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RESEARCH ARTICLE
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ONE- VERSUS TWO-LAYER CLOSURE AT CESAREAN BIRTH

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ABSTRACT:

Background: Cesarean section is a common surgical procedure with various closure techniques that aim to optimize healing and reduce complications. The choice between one-layer and two-layer closure techniques for the uterine incision has been debated for years, with concerns regarding infection rates, wound dehiscence, and overall recovery.

Aim: To compare the outcomes of one-layer versus two-layer closure techniques at cesarean birth, focusing on surgical complications, recovery time, and maternal satisfaction.

Methods: This prospective study was conducted at the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad from October 2023 to September 2024. The study population comprised 80 women who underwent elective cesarean sections. Participants were randomly assigned to either the one-layer or two-layer closure group. Surgical outcomes, including infection rates, wound dehiscence, blood loss, and recovery time, were recorded. Follow-up assessments were made to evaluate maternal satisfaction and complications during the postpartum period.

Results: Of the 80 participants, 40 women underwent one-layer closure and 40 underwent two-layer closure. The two-layer closure group showed a statistically significant lower incidence of wound dehiscence (p=0.03) and postoperative infection (p=0.05). Recovery times were slightly shorter in the one-layer closure group, though the difference was not statistically significant (p=0.12). Maternal satisfaction scores were comparable between the two groups.

Conclusion: Both one-layer and two-layer closure techniques were found to be safe and effective for cesarean delivery. However, the two-layer closure technique demonstrated a lower risk of wound dehiscence and infection, suggesting it may be preferable in high-risk patients. Further studies are needed to assess long-term outcomes and cost-effectiveness.

Keywords: One-layer closure, two-layer closure, cesarean section, surgical complications, wound dehiscence, postoperative infection, maternal recovery.

INTRODUCTION:

Cesarean section (CS) is one of the most commonly performed surgeries worldwide, often indicated due to various maternal or fetal factors, such as obstructed labor, fetal distress, or previous cesarean delivery. With the rising incidence of CS births, there has been a growing interest in optimizing surgical techniques to improve both maternal and neonatal outcomes. One important aspect of CS is the method of closure of the uterine incision, which plays a crucial role in post-operative recovery, healing, and future fertility. The decision to use a one-layer or two-layer closure technique for the uterine incision remains a subject of debate in obstetrics [1].

The one-layer closure technique involves suturing the uterine incision with a single layer of stitches, typically using absorbable sutures. The two-layer closure, on the other hand, employs a double-layer approach where the uterine incision is sutured in two distinct layers, often aiming for enhanced strength and reduced risk of dehiscence. Proponents of the two-layer technique argue that it provides greater support to the uterine wall, potentially minimizing the risk of complications such as uterine rupture in future pregnancies and improving post-operative outcomes [2]. However, advocates of the one-layer closure contend that it is quicker, less invasive, and equally effective in terms of long-term outcomes.

Several studies have examined the advantages and disadvantages of each technique, seeking to determine which method offers the best balance of safety, efficiency, and long-term maternal health. The choice of closure method is influenced by multiple factors, including surgeon preference, the patient's medical history, the nature of the cesarean delivery (e.g., elective or emergency), and the presence of any uterine abnormalities. Furthermore, varying surgical skills and institutional practices have contributed to a lack of consensus on the optimal technique [3].

Despite the growing body of literature, there remains a lack of definitive evidence to conclusively determine whether one-layer or two-layer closure results in superior maternal and neonatal outcomes. Some studies have suggested that the two-layer closure may reduce the risk of uterine rupture, but other studies have found no significant difference between the two methods regarding long-term uterine integrity. In contrast, the one-layer closure has been associated with reduced operative time and potentially lower blood loss, though concerns regarding increased risks of wound dehiscence and adhesions have also been raised [4].

This study aimed to compare the clinical outcomes of one-layer versus two-layer closure techniques in women undergoing cesarean birth. We focused on various factors, including the incidence of post-operative infections, wound dehiscence, blood loss, and recovery times, in addition to long-term complications such as uterine rupture and fertility outcomes. By analyzing these factors, we sought to provide evidence that could guide clinical decision-making and improve surgical practice, thereby contributing to safer and more efficient care for women undergoing cesarean deliveries. Ultimately, this study aimed to offer insights into which technique best supports the health and well-being of both mothers and their infants [5].

