Section: Obstetrics and Gynaecology

Original Research Article

A COMPARATIVE STUDY TO ASSESS TWO METHODS OF SKIN SCAR SUTURING IN PREVIOUS CAESAREAN SECTION IN A TEACHING HOSPITAL IN WESTERN UTTAR PRADESH

Mridula Sharma[1], Rajani Agarwal[2], Nikita Srivastav[3], Nandini Jha[4], Anupam Sharma[5]

[1]*Associate Professor, Department of Obstetrics and Gynaecology, Rajshree Medical Research Institute, Bareilly, India.*
[2]*Professor, Department of Obstetrics and Gynaecology, Rajshree Medical Research Institute, Bareilly, India.*
[3]*Graded specialist, Department of Hospital Administration, Command Hospital, Pune.*
[4]*Junior Resident, Department of Obstetrics and Gynaecology, Rajshree Medical Research Institute, Bareilly, India.*
[5]*Professor, Department of General Medicine, Rajshree Medical Research Institute, Bareilly, India.*

Received *: 17/07/2024*
Received in revised form *: 06/09/2024*
Accepted *: 21/09/2024*

Corresponding Author:
Dr. Mridula Sharma,
Associate Professor, Department of Obstetrics and Gynaecology and Corresponding Author, Rajshree Medical Research Institute, Bareilly, India.
Email: drmridu@gmail.com

DOI: 10.70034/ijmedph.2024.3.186

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2024; 14 (3); 1036-1041

ABSTRACT

Background: Caesarean sections are one of the most common surgical procedures in obstetrics, and optimal wound closure techniques are crucial for minimizing complications and improving cosmetic outcomes. This comparative study evaluates two skin suturing methods—subcuticular and interrupted suturing—used in repeat Caesarean sections, aiming to assess their impact on scar appearance, post-operative complications, and patient satisfaction. **Aim:** A Comparative Study to Assess Two Methods of Skin Scar Suturing in Previous Caesarean Section.

Material and Methods: A total of 120 patients were randomized into two groups, and outcomes were assessed at 6 weeks post-surgery using the Vancouver Scar Scale (VSS) and a patient satisfaction survey. **Results:** Group A (subcuticular suturing) had a significantly shorter closure time (7.2 minutes) compared to Group B (11.3 minutes), indicating the efficiency of the continuous suturing method. While post-operative complications were slightly lower in Group A, the differences were not statistically significant. Scar appearance, assessed using the Vancouver Scar Scale, was significantly better in Group A, with lower scores for pigmentation, height, and vascularity. Patient satisfaction was also significantly higher in Group A, with most patients rating their experience as "very satisfied" due to better cosmetic outcomes and fewer post-operative issues.

Conclusion: The study concludes that subcuticular suturing should be the preferred method for skin closure in caesarean sections due to its aesthetic and clinical benefits. Future research should include longer follow-up periods to assess long-term scar quality and complications.

Key Words: Caesarean section, Skin closure techniques, Subcuticular suturing, Interrupted suturing, Absorbable sutures, non-absorbable sutures, Scar healing.

INTRODUCTION

The rate of Caesarean sections (C-sections) has been steadily increasing worldwide, becoming one of the most commonly performed surgical procedures in obstetrics. As more women undergo C-sections, the quality of wound closure techniques has garnered significant attention. Among the concerns following a C-section is the long-term cosmetic and functional outcome of the skin scar. Achieving optimal wound healing with minimal scarring is crucial, not only for aesthetic reasons but also to minimize the risk of complications, such as wound infection, dehiscence, or hypertrophic scarring. As a result, evaluating different skin suturing methods in C-sections has become a focus of many studies aimed at improving surgical outcomes and patient satisfaction.[1] Skin

closure techniques used in C-sections can significantly influence scar formation, healing, and patient recovery. Suturing methods have evolved over the years, and various techniques are employed based on surgeon preference, wound type, and individual patient factors. The two most common techniques for skin closure in Caesarean sections are subcuticular sutures and interrupted sutures, each with distinct advantages and drawbacks. While both methods are widely practiced, there is ongoing debate regarding which technique provides better cosmetic outcomes, faster recovery, and fewer complications.[2]

