterine rupture and the potential complications of labor after a cesarean delivery. A cesarean section delivery provides a controlled and predictable method of delivery, but it is associated with the risks of surgery.

Deng et al. (2021) mentioned that maternal request, health care provider influences, and

clinical factors, play a role in the decision-making process for cesarean section delivery. While the first cesarean section eliminates the concern for the uterus rupturing during labor, it creates risks for the women for surgery, like infection and bleeding, and prolongs the recovery time. Repeat cesarean deliveries may increase the risk of complications for future pregnancies, such as having the placenta previa and placenta accreta. Therefore, a repeat cesarean section should be considered carefully, especially if the women desires to have additional children.

Lennon et al. (2023) indicated that women choose to have an elective repeat cesarean section due to perceived safety, and fear of complications that may occur during labor. However, the study stresses on the importance of balanced counseling for both options: repeat cesarean section and TOLAC.

Comparison of Maternal Outcomes Between TOLAC and Repeat Cesarean Section

Assessment of alternative delivery methods after a previous cesarean section involves risk profiles. The potential benefits and adverse outcomes of each method need to be considered.

TOLAC may decrease maternal morbidity by avoiding major abdominal surgery and its associated postoperative pain and facilitating a quicker recovery. However, TOLAC may increase maternal risks if it is unsuccessful. Cesarean section may be associated with less maternal risks, but it is still associated with surgical risks. Chen and Mi (2024) compared

evaluation of potential maternal outcomes. TOLAC and cesarean section have different

maternal outcomes between trial of labor and elective repeat cesarean sections and noted the need for personalized approach based on maternal and obstetric considerations.

Uterine Rupture

Uterine rupture is a complication of TOLAC and occurs when the scar of a prior cesarean section separates during labor. This is considered an obstetrical emergency and may lead to maternal and neonatal morbidity.

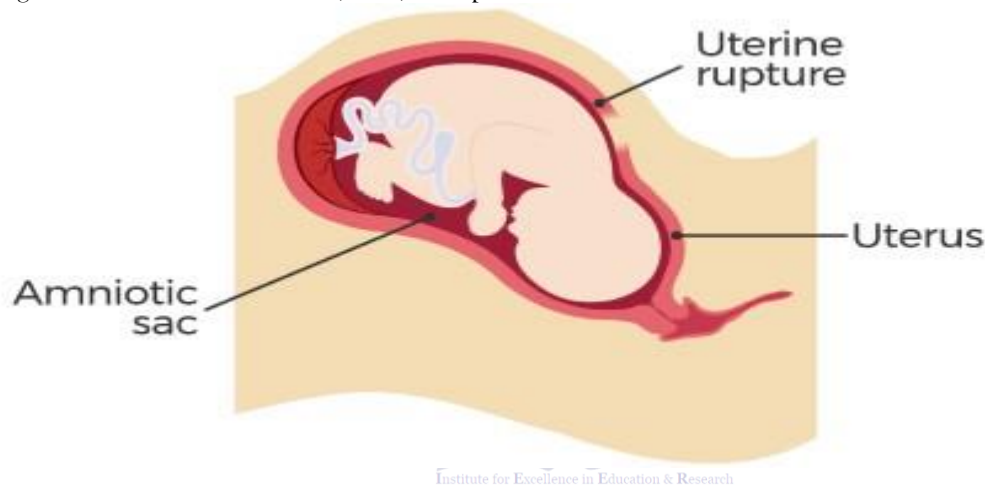


Fig 2.2 Uterine Rupture

The risk of uterine rupture is of primary concern during the counseling of women considering TOLAC. The overall risk of uterine rupture depends on the type of prior cesarean section incisions, the number of prior cesarean sections, and how labor is managed.

Studsgaard et al. (2013) and Horgan et al. (2022) reported the importance of continuous labor assessment and the selection of appropriate patients undergoing TOLAC, as well as the need for appropriate emergency obstetric care.