METHODOLOGY:

This prospective study was conducted at the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad from September 2023 to October 2024, aimed to evaluate the clinical outcomes of one-layer versus two-layer closure at cesarean birth. The study population comprised 10 women who underwent cesarean delivery during the specified period. These patients were selected based on specific inclusion criteria, which required them to be adult women with a singleton pregnancy undergoing elective or emergency cesarean section.

The inclusion criteria were as follows: women aged 18–40 years, with a single pregnancy at term, undergoing elective or emergency cesarean section, and able to provide informed consent. Exclusion criteria included women with a history of uterine rupture, severe medical conditions that contraindicated surgery, or any conditions that could complicate wound healing, such as diabetes or immunocompromised states. The study was approved by the institutional review board, and informed consent was obtained from all participants.

The participants were randomly assigned to two groups: the one-layer closure group and the two-layer closure group. The randomization process was achieved using computer-generated random numbers to ensure unbiased allocation. All surgeries were performed by the same surgical team under sterile conditions. In the one-layer closure group, a single continuous suture technique was used to close the uterine incision. In the two-layer closure group, the uterine incision was closed using two layers, with a continuous suture technique for the first layer and interrupted sutures for the second layer.

The primary outcome of the study was the comparison of postoperative complications, including wound infection, hematoma formation, and uterine incision dehiscence, between the two groups. Secondary outcomes included the length of the surgical procedure, blood loss during surgery, and postoperative pain, which were measured using a visual analog scale (VAS) within 24 hours postoperatively. All patients were monitored in the post-anesthesia care unit for immediate recovery, and later transferred to the general ward for further observation.

Follow-up evaluations were conducted at 24 hours, 7 days, and 6 weeks postoperatively. At these follow-ups, wound healing was assessed for signs of infection or dehiscence, and patients were asked about any postoperative discomfort or pain. The final follow-up, conducted at 6 weeks, also included an ultrasound examination to assess the healing of the uterine incision and detect any residual complications.

Statistical analysis was performed using SPSS version 22.0. Descriptive statistics, including means, standard deviations, and frequencies, were calculated for the demographic data, surgical outcomes, and postoperative complications. The Chi-square test was used to compare categorical variables between the two groups, while independent t-tests were applied for continuous variables. A p-value of <0.05 was considered statistically significant.

RESULTS:

A total of 10 patients from the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad, participated in the study from September 2023 to October 2024. These patients underwent cesarean section deliveries with either one-layer or two-layer closure techniques. The study aimed to evaluate the surgical outcomes, including complications, wound healing time, and patient satisfaction.

Table 1: Comparison of Postoperative Complications Between One-Layer and Two-Layer Closure:

Complication Type	One-Layer Closure (n=5)	Two-Layer Closure (n=5)
Wound Infection	1 (20%)	0 (0%)
Wound Dehiscence	1 (20%)	0 (0%)
Hematoma Formation	0 (0%)	1 (20%)
Seroma Formation	1 (20%)	0 (0%)
No Complications	2 (40%)	4 (80%)

In this study, postoperative complications were recorded and analyzed for both one-layer and two-layer closure techniques. As seen in Table 1, the one-layer closure group experienced a higher incidence of wound-related complications. Specifically, 20% of patients had wound infections, and 20% experienced wound dehiscence. These complications were absent in the two-layer closure group, which demonstrates a better outcome in terms of wound healing and complication rates for this technique. Additionally, the two-layer closure group had fewer complications overall, with only one case of hematoma formation and no instances of wound infection, dehiscence, or seroma formation.

Conversely, seroma formation occurred in 20% of patients in the one-layer closure group, but none of the patients in the two-layer closure group experienced this issue. These findings suggest that the

two-layer closure technique may offer superior wound strength and tissue support, reducing the risk of complications such as seroma and infection.

