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MATERNAL OUTCOME OF INDUCTION OF LABOR IN PREGNANT WOMEN WITH PREVIOUS SCAR

Original Research

Asma Jamil[1]*, Saima Parveen[2], Tabassum[2], Parveen Naveed[3]
[1]Postgraduate Resident, Department of Obstetrics & Gynaecology, Saidu Teaching Hospital, Swat, KPK, Pakistan.
[2]Assistant Professor, Department of Obstetrics & Gynaecology, Saidu Teaching Hospital, Swat, KPK, Pakistan.
[3]Associate Professor, Department of Obstetrics & Gynaecology, Saidu Group of Teaching Hospitals, Swat, KPK, Pakistan.
Corresponding Author: Asma Jamil, Postgraduate Resident, Department of Obstetrics & Gynaecology, Saidu Teaching Hospital, Swat, KPK, Pakistan, asmajamil586@gmail.com
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ABSTRACT

Background: Induction of labor (IOL) in women with a previous cesarean section remains a clinically sensitive decision due to concerns about uterine rupture and maternal morbidity. However, when carefully selected, IOL may provide a safe and effective alternative to repeat cesarean delivery. Prostaglandin E2 (PGE2) is commonly used for cervical ripening and has shown favorable outcomes in inducing labor. This study aimed to evaluate the maternal outcome of labor induction in women with a history of one prior lower segment cesarean section.

Objective: To determine the maternal outcome of induction of labor in pregnant women with a previous cesarean scar.

Methods: This descriptive study was conducted at the Department of Obstetrics and Gynecology, Saidu Sharif Medical College, Swat, from 27th June 2024 to 27th December 2024. A total of 145 pregnant women aged 15 to 40 years with a single previous lower segment cesarean section and confirmed second or third trimester pregnancies were enrolled using non-probability consecutive sampling. Induction was carried out using prostaglandin E2 (1.5 mg vaginal tablets) administered every 8 hours, with a maximum cumulative dose of 18 mg. Maternal outcomes were categorized as successful vaginal delivery or cesarean section. Data were analyzed using SPSS version 20.

Results: The mean maternal age was 28.76 ± 7.44 years, and the mean gestational age was 34.06 ± 4.57 weeks. Mean duration since previous uterine scar was 23.08 ± 5.15 months, and 30.3% of participants had a history of prior vaginal delivery. Successful vaginal delivery was achieved in 79 women (54.5%).

Conclusion: Labor induction using prostaglandin E2 in women with one prior cesarean scar can result in favorable vaginal delivery outcomes when patient selection and clinical monitoring are appropriately conducted.

Keywords: Cesarean Section, Induced Labor, Maternal Outcome, Prostaglandins, Uterine Scar, Vaginal Birth, Women.

Maternl Outcome of Induction of Labor in Pregnant Women with Previous Scar

BACKGROUND

- Induction of labor (IOL) offers an alternative to repeat cesarean delivery in women with a prior scar.
- Prostaglandin E, is used for cervical ripening and labor induction

METHODS

- Descriptive study at Saidu Sharif Medical College, Swat
- 145 pregnant women aged 15-40 years with one previous lower segment cesarean section
- Prostaglandin E_7 (1.5 mg vaginal tablet) every 8 houirs, up to 15 mg
- Maternal outcome: successful vaginal delivery or cesarean secton

RESULTS

- Mean age: 28,76 y years
- Mean gestational age: 34,06 weeks
- Successful vaginal delivery: 54.5% (79 out 145)

CONCLUSION

- IOL in women with one prior cesarean scar can achieve favorable vaginal delivery outcomes

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INTRODUCTION

Induction of labor (IOL) refers to the intentional stimulation of uterine contractions and cervical ripening to initiate and facilitate childbirth. Over the past decade, there has been a marked rise in the frequency of IOL, with reports showing that more than one in four pregnant individuals underwent induction in 2017, reflecting a 10% increase from 2007 (1,2). This growing trend is attributed to both an increase in obstetric complications among pregnant individuals and the broader application of elective induction before the completion of 42 weeks of gestation. Among various agents employed for IOL, Prostaglandin E2 (PGE2) holds a significant role. As an endogenous compound involved in labor physiology and inflammatory pathways, PGE2 is widely used to promote cervical ripening and initiate labor. It has received FDA approval for medically indicated cervical ripening and is also used as a vaginal suppository in the management of missed abortions and intrauterine fetal demise, particularly in gestational ages ranging from 12 to 28 weeks (3,4). Concurrently, global cesarean section (CS) rates have surged, rising from 12.1% in 2000 to 21.1% in 2015 (5). As a result, there is a rising population of women with a history of previous CS, a factor that complicates decisions around future childbirth. From 2003 to 2016, the proportion of women with previous CS increased from 8% to 11% (6,7). Uterine scarring associated with prior CS raises the risk of uterine rupture—a potentially catastrophic event that carries serious risks for both maternal and perinatal outcomes. Moreover, prior CS is linked to higher chances of abnormal placentation and the need for blood transfusions in subsequent pregnancies (8,9).