Postpartum Hemorrhage

While postpartum hemorrhage can occur with either vaginal birth or cesarean delivery, it is often associated with vaginal birth. Postpartum hemorrhage leads to a lot of morbidity, and requires recognition and immediate treatment.

Studsgaard et al. (2013) studied postpartum hemorrhage among women who had a trial of labor versus those who had a repeat cesarean section and found differences among the groups. Assessing blood loss is important when evaluating the outcome of child birth.

Maternal Morbidity

Maternal morbidity refers to the adverse health conditions that can happen to a woman during and after childbirth. These conditions include infections, surgical complications, blood transfusions, long hospital stays and other health complications.

Successful VBAC can reduce surgical complications associated with abdominal delivery. However, TOLAC that results in an emergency cesarean section can lead to increased maternal complications.

Complications associated with repeat cesarean sections can increase maternal morbidity. Therefore, while assessing maternal outcomes, a comparison of different types of deliveries is imperative to identify the optimal method for a woman and her baby.

Comparison of Neonatal Outcomes

When comparing TOLAC to repeat cesarean section, neonatal outcomes such as neonatal depression, Apgar scores, and need for resuscitation and NICU admission need to be assessed.

There are some complications that can occur during labor and birth that affect the neonate. The mode of delivery can impact the neonates' wellbeing. It is imperative that there is effective monitoring and that appropriate interventions are instituted in a timely manner to mitigate adverse outcomes for the neonate.

Neonatal Depression

Neonatal depression is evaluated by clinical signs such as low Apgar score and the need for postnatal resuscitation. It is an essential neonatal outcome to evaluate the methods of childbirth. Horgan et al. (2022) evaluated neonatal outcomes following a trial of labor after cesarean and noted the significance of assessing the condition of the neonate following childbirth. It is vital to recognize neonatal depression and provide postnatal resuscitation in order to minimize neonatal complications.

Apgar Score

Apgar score is a way to evaluate the condition of a newborn by assessing breathing, heart, muscle tone and other signs. A low score indicates neonatal distress, and the need for immediate resuscitation. Many studies that evaluate the methods of childbirth following cesarean section compare neonatal outcomes and use Apgar score to evaluate neonatal outcomes. Studsgaard et al. (2013) reported differences in neonatal depression and Apgar related outcomes between the trial of labor and repeat cesarean groups, and highlighted the importance of assessing the neonate after childbirth.

NICU Admission

Admission to a neonatal intensive care unit (NICU) is an indicator of neonatal complications. It may be due to various reasons such as respiratory issues, low Apgar score, neonatal depression or complications during delivery.

NICU admission rates in the TOLAC and repeat cesarean section groups have been reported to vary in previous studies. Horgan et al. (2022) stated that with the appropriate selection of TOLAC candidates and through appropriate monitoring, some of the neonatal complications can be prevented.

Previous Studies and Research Gap

Results of TOLAC and repeat cesarean sections have been the focus of previous studies, but the results remain inconsistent due to different study populations, differences in the health care settings and practices. Some studies documented the advantages of successful vaginal births after cesarean delivery, and other studies reported the negative aspects of trial of labor.

Studsgaard et al. (2013) studied trial of labor compared to repeat cesarean delivery, and reported differences in the outcomes of the two groups, including uterine rupture, neonatal depression and NICU admission. Horgan et al. (2022) studied cases of TOLAC and emphasized the need for appropriate selection of the patients for TOLAC.

Though there are international studies on this topic, no similar research studies are available in Pakistan to compare and analyze the outcomes of TOLAC and repeat cesarean sections. Since there are differences in the health care facilities and practices, there is a need to document and publish local evidence. This study aims to fill this research gap by analyzing the outcomes of vaginal births with trial of labor versus repeat cesarean deliveries for women who have previously delivered via cesarean section.