The subcuticular suturing method involves the use of a continuous suture placed just beneath the skin surface, approximating the skin edges without the need for external knots. This technique is often preferred for its cosmetic advantages, as the scar tends to be finer and less visible over time. Subcuticular sutures are also associated with reduced wound infection rates due to the absence of exposed sutures, which might act as a nidus for bacterial colonization. Moreover, patients generally report greater satisfaction with the appearance of scars closed with this method.[3] On the other hand, the interrupted suturing method involves placing individual stitches across the skin edges at regular intervals. This technique allows for precise alignment of the skin edges and ensures strong wound closure. Each suture is tied off individually, which may provide better control in cases where there is tension across the wound. However, the use of interrupted sutures may result in a more pronounced scar due to the individual knots and greater potential for suture marks. Additionally, the time required for this method is usually longer than for subcuticular suturing, and there may be a higher likelihood of wound infection due to the exposed sutures.[4,5] Previous research has explored the benefits and limitations of these two techniques, but a definitive consensus has yet to be reached. Some studies suggest that subcuticular suturing leads to superior cosmetic outcomes and faster healing, while others argue that interrupted sutures provide better wound strength and lower complication rates in the long term. Factors such as skin type, patient comorbidities, and surgical environment also play a role in determining the most suitable closure method for each individual. As the choice of suturing technique can have a lasting impact on patient recovery and satisfaction, it is important to conduct comparative studies to evaluate the outcomes of different methods objectively.[6]

Another consideration in selecting a suturing method is the potential for scar complications. Hypertrophic scarring and keloid formation are two of the most common complications following C-sections, particularly in patients with darker skin tones. Hypertrophic scars are raised, red scars that can cause itching or discomfort but remain within the boundaries of the original incision. Keloids, on the other hand, extend beyond the incision and may continue to grow over time, causing significant cosmetic concerns and even functional limitations. The method of skin closure can influence the likelihood of these complications, with some evidence suggesting that subcuticular sutures may reduce the risk of hypertrophic scarring compared to interrupted sutures.[7] In addition to cosmetic outcomes, functional recovery after a C-section is another important factor when evaluating skin closure techniques. A well-healed, minimal scar is associated with less discomfort and better mobility, enabling the mother to care for her newborn with greater ease. Conversely, a poorly healed scar with excessive tension, infection, or dehiscence may prolong the recovery period and negatively impact the overall childbirth experience. Therefore, choosing the most appropriate suturing method can enhance both short-term recovery and long-term maternal well-being.[8]

Furthermore, patient satisfaction with the scar and overall wound healing plays a key role in the perception of surgical success. While surgeons may prioritize technical aspects such as wound strength and infection prevention, patients are often more concerned with the cosmetic appearance of the scar and the ease of recovery. Studies that focus on patient-reported outcomes, such as pain, satisfaction with scar appearance, and quality of life, can provide valuable insights into the benefits of each suturing technique from the patient's perspective.9 Given the increasing number of Caesarean sections performed worldwide, it is crucial to continuously assess and refine surgical techniques to optimize patient outcomes. A comparative study of subcuticular and interrupted suturing methods in C-sections offers an opportunity to evaluate which technique is more effective in minimizing scar complications, promoting wound healing, and enhancing patient satisfaction. By understanding the relative advantages and disadvantages of each method, healthcare providers can make informed decisions that lead to better surgical outcomes for women undergoing Caesarean deliveries.

MATERIAL AND METHODS

This study was a prospective, randomized comparative trial conducted at Rajshree Medical Research Institute from January 2023 to December 2023. The study included a total of 120 women scheduled for elective repeat Caesarean sections. After obtaining informed consent, participants were randomized into two groups:

- **Group A (n=60):** Skin closure performed using continuous subcuticular suturing with absorbable sutures (Vicryl 4-0).
- **Group B (n=60):** Skin closure performed using interrupted suturing with non-absorbable sutures (Nylon 3-0).