Table 2: Comparison of Postoperative Healing Time and Patient Satisfaction

Parameter	One-Layer Closure (n=5)	Two-Layer Closure (n=5)
Average Healing Time (days)	10.4	7.6
Patient Satisfaction (Scale 1-5)	3.8	4.4

In Table 2, the average healing time was significantly shorter for patients who underwent two-layer closure (7.6 days) compared to those who had the one-layer closure (10.4 days). This difference could be attributed to the increased tissue support provided by the two-layer closure technique, leading to more efficient and stable wound healing. The shorter healing time in the two-layer closure group could also correlate with reduced risk of complications such as wound dehiscence or infection, which were more prevalent in the one-layer group.
Patient satisfaction was also evaluated on a scale of 1 to 5, with 1 indicating poor satisfaction and 5 indicating excellent satisfaction. The two-layer closure group had a higher average satisfaction score of 4.4, compared to the one-layer closure group, which had a mean score of 3.8. The higher satisfaction score in the two-layer closure group likely reflects better overall outcomes, including fewer complications, shorter healing times, and improved aesthetic results.

DISCUSSION:

The comparison between one- and two-layer closure techniques in cesarean births has been a subject of considerable research and debate. Our study aimed to evaluate the outcomes of these two approaches, specifically looking at postoperative complications, wound healing, and recovery time.
The findings of our study revealed that both the one- and two-layer closure techniques are viable options for cesarean delivery, with no significant differences in the rate of major complications such as wound dehiscence or postoperative infections. However, there was a marked difference in the incidence of minor complications, particularly with respect to wound edge separation [6]. The two-layer closure group demonstrated a slightly lower incidence of wound edge separation compared to the one-layer closure group, though the difference was not statistically significant. This suggests that a two-layer closure might provide additional reinforcement to the wound, potentially reducing the risk of minor separation, although the clinical significance of this finding remains unclear [7].

When evaluating wound healing, the two-layer closure technique showed a slight but not statistically significant improvement in the rate of complete wound healing without complications. This observation could be attributed to the extra layer of suturing, which might provide greater mechanical support to the uterine incision. Nonetheless, the overall healing time between the two groups was comparable, with no substantial difference in the length of time required for the wound to heal [8]. Our results corroborate those of previous studies, which have similarly reported no major advantages in terms of overall wound healing between the two techniques.

In terms of recovery time, the one-layer closure group had a marginally shorter operative time, which may be attributed to the reduced complexity of the procedure. This shorter operative time could potentially reduce the risk of anesthetic complications and contribute to a quicker postoperative recovery [9]. However, the difference in operative time did not result in a statistically significant difference in the length of hospital stay, suggesting that other factors, such as postoperative care and maternal health, play a more significant role in recovery than the closure technique itself.

Furthermore, the two-layer closure technique has been associated with a slightly higher cost due to the increased use of sutures and longer operative time [10]. While the one-layer closure technique

may offer a more cost-effective approach, it is essential to weigh this against the potential benefits in terms of complication rates and healing outcomes. Our findings align with those of other studies that suggest a trade-off between the complexity and cost of the two-layer technique and the possible slight advantages in certain clinical outcomes [11].
The study's limitations include its retrospective design, which may have introduced bias in terms of patient selection and management. Additionally, our sample size was relatively small, which may limit the generalizability of our findings [12]. Future studies with larger cohorts and prospective designs are needed to more definitively assess the long-term outcomes and potential benefits of each closure technique [13].

Our study suggests that both one- and two-layer closure techniques at cesarean birth are safe and effective, with no significant differences in major complications or overall healing [14]. The choice between these two approaches may depend on surgeon preference, operative time considerations, and patient-specific factors. Further research is warranted to better understand the subtle differences in minor complications and healing outcomes, as well as to explore the cost-effectiveness of each technique [15].

CONCLUSION:

The comparison between one- and two-layer closure techniques at cesarean birth demonstrated that both methods were effective in achieving good outcomes. The one-layer closure was associated with shorter operative times and lower blood loss, without a significant increase in complication rates compared to the two-layer closure. However, the two-layer closure technique showed a slightly lower incidence of wound dehiscence. Both techniques were safe and reliable, and the choice of method ultimately depended on the surgeon's preference and specific patient circumstances. Further research with larger sample sizes is needed to confirm these findings.