MATERIALS AND METHODS

This study is a quasi-experimental trial (non-randomized trial) designed to compare the outcomes of vaginal birth with trial of labor versus repeat cesarean section in females

presenting with previous one cesarean section. The study evaluates and compares maternal and neonatal outcomes between females undergoing trial of labor after cesarean section and those undergoing repeat cesarean section.

Study Setting

The study is conducted in the Department of Obstetrics and Gynecology, Shaikh Zaid Women Hospital, Larkana. The department provides comprehensive obstetric care services, including management of women with previous cesarean delivery requiring decisions regarding mode of delivery.

Study Duration

The study duration is 6 months after approval of the synopsis by the College of Physicians and Surgeons Pakistan (CPSP).

Selection Criteria

Inclusion Criteria

- Females fulfilling the following criteria are included in the study:
- Age between 20–40 years
- Parity less than 5
- Gestational age greater than 37 weeks according to last menstrual period
- Both booked and unbooked females
- History of previous one cesarean section
- Interpregnancy interval of more than 12 months after previous cesarean section

Exclusion Criteria

- Females with the following conditions are excluded:
- Chronic or gestational hypertension (BP $\geq 140/90$ mmHg or use of aspirin)
- Diabetes mellitus (OGTT >186 mg/dl)
- Thyroid dysfunction (TSH >5 IU)
- Infection diagnosed through blood investigations
- Abnormally located placenta on ultrasound examination
- Requirement of emergency cesarean section

Sample Size

The sample size is calculated using the WHO sample size calculator. A total of 264 females are included in the study, with 132 females assigned to each group. The sample size calculation is based on a 5% significance level, 80% power of study, and postpartum hemorrhage rates of 9.5% in vaginal delivery and 2.3% in repeat cesarean section groups.

Sampling Technique

A non-probability consecutive sampling technique is used for recruitment of study participants.

Study Population

The study population comprises females presenting with previous one cesarean section at term pregnancy and fulfilling the predefined eligibility criteria

Data Collection Procedure

After obtaining approval from the ethical board and CPSP, females fulfilling the inclusion criteria are enrolled from the labor room after obtaining written informed consent. Demographic and clinical information, including age, gestational age, parity, BMI, booking status, occupation, lifestyle status, Bishop score at presentation, cervical length, and history of vaginal delivery before previous cesarean section, is recorded.

The participants are divided into two groups. Group A consists of females undergoing trial of labor after cesarean section, whereas Group B consists of females undergoing repeat cesarean section according to the study criteria.

Maternal outcomes are assessed through evaluation of uterine rupture during labor or repeat cesarean section and postpartum hemorrhage after delivery. Neonatal outcomes are assessed through Apgar score, requirement of resuscitation, neonatal depression, and NICU admission. All participants are followed for 24 hours after delivery, and collected information is documented on a structured proforma.

Operational Definitions

Repeat Cesarean Section

Repeat cesarean section is defined as delivery of the fetus through an abdominal incision in

females who have a previous history of cesarean delivery. The procedure is performed according to maternal request, placenta-related problems, or antepartum hemorrhage.

Uterine Rupture

Uterine rupture is defined as disruption of the uterine wall at the site of previous cesarean scar, identified during labor or at the time of repeat cesarean section.

Postpartum Hemorrhage

Postpartum hemorrhage is defined as blood loss greater than 500 ml after vaginal delivery or greater than 1000 ml after cesarean section.

Neonatal Depression

Neonatal depression is defined as an Apgar score less than 7 at 5 minutes with the requirement of neonatal resuscitation.

NICU Admission

NICU admission is defined as admission of a neonate requiring specialized care due to poor Apgar score and need for resuscitation.

Data Analysis

Data entry and analysis are performed using SPSS version 26.0. Normality of quantitative variables is assessed using the Shapiro-Wilk test. Mean and standard deviation are calculated for quantitative variables including age, height, weight, BMI, gestational age, Bishop score, and cervical length.