Inclusion Criteria

1. Women aged 20-40 years with a previous Caesarean section performed at least 18 months prior.
2. Patients with no underlying medical conditions such as diabetes, hypertension, or immunosuppression.

Exclusion Criteria

Patients with pre-existing wound infections or keloid formation.

Patients with severe anemia (Hb < 8 g/dL) or morbid obesity (BMI > 35).

Methodology

Both groups underwent standard Caesarean sections, which were performed by experienced obstetric surgeons following a uniform surgical protocol for all steps except for the method of skin closure. In Group A, the skin was closed using a continuous subcuticular suture with absorbable material (Vicryl 4-0), a technique known for its cosmetic advantages and reduced risk of infection. In contrast, Group B had skin closure performed with interrupted suturing using non-absorbable material (Nylon 3-0), which is traditionally used for its strength and precision in wound closure. The key difference between the groups lay in the suturing method, while all other aspects of the Caesarean section remained consistent. The primary outcomes of this study were evaluated to compare the two suturing techniques. The first outcome measured was the operative time for skin closure, which was recorded in minutes to assess the efficiency of each method. The second outcome was the scar appearance, evaluated at 6 weeks post-operatively using the Vancouver Scar Scale (VSS). The VSS examines several aspects of scar healing, including pigmentation, pliability, height, and vascularity, with lower scores indicating better cosmetic results. Additionally, post-operative complications such as wound infection, dehiscence, and hypertrophic scar formation were monitored during the 6-week follow-up period. Patient satisfaction was also an important outcome measure, assessed using a 5-point Likert scale, ranging from "very dissatisfied" to "very satisfied," which helped gauge the subjective experience of scar appearance and comfort.

Data Collection and Statistical Analysis

Data were collected immediately after surgery and during the follow-up visit at 6 weeks. To analyze the data, categorical variables like the occurrence of complications and patient satisfaction were assessed using the Chi-square test. Continuous variables, including operative time and VSS scores, were analyzed using the Student's t-test. A p-value of less than 0.05 was considered statistically significant. All statistical analyses were conducted using SPSS version 25.0 to ensure accurate and reliable comparisons between the two groups, allowing for meaningful conclusions regarding the efficacy of each suturing method.

RESULTS

Table 1: Demographic Characteristics of the Patients

The demographic data of both groups were comparable, as demonstrated by the lack of statistically significant differences between Group A (subcuticular suturing) and Group B (interrupted suturing). The mean age in Group A was 30.1 years compared to 29.8 years in Group B ($p = 0.71$), indicating that the two groups were similar in terms of age distribution. Similarly, the mean BMI was 28.3 in Group A and 27.9 in Group B ($p = 0.61$), showing no significant differences in body mass index. Both groups had an average parity of 2 ($p = 0.91$). These comparable baseline characteristics help ensure that any differences observed in the outcomes are likely due to the suturing method rather than demographic variables.

Table 2: Intraoperative Time

The time taken for skin closure was significantly shorter in Group A (subcuticular suturing) compared to Group B (interrupted suturing). The mean closure time for Group A was 7.2 minutes, whereas it was 11.3 minutes for Group B ($p < 0.001$). This statistically significant difference suggests that the continuous subcuticular technique is faster, likely because it involves a single continuous suture, as opposed to the multiple individual stitches required in the interrupted method. The shorter closure time for Group A may translate into reduced operative times and potentially less anesthesia exposure, which could have clinical benefits.

Table 3: Post-Operative Complications

Although Group B exhibited a higher incidence of post-operative complications, including wound infections (6.7%) and wound dehiscence (5%), these differences were not statistically significant when compared to Group A, which had 3.3% wound infections and 1.7% wound dehiscence ($p = 0.41$ and $p = 0.31$, respectively). While the findings suggest a trend toward fewer complications with subcuticular suturing, the lack of statistical significance indicates that larger sample sizes or further studies may be needed to confirm this trend. Nonetheless, these results provide an initial indication that subcuticular suturing may reduce the risk of post-operative wound complications.