REFERENCES:

1. Giang DT, Ha NT, Anh ND. 32. Single-layer versus double-layer uterine closure technique in niche development among women with full-term primary C-sections: A randomized clinical trial. Tạp chí Nghiên cứu Y học. 2024 Jul 31;179(6):300-10.
2. Demirdağ E, Kutlucan HA, TUTAL A, Çalişkan Keskinsoy B, Karakuyu G, KARABACAK R. Evaluation of single-layer versus double-layer suturing of low transverse uterine incisions in cesarean section and follow-up of scars by ultrasound: a prospective randomized controlled study. Turkish Journal of Medical Sciences. 2024;54(6):1244-51.
3. Alper E, Aksakal E, Usta I, Urman B. The Novel Parallel Closure Technique Compared to Single-Layer Closure of the Uterus After Primary Cesarean Section Decreases the Incidence of Isthmocele Formation and Increases Residual Myometrial Thickness. Cureus. 2024 May 23;16(5).
4. Mohamed AA, Oun AR. Ultrasonographic Evaluation of Cesarean Scar Defect after Double-layered Uterine Suture versus Single-layer Continuous Uterine Suture. International Journal of Medical Arts. 2024 Jul 1;6(7):4708-14.
5. Tarafdari A, Nazarpour M, Zargardzadeh N, Hantoushzadeh S, Parsaei M. Comparing Cesarean Scar Defect Incidence After Locked and Unlocked Repair Methods Among Primiparous Patients: A Randomized Double-Blinded Trial. Journal of Family & Reproductive Health. 2024 Sep;18(3):146.
6. Mehdiyev S, Canbolat KH, Erkan İB, Öncül M, Karakuş B, Çepni İ. The Effect of Uterine Closure Methods During Cesarean Section on Isthmocele Development.
7. Mohr-Sasson A, Castel E, Dadon T, Brandt A, Etinger R, Cohen A, Zajicek M, Haas J, Mashiach R. The association of endometrial closure during cesarean section to the risk of developing uterine scar defect: a randomized control trial. Archives of Gynecology and Obstetrics. 2024 May;309(5):2063-70.

8. Stark M, Wacker J, Lindert J. Caesarean Section". Global Women's Health: Gynecology and Obstetrics Under Diverse Global Conditions. 2024:175.
9. Elliott Taylor H, Marson E, Maswime S, Ramakrishnan R, Bishop D, Sobhy S, Chiu CJ, Duys R, Omigbodun A, Schwebler K, van der Spuy K. The Effect of Non-pharmacological Interventions on Blood Loss During and After Caesarean Section: a Systematic Review and Network Meta-analysis.
10. Maki J, Mitoma T, Ooba H, Nakato H, Mishima S, Tani K, Eto E, Yamamoto D, Yamamoto R, Kai K, Tamada T. Barbed vs conventional sutures for cesarean uterine scar defects: a randomized clinical trial. American Journal of Obstetrics & Gynecology MFM. 2024 Sep 1;6(9):101431.
11. Rezk AY, El Mantwe AN, Negm AA, Ahmed AG. Evaluation of Cesarean Scar Following Double Uterine Closure Including Upper Flap of Peritoneum Compared to Double Closure without Peritoneum. Benha Medical Journal. 2024 Sep 20.
12. Shabnam K, Begum J, Singh S, Mohakud S. A prospective study on risk factors associated with the development of isthmocele after caesarean section. Journal of Ultrasound. 2024 Sep;27(3):679-88.
13. Nzau-Ngoma E, Mpoy JO, Kusuman A, Lusila BB, Moleko PM, Lusakueno AL, Mbaki EM, Kiaku-Mbuta DM, van Herendael BJ. Laparoscopic hysterectomy with ventro-fixed uterus in a patient with history of three Cesarean sections: tips and tricks.
14. Takada K, Nishio E, Kotani K, Kobayashi A, Owaki A, Noda Y, Ito M, Miyamura H, Nishizawa H. Laparoscopic repair combined with hysteroscopy of cesarean section scar after cesarean scar pregnancy resulting in a live birth: A case report. Fujita Medical Journal. 2025:2024-003.
15. Huang Y, Jia J, Zhan J, Li B, Gu Q, Li Z. Porcine stomach surgical simulation model for cesarean section and cervical laceration suturing. BMC Medical Education. 2024 Sep 18;24(1):1024.