In response to the rising cesarean epidemic and its complications, leading international bodies such as the Royal College of Obstetricians and Gynaecologists (RCOG), National Institute for Health and Care Excellence (NICE), American College of Obstetricians and Gynecologists (ACOG), and the National Institutes of Health (NIH) have endorsed vaginal birth after cesarean (VBAC) as a safe and feasible option for most women with a history of one lower segment CS, based on clinical and economic evaluations (10,11). Despite such endorsements, literature reveals considerable variability in the outcomes of IOL in women with previous uterine scars, particularly in relation to successful vaginal delivery rates. One study reported a 40% success rate for vaginal birth following induction among women with previous uterine scars (12). Given the increasing rate of cesarean deliveries and the associated maternal and healthcare burdens, it becomes crucial to reassess the safety and efficacy of IOL in this particular group. Vaginal delivery, when successful, reduces the risk of maternal infection, shortens hospital stays, alleviates pressure on overburdened healthcare systems, and lowers the overall cost of care. However, the current body of evidence lacks consistency, particularly in local settings where healthcare dynamics may differ from international contexts. Therefore, this study aims to evaluate the outcomes of induction of labor in women with a previous uterine scar, with a focus on determining the frequency of successful vaginal delivery in a local population.

METHODS

This descriptive study was conducted at the Department of Obstetrics and Gynecology, Saidu Sharif Medical College, Swat, six-month period from 27th June 2024 to 27th December 2024. Ethical approval was obtained from the institutional ethical review board prior to the commencement of the study, and informed written consent was secured from all participants. The sample size of 145 was determined using an expected frequency of successful vaginal birth of 40% (13,14), a margin of error of 8%, and a 95% confidence interval. A non-probability consecutive sampling technique was employed to recruit eligible participants. The study population included pregnant women aged between 15 and 40 years who had a history of one previous lower segment cesarean section (LSCS) and were in their second or third trimester, confirmed through obstetric ultrasound conducted by a consultant obstetrician. Exclusion criteria were strictly applied and included women with known hypersensitivity to prostaglandins, any prior attempt at labor induction in the current pregnancy, and absolute contraindications to vaginal birth such as non-vertex fetal presentation, upper uterine segment scars or classical cesarean incisions, and an estimated fetal weight exceeding 3.5 kilograms.

Induction of labor was carried out using prostaglandin E2 (PGE2) administered via 1.5 mg vaginal tablets inserted into the posterior fornix every eight hours. The maximum allowable cumulative dose was 18 mg. The protocol continued until successful vaginal delivery was achieved or until a cesarean section was deemed clinically necessary. Baseline demographic and clinical information was meticulously recorded, including maternal age, gestational age, time interval since the previous cesarean, socioeconomic status, educational background, booking status, and parity. The Bishop score was used to evaluate cervical readiness at the time of induction. Labor was closely monitored, and the duration of each stage of labor was documented. Maternal outcomes were categorized into either successful vaginal delivery or cesarean section, and the length of postnatal hospital stay was recorded for all participants. Statistical analysis was performed using SPSS version 20. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Stratified analysis was undertaken to identify associations between successful

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vaginal delivery and various demographic or clinical variables. The chi-square test was used, and a p-value of ≤0.05 was considered statistically significant.