Table 4: Vancouver Scar Scale (VSS) Scores

Scar appearance, as measured by the Vancouver Scar Scale (VSS), favored Group A in all parameters. Group A had significantly lower scores for pigmentation (1.2 vs. 1.6, $p = 0.02$), scar height (0.8 vs. 1.4, $p < 0.001$), and vascularity (0.7 vs. 1.3, $p < 0.001$) compared to Group B. The total VSS score was also significantly better in Group A, with an average score of 3.7 versus 4.9 in Group B ($p <$

0.001). Lower VSS scores reflect better cosmetic outcomes, indicating that the subcuticular suturing technique resulted in less noticeable scars, which is a major concern for many patients. This suggests that subcuticular suturing may be the preferred method when considering the long-term appearance of the surgical scar.

Table 5: Patient Satisfaction

Patient satisfaction, assessed using a 5-point Likert scale, was significantly higher in Group A, with a mean satisfaction score of 4.6 compared to 3.9 in Group B ($p < 0.001$). The majority of patients in Group A rated their satisfaction as "very satisfied" or "satisfied," highlighting the superior patient-reported outcomes for subcuticular suturing. This difference in satisfaction could be attributed to the better cosmetic results and potentially lower complication rates in Group A. The high level of satisfaction in Group A underscores the importance of considering patient preferences and aesthetic outcomes when selecting a suturing method.

Table 1: Demographic Characteristics of the Patients

Parameter	Group A (n=60)	Group B (n=60)	p-value
Age (mean ± SD)	30.1 ± 4.5	29.8 ± 3.0	0.71
BMI (mean ± SD)	28.3 ± 3.2	27.9 ± 3.5	0.61
Parity (mean)	2	2	0.91

Table 2: Intraoperative Time

Parameter	Group A (n=60)	Group B (n=60)	p-value
Time to closure (minutes)	7.2 ± 1.8	11.3 ± 2.4	<0.001

Table 3: Post-Operative Complications

Complication	Group A (n=60)	Group B (n=60)	p-value
Wound infection	2 (3.3%)	4 (6.7%)	0.41
Wound dehiscence	1 (1.7%)	3 (5%)	0.31

Table 4: Vancouver Scar Scale (VSS) Scores

VSS Parameter	Group A (n=60)	Group B (n=60)	p-value
Pigmentation	1.2 ± 0.5	1.6 ± 0.6	0.02
Height	0.8 ± 0.3	1.4 ± 0.5	<0.001
Vascularity	0.7 ± 0.2	1.3 ± 0.4	<0.001
Total VSS score	3.7 ± 1.0	4.9 ± 1.3	<0.001

Table 5: Patient Satisfaction

Likert Scale	Group A (n=60)	Group B (n=60)	p-value
Satisfaction score	4.6 ± 0.5	3.9 ± 0.6	<0.001

DISCUSSION

The findings of this study suggest that subcuticular suturing with absorbable material provides significant advantages over interrupted suturing with non-absorbable sutures in repeat Caesarean sections, particularly regarding cosmetic outcomes, patient satisfaction, and post-operative recovery. The study's results align with earlier research by Chundrigar et al. (1997), who also demonstrated superior scar healing and better cosmetic results with subcuticular suturing, as indicated by the lower Vancouver Scar Scale (VSS) scores at 6 weeks post-surgery.[10] Similarly, Mackeen et al. (2012) found that subcuticular suturing leads to better patient comfort and improved aesthetic outcomes compared to interrupted sutures, reinforcing the benefits of this technique.[11] This study was the significantly shorter operative time required for skin closure in the subcuticular group, highlighting the efficiency of continuous suturing methods. Faster skin closure not only reduces the time patients spend under anesthesia, thereby lowering the risk of anesthesia-related complications, but it also decreases the time tissues are exposed, which could reduce the risk of post-operative wound infections. This supports the hypothesis that faster surgical procedures may lead to improved outcomes. Reduced operative times, as seen in the subcuticular group, are particularly beneficial in Caesarean sections where minimizing both maternal and fetal risks is crucial.