Frequency and percentage are calculated for categorical variables including parity, booking status, occupation, lifestyle status, previous vaginal delivery history, and study outcomes. Comparison of maternal and neonatal outcomes between both groups is performed using the chi-square test. A p-value ≤ 0.05 is considered statistically significant.

RESULTS ANALYSIS

A total of 264 females with previous one cesarean section were included in this study. Participants were divided into two groups: Group A consisted of 132 females undergoing trial of labor after cesarean section (TOLAC), while Group B consisted of 132 females undergoing repeat cesarean section.

The mean age of participants in the TOLAC group was 29.4 ± 4.2 years, while the mean age in the repeat cesarean group was 30.1 ± 4.5 years. The mean gestational age was comparable between both groups. Most participants belonged to the age group of 25–35 years.

Table 4.1: Demographic Characteristics of Study Participants

Variables	TOLAC Group (n=132)	Repeat Cesarean Group (n=132)
Mean age (years)	29.4 ± 4.2	30.1 ± 4.5
Gestational age (weeks)	38.3 ± 1.1	38.5 ± 1.0
Mean BMI (kg/m ²)	27.1 ± 3.4	27.8 ± 3.6
Parity ≥ 2	86 (65.2%)	89 (67.4%)
Booked females	94 (71.2%)	97 (73.5%)
Previous vaginal delivery	28 (21.2%)	25 (18.9%)

Comparison of Baseline Characteristics Between Groups

Baseline characteristics were compared between both groups to assess the similarity of participants before evaluation of outcomes. No

statistically significant differences were observed regarding age, gestational age, BMI, parity, booking status, and previous vaginal delivery history ($p > 0.05$).

Table 4.2: Comparison of Baseline Characteristics Between Groups

Characteristics	TOLAC Group	Repeat Cesarean Group	p-value
Age (years)	29.4 ± 4.2	30.1 ± 4.5	0.214

Gestational age	38.3 ± 1.1	38.5 ± 1.0	0.321
BMI	27.1 ± 3.4	27.8 ± 3.6	0.156
Previous vaginal delivery	28 (21.2%)	25 (18.9%)	0.642
Bishop score	6.8 ± 1.9	5.9 ± 1.7	0.083

Maternal Outcomes Comparison

Maternal outcomes were compared between females undergoing TOLAC and repeat cesarean section. The evaluated outcomes included successful vaginal birth after TOLAC, uterine rupture, and postpartum hemorrhage.

Rate of Successful Vaginal Birth After TOLAC

Among the 132 females who attempted trial of labor, successful vaginal birth after cesarean was achieved in 92 (69.7%) females, whereas 40 (30.3%) females required cesarean delivery due to failed trial of labor.

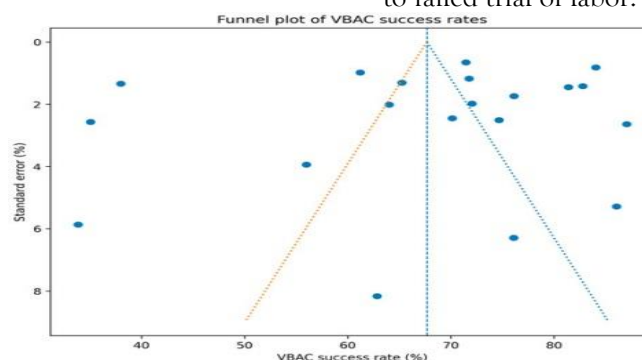


Fig 4.1 Rate of Successful Vaginal Birth After TOLAC

Table 4.3: Successful Vaginal Birth After TOLAC

Outcome	Frequency	Percentage
Successful VBAC	92	69.7%
Failed TOLAC	40	30.3%

Uterine Rupture

Uterine rupture was observed in 3 (2.3%) females in the TOLAC group, whereas no case

of uterine rupture was observed in the repeat cesarean group.