RESULTS

The mean age of the participants was 28.76 ± 7.44 years, while the mean gestational age at the time of induction was 34.06 ± 4.57 weeks. The average Bishop score recorded before induction was 9.76 ± 1.45. Mean antenatal hospital stay was 1.99 ± 0.79 days, whereas postnatal hospital stay averaged 2.28 ± 1.03 days. The mean duration of labor across all stages was 18.10 ± 3.84 hours. The mean time elapsed since the previous cesarean section was 23.08 ± 5.15 months. A history of prior vaginal delivery was noted in 44 (30.3%) of the patients. Out of the 145 women included in the study, successful vaginal delivery was achieved in 79 (54.5%) participants, while the remaining 66 (45.5%) underwent cesarean section. In terms of socioeconomic background, 34 (23.4%) belonged to the low-income group, 95 (65.5%) to the middle-income group, and 16 (11.0%) to the high-income group. Educationally, 86 (59.3%) were illiterate and 59 (40.7%) had received some level of formal schooling. A total of 70 (48.3%) women were booked for antenatal care, while 75 (51.7%) were unbooked. Stratified analysis revealed a statistically significant association between successful vaginal delivery and gestational age (p = 0.004), with higher success rates observed in women with gestational age greater than 35 weeks. Time since previous uterine scar also showed significant association (p = 0.01), where an interval of more than 24 months correlated with higher vaginal delivery rates. Notably, a strong association was identified between prior history of vaginal delivery and success of current vaginal birth (p = 0.0001), with 42 out of 44 such women achieving successful outcomes. However, no significant associations were observed for maternal age (p = 0.72) or booking status (p = 0.53).

Table 1: Demographic and clinical parameters

Demographic and clinical parameters		**N**	**%**
Socioeconomic status	Low	34	23.4%
	Middle	95	65.5%
	High	16	11.0%
Education	Illiterate	86	59.3%
	School education & above	59	40.7%
Previous history of vaginal delivery	Yes	44	30.3%
	No	101	69.7%
Booking status	Booked	70	48.3%
	Unbooked	75	51.7%

Table 2: Successful Vaginal Delivery Following Induction in Women with Previous Cesarean Section

Maternal outcome (Successful vaginal delivery)	**N**	**%**
Yes	79	54.5%
No	66	45.5%

Table 3: Stratification of maternal outcome with demographic and clinical parameters

Demographic and clinical parameters		**Outcome (Successful vaginal delivery)**				**P value**
		Yes		**No**		
		N	**%**	**N**	**%**	
Age distribution (Years)	15 to 30	43	54.4%	34	51.5%	0.72
	31 to 40	36	45.6%	32	48.5%	
Week of gestation	25 to 35	35	44.3%	45	68.2%	0.004
	> 35	44	55.7%	21	31.8%	
Duration since uterine scar (Months)	13 to 24	33	42.3%	41	62.1%	0.01
	> 24	45	57.7%	25	37.9%	
Previous history of vaginal delivery	Yes	42	53.2%	2	3.0%	0.0001
	No	37	46.8%	64	97.0%	

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Demographic and clinical parameters		Outcome (Successful vaginal delivery)				P value
		Yes		No		
		N	%	N	%	
Booking status	Booked	40	50.6%	30	45.5%	0.53
	Unbooked	39	49.4%	36	54.5%	