While the incidence of post-operative complications such as wound infection and dehiscence was lower in the subcuticular group, the differences between the two groups were not statistically significant. However, the trend toward fewer complications with subcuticular suturing could be linked to the use of absorbable sutures, which may provoke a milder inflammatory response compared to non-absorbable sutures like Nylon, which remain in the body for longer periods. The biocompatibility of absorbable sutures likely plays a role in reducing irritation and the risk of wound breakdown, which is consistent with the findings of Kadam et al. (2016) in various surgical settings.[12] Patient satisfaction, a critical metric in surgical outcomes, was notably higher in the subcuticular suturing group. Patients reported better cosmetic outcomes, faster recovery, and less discomfort due to the absence of non-absorbable sutures requiring removal. The cosmetic appearance

of the scar significantly influences patient satisfaction, particularly in younger women concerned with post-surgical aesthetics. This finding aligns with the study by Kovacs et al. (2014), which demonstrated that continuous suturing techniques lead to better long-term satisfaction due to their favorable impact on scar appearance.[13]

However, there are several limitations to this study. The follow-up period of 6 weeks may not be sufficient to evaluate long-term outcomes, such as hypertrophic scar formation or keloid development, which could emerge later in the healing process. Longer follow-up periods are necessary to assess the durability of cosmetic results and the potential for late-onset complications. Moreover, patient satisfaction is inherently subjective and may be influenced by factors unrelated to the surgical technique, such as preoperative counseling and pain management. Additionally, the sample size, though adequate for detecting differences in cosmetic outcomes and patient satisfaction, may not be large enough to fully assess less common post-operative complications. Larger-scale studies with extended follow-up periods would be valuable in providing a more comprehensive understanding of the long-term efficacy and potential risks associated with each suturing method. Despite these limitations, this study contributes valuable insights into optimizing skin closure techniques in Caesarean sections, emphasizing the benefits of subcuticular suturing for improved patient outcomes.

CONCLUSION

The results of this comparative study strongly suggest that subcuticular suturing with absorbable sutures offers several key advantages over interrupted suturing with non-absorbable material in the context of skin closure after repeat caesarean sections. These benefits include: -

1. **Superior cosmetic outcomes:** Patients in the subcuticular group exhibited better scar healing with lower VSS scores, reflecting improved pigmentation, height, and vascularity of the scar.
2. **Reduced post-operative complications:** While not statistically significant, there was a trend toward fewer wound infections and less wound dehiscence in the subcuticular group, possibly due to the reduced inflammatory response to absorbable sutures.
3. **Higher patient satisfaction:** Patients in the subcuticular group reported greater satisfaction with their scars and the overall surgical experience, likely due to both the aesthetic outcomes and the absence of the need for suture removal.
4. **Shorter operative times:** Subcuticular suturing significantly reduced the time required for skin closure, which can contribute to reduced surgical risk and quicker recovery.

Given these findings, subcuticular suturing should be considered the preferred method for skin closure in caesarean sections, especially in patients for whom cosmetic outcomes and shorter recovery times are priorities. While both methods are safe and effective, the aesthetic and practical benefits of subcuticular suturing with absorbable sutures make it a compelling choice for clinicians and patients alike. Future research should focus on long-term outcomes and explore the role of patient-specific factors, such as skin type, scar history, and genetic predispositions, in determining the optimal suturing technique for individual patients. Additionally, the use of emerging technologies, such as advanced suture materials and tissue adhesives, should be investigated to further enhance post-operative outcomes in caesarean sections and other surgical procedures.

Acknowledgments

The authors would like to thank the surgical team at Rajshree Medical Research Institute for their invaluable support in conducting this study. We also acknowledge the assistance of the nursing staff and the patients who participated in this research.

Conflicts of Interest Statement

The authors declare no conflicts of interest related to this study.

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