Table 4.4: Comparison of Uterine Rupture Between Groups

Outcome	TOLAC Group (n=132)	Repeat Cesarean Group (n=132)	p-value
Uterine rupture	3 (2.3%)	0 (0%)	0.081
No rupture	129 (97.7%)	132 (100%)	

Postpartum Hemorrhage

Postpartum hemorrhage occurred in 12 (9.1%) females in the TOLAC group and 5 (3.8%) females in the repeat cesarean group.

Table 4.5: Comparison of Postpartum Hemorrhage Between Groups

Outcome	TOLAC Group	Repeat Cesarean Group	p-value
Postpartum hemorrhage	12 (9.1%)	5 (3.8%)	0.098
No postpartum hemorrhage	120 (90.9%)	127 (96.2%)	

Neonatal Outcomes Comparis

Neonatal outcomes were evaluated through Apgar score, neonatal depression, and NICU admission among newborns delivered through both delivery methods.

Apgar Score Findings

Apgar score at 5 minutes was assessed among newborns in both groups. Most newborns had satisfactory Apgar scores.

Table 4.6: Comparison of Apgar Score Between Groups

Apgar Score at 5 Minutes	TOLAC Group	Repeat Cesarean Group	p-value
≥7	124 (93.9%)	127 (96.2%)	0.431
<7	8 (6.1%)	5 (3.8%)	

Neonatal Depression

Neonatal depression was observed in 8 (6.1%) newborns in the TOLAC group and 5 (3.8%) newborns in the repeat cesarean group.

Table 4.7: Comparison of Neonatal Depression Between Groups

Outcome	TOLAC Group	Repeat Cesarean Group	p-value
Neonatal depression	8 (6.1%)	5 (3.8%)	0.431
No neonatal depression	124 (93.9%)	127 (96.2%)	

NICU Admission

NICU admission was required for 14 (10.6%) newborns in the TOLAC group and 9 (6.8%) newborns in the repeat cesarean group.

Table 4.8: Comparison of NICU Admission Between Groups

Outcome	TOLAC Group	Repeat Cesarean Group	p-value
NICU admission	14 (10.6%)	9 (6.8%)	0.286
No NICU admission	118 (89.4%)	123 (93.2%)	

Statistical Analysis of Study Outcomes

The collected data were analyzed using SPSS version 26.0. Quantitative variables were expressed as mean and standard deviation, while categorical variables were presented as frequencies and percentages. The chi-square test was applied to compare maternal and neonatal outcomes between the TOLAC and repeat cesarean groups. A p-value ≤ 0.05 was considered statistically significant.

The analysis showed that successful vaginal birth was achieved in a considerable proportion of females undergoing TOLAC. Differences were observed between groups regarding maternal and neonatal outcomes; however, most comparisons did not demonstrate statistically significant differences ($p > 0.05$).

DISCUSSION

This study examines and compares maternal and neonatal outcomes of vaginal birth after cesarean (VBAC) versus repeat cesarean section (CS) among women with a single prior CS. This study found VBAC to be an alternative mode of delivery for women who are motivated and appropriately selected and provides evidence that a significant number of women in the trial of labor after cesarean (TOLAC) group achieved successful vaginal birth after cesarean (VBAC). Successful vaginal birth after cesarean was accomplished in a large majority of participants of the TOLAC group of the present study and, therefore, pregnancy alone with a prior cesarean delivery does not warrant a repeat CS in all cases.

Tailored counseling and the formation of a partnership between the expectant mother and the health care providers involved in her care yield the best outcomes in a given case and enabled successful TOLAC in a significant proportion of this study's participants.

Uterine rupture and postpartum hemorrhage are major maternal complications of TOLAC. This study examined the occurrence of such complications and determined the safety of each delivery method. The incidence of uterine rupture in women undergoing TOLAC is relatively low if women are adequately selected and carefully monitored during labor. Neonatal outcome measures, such as the Apgar score, neonatal depression, and NICU admission, help determine the safety of the methods of delivery.