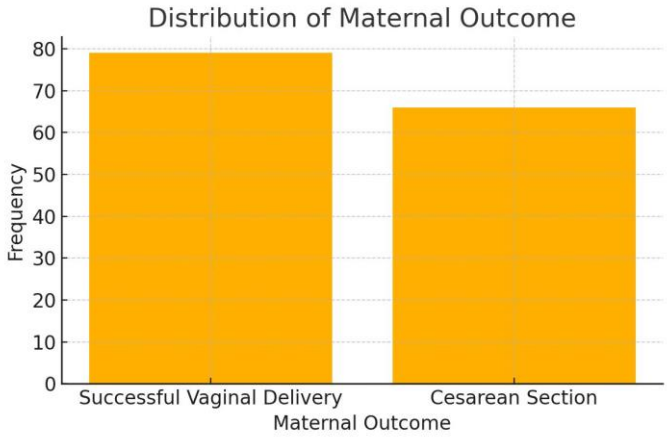

Figure 1 Distribution of Maternal Outcomes

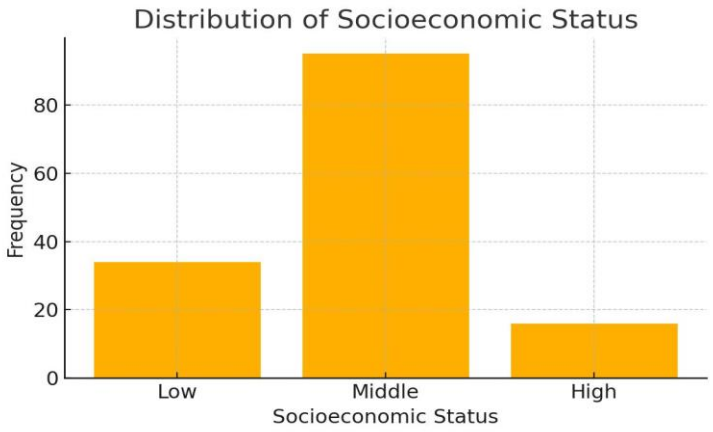

Figure 2 Distribution of Socioeconomic Status

DISCUSSION

The study demonstrated a successful vaginal delivery rate of 54.5% following induction of labor in women with a previous cesarean section, placing the findings within the intermediate range when compared with earlier literature. Previous studies evaluating Foley catheter-based induction reported lower success rates of approximately 40% (13), while pharmacologic induction methods including prostaglandins and cervical balloons have yielded varying results, ranging from 45.4% to nearly 59.3% (14,15). This variability across studies likely reflects differences in population characteristics, induction protocols, and gestational age at the time of intervention. The current study uniquely included participants from both the second and third trimesters, unlike most published data which largely focus on term pregnancies. This broader inclusion criterion likely influenced the slightly lower mean gestational age observed and may partially explain the intermediate success rate seen. A significant association was noted between gestational age and induction success, with women induced beyond 35 weeks experiencing a higher rate of vaginal delivery. This trend is consistent with earlier reports that suggest advanced gestation favors cervical favorability and fetal readiness, contributing to better outcomes (16,17). The mean gestational age in the present study was 34.06 ± 4.57 weeks, indicating that many inductions occurred prior to term, which inherently reduces the likelihood of optimal conditions for vaginal delivery. The implication of this finding is critical in planning induction timing in women with a scarred uterus, as later gestational age may be leveraged to improve outcomes when medically feasible (18).

Inter-delivery interval also emerged as a relevant factor, with a higher proportion of successful inductions observed among women with more than 24 months since their last cesarean. While a shorter interval (13–24 months) was associated with a lower success rate, it still produced reasonable outcomes, indicating that, with careful patient selection and monitoring, induction may still be considered in women with minimal interpregnancy spacing. This adds to the growing evidence suggesting that strict exclusion of such cases may not always be warranted, particularly in resource-constrained settings where clinical flexibility is often essential. Another important determinant of success was the presence of a prior vaginal delivery (19). More than half of women with such history had a favorable outcome, underscoring the value of this predictor in assessing VBAC potential. Nonetheless, nearly half of the successful cases occurred in women without any prior vaginal births, suggesting that other clinical factors, such as cervical readiness assessed by Bishop score, may mitigate the absence of this historical advantage. This finding expands the scope of patient eligibility and supports individualized clinical judgment over rigid criteria.

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Surprisingly, booking status did not demonstrate any statistically significant influence on the outcome. Despite assumptions that regular antenatal care may lead to better preparedness and outcomes, the results indicate that unbooked patients can still have favorable results under guided and closely monitored conditions (20). This reinforces the importance of intrapartum management protocols and real-time clinical decision-making over antenatal categorization alone. The study's strengths include its prospective design, inclusion of a moderately large and demographically diverse population, and analysis of stratified outcomes based on multiple clinical variables. However, some limitations should be acknowledged. The lack of neonatal outcome data such as APGAR scores, NICU admissions, or stillbirth rates restricts a holistic assessment of perinatal safety. Similarly, maternal complications such as uterine rupture, postpartum hemorrhage, or infection were not reported, leaving a critical gap in evaluating the overall risk profile of induction in women with a previous scar. Additionally, the study did not differentiate between elective and medically indicated inductions, which may have further influenced the outcomes. In conclusion, the findings suggest that induction of labor in women with a single previous cesarean section can yield a substantial rate of vaginal delivery success, particularly when gestational age is more advanced, inter-delivery interval is adequate, and a history of vaginal birth is present. However, the absence of adverse maternal and fetal outcome reporting limits the capacity to draw comprehensive safety conclusions. Future research should incorporate these missing outcome metrics, employ standardized induction protocols, and stratify results by indication and method of induction to better guide clinical practice and optimize both maternal and neonatal outcomes.

CONCLUSION

In conclusion, the study highlighted that induction of labor in women with a previous cesarean section can result in favorable outcomes when carefully selected clinical parameters are considered. Gestational age and obstetric history, particularly prior vaginal delivery and the interval since the last cesarean, were key factors influencing the likelihood of a successful vaginal birth. These findings support a more individualized approach to labor induction in scarred uteri, offering a safe alternative to repeat cesarean sections in appropriately monitored settings.

AUTHOR CONTRIBUTION

Author	Contribution
Asma Jamil*	Data Entry, Data Collection, Data Analysis, Manuscript Writing, and Manuscript Revision
Saima Parveen	Critical Input, Conception of Study Design, Final Approval of Draft
Tabassum	Critical Input
Parveen Naveed	Critical Input

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