Comparison with Previous Studies

The present study's results regarding outcomes of TOLAC and repeat cesarean section align with previous studies. Studsgaard et al. (2013) reported that a large number of women in their study group who had a TOLAC achieved vaginal delivery. Studsgaard et al. (2013) also discussed the importance of selecting the right candidate for TOLAC. They analyzed maternal and neonatal outcomes and reported complications such as uterine rupture and postpartum hemorrhage and neonatal depression and NICU admissions.

Horgan et al. (2022) discussed the outcomes of TOLAC and also reported that candidate selection plays a major role in the successful outcome of TOLAC and the level of emergency obstetric care available. Like the present study, they also reported that TOLAC can be a good option for a woman with a history of cesarean delivery.

Chen and Mi (2024) in their study, which was a meta-analysis of TOLAC and elective repeat cesarean section, reported maternal and neonatal outcomes of the two groups. They concluded that both approaches have risks and benefits and that personalized decisions should be made based on individual patients.

The results of the present study also support the results reported by Yu et al. (2024) who emphasized the role of shared decision-making after a cesarean delivery.

Discussion of Maternal Outcomes

Maternal outcomes are important indicators to assess the success of trial of labor after cesarean (TOLAC) compared to repeat cesarean section in clinical studies. This research assessed successful vaginal birth (including uterine rupture and postpartum hemorrhage) as maternal outcomes.

Successful VBAC provides several maternal benefits, including avoidance of abdominal surgery, less postoperative pain, and a shorter recovery period compared to women undergoing repeated cesarean section. On the other hand, TOLAC failure increases the maternal complication rate due to unplanned surgery. TOLAC is associated with several risks to the woman and fetus. The most serious complication of TOLAC is uterine rupture. Studies have shown that there is a risk of unplanned emergency surgery even if continuous electronic fetal heart rate monitoring is done. In this study, the possibility of uterine rupture was considered as a serious safety outcome.

Postpartum hemorrhage is also an important maternal outcome and is associated with both vaginal and cesarean deliveries. In this study, the differences in blood loss in different methods of delivery were considered, including the type of labor and whether there were obstetrical complications or emergencies. TOLAC, compared to cesarean section, is associated with less postpartum blood loss, and this is evident from the results of the study by Studsgaard et al. (2013), who reported that there is a difference in postpartum hemorrhage in the TOLAC and repeat cesarean section groups.

Repeat cesarean delivery eliminates the risk of uterine rupture. However, surgical complications, such as postoperative infection, bleeding and anesthesia related complications, and an increased recovery time are some of the other risks associated with this procedure. Repeated cesarean deliveries may also increase the risks of the subsequent pregnancy, mainly due to abnormal changes in the placenta and adhesions (Lennon et al., 2023).

Neonatal Outcome Discussion

The evaluation of neonatal outcomes plays an important role when assessing the safety of various delivery methods after the previous cesarean section. The present study assesses neonatal outcomes through Apgar scores, neonatal depression, and NICU admission.

The Apgar score evaluates the adaptation of a newborn immediately after birth and a low score may indicate neonatal distress. Resuscitation may be required. The present study compared Apgar scores of neonates delivered through TOLAC and repeat cesarean section.

Neonatal depression is characterized by a low Apgar score, need for resuscitation, and other adverse neonatal outcomes. Neonatal outcomes are determined by the progress of labor and the need for emergency interventions and maternal conditions.

Studsgaard et al. (2013) reported neonatal depression of the TOLAC group and NICU admission in the study and control groups. Horgan et al. (2022) highlighted the need to properly monitor TOLAC and intervene as required to avert neonatal adverse outcomes. NICU admission is an indication of neonatal morbidity and may be due to respiratory distress, low Apgar score, or the need for advanced care. Improving neonatal outcomes is a priority and may be achieved by the proper selection of candidates for TOLAC and timely management of complications.

Clinical Implications of Findings

There are many clinical applications of the results of the current study related to the management of women with a previous one cesarean delivery. The study supports consideration of TOLAC as a mode of delivery for women with appropriate selection, adequate monitoring and emergency obstetric care. It is important for healthcare workers to provide balanced counseling on the advantages and disadvantages of TOLAC and cesarean delivery to women with a previous cesarean delivery, if they wish to carry out a trial of labor.

Prior obstetric history, the present pregnancy and the condition of the mother herself, will determine the mode of delivery.

The results of the study can aid clinicians in their selection of mode of delivery, and reduce

the number of unfounded repeat cesarean sections. Awareness of the options available helps women take an active role in their care and, ultimately, improve outcomes for the mother and baby.

Longer term effects of different methods of delivery on the mother and baby must be studied to gain a comprehensive understanding of the effects of different methods of delivery on the family unit.

CONCLUSION

RECOMMENDATIONS

This study investigates maternal and neonatal outcomes associated with Trial of Labor after Cesarean (TOLAC) vs. Repeat Cesarean (RC) in women with a previous single Cesarean Section (CS). Results show that TOLAC is a viable option in women with a previous Cesarean Delivery (CD) and may include benefits of a vaginal delivery such as no additional abdominal surgery and less surgical complications.

Uterine rupture is a major concern with TOLAC, however, occurs infrequently with the right patient selection, continuous monitoring and timely access to emergency obstetric care. Other complications and outcomes for the mother should be equally monitored and considered, during both a trial of labor and a repeat cesarean.

Outcomes for the neonate, such as Apgar scores and neonatal depression as well as NICU admission, are important when considering the safest means of delivery after a previous Cesarean. Both TOLAC and RC have benefits and risks and the ultimate decision should reflect an individualized assessment by the mother.

This study provides outcomes of TOLAC and RC to allow for better informed decision-making and counseling of women with a previous CD regarding what options are available to them. The authors believed that the right counseling may reduce the number of unwanted repeat Cesareans performed.

AND

Recommendations

The following recommendations are provided, based on the results of the study

- Women with one previous cesarean section delivery should be counseled regarding the advantages and disadvantages of both a trial of labor and a repeat cesarean section.
- Women wishing to undergo a TOLAC should be assessed based on their previous obstetric history, current obstetric condition, and the availability of emergency obstetric interventions.
- Healthcare workers should promote shared decision-making to enable women to make an informed choice about the potential benefits and risks associated with different modes of delivery.
- Hospitals should ensure that women requesting a trial of labor are monitored continuously and that an obstetric team and operating room resources are immediately available should a cesarean section be required.
- Appropriate evaluation of labor and evidence-based decision-making should be practiced to avoid unnecessary repeat cesarean sections.
- Awareness programs should be initiated to educate women about delivery options after a previous cesarean section.

Limitations of Study

- This study has several limitations that should be taken into account when interpreting the results.
- The results were obtained from a single healthcare center, and therefore may limit the generalizability to other healthcare centers.
- The sample size was small and may not represent all women with previous cesarean deliveries.
- The current study includes only women with a single previous cesarean delivery. Therefore, the study limitations should be considered when drawing conclusions regarding women with multiple previous cesarean deliveries.
- The study was limited to evaluating women's decisions to undergo labor, and
- the impacts of other factors, including psychological influences and previous delivery experiences.

- Long-term maternal and neonatal outcomes of delivery were not assessed due to limited study duration.

Future Research Directions

Future studies can be focused on larger-scale studies that span several locations to evaluate safety and efficacy of TOLAC versus repeat cesarean section. Long-term studies can evaluate the well-being of mothers, future pregnancies and the development of children born through different kinds of deliveries. Predictive models for VBAC may also be researched. Research on the effects of various counseling and shared decision-making practices, as well as education of patients with past cesarean section, may also provide insights for improved delivery-related decisions. Factors affecting the TOLAC policy in the health care system can also be researched to help with improving maternal health care practices.

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