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Original Research Article

COMPARATIVE STUDY OF SUBCUTICULAR PROLENE VS VICRYL FOR SKIN CLOSURE IN LOWER SEGMENT CAESAREAN SECTION

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ABSTRACT

Background: Cesarean section (CS) is one of the most frequently performed surgical procedures globally. Optimizing skin closure techniques is critical to minimizing postoperative wound complications and enhancing cosmetic outcomes. Subcuticular skin closure is widely preferred; however, a definitive consensus regarding the optimal suture material between synthetic non-absorbable monofilaments like Prolene and synthetic absorbable braided materials like Vicryl remains limited. This study compared the clinical and cosmetic outcomes of Prolene versus Vicryl for subcuticular skin closure in patients undergoing lower segment cesarean section (LSCS).

Materials and Methods: A randomized prospective comparative trial was conducted over a one-year period in Department of obstetrics and Gynaecology, Gayatri Vidya parishad institute of health care and medical Technology, Visakhapatnam, Andhra Pradesh. A total of 140 pregnant women undergoing LSCS via a Pfannenstiel incision were recruited and randomized into two equal cohorts (n = 70 per group): Group A received subcuticular skin closure using Prolene 1-0, and Group B received Vicryl 1-0. Assessments included operative duration, postoperative pain via a Visual Analog Scale (VAS), early wound complications (induration, discharge, dehiscence, and infection) up to 2 weeks, scar cosmetic outcomes at 6 weeks, and a comprehensive cost analysis.

Results: The demographic and baseline clinical profiles were comparable between both groups ($p > 0.05$). The mean operative duration (30.0 ± 4.8 vs. 32.5 ± 5.0 minutes; $p = 0.03$) and skin closure times were significantly shorter in the Prolene group. While postoperative pain scores were statistically similar across all follow-up intervals ($p > 0.05$), early wound complications within 1 week were significantly lower in the Prolene group compared to the Vicryl group, specifically wound site induration (11.4% vs. 45.7%; $p < 0.001$) and wound discharge (11.4% vs. 24.3%; $p = 0.04$). No cases of wound dehiscence occurred in either cohort. Surgical site infections occurred in 7.1% of the Prolene group compared to 21.4% in the Vicryl group ($p < 0.05$). At the 6-week follow-up, patients in the Prolene group demonstrated significantly higher satisfaction with scar appearance, with 71.4% rating it as "Excellent" compared to 57.1% in the Vicryl group ($p = 0.04$), and a higher percentage presenting with no visible scar (80.0% vs. 64.3%; $p = 0.03$). Cost-analysis

indicated that the material cost of Prolene was less than half that of Vicryl (INR 350 vs. INR 780 per unit).

Conclusion: Subcuticular skin closure with Prolene for lower segment cesarean section offers significant clinical and economic advantages over Vicryl. It reduces operative time, significantly lowers the rate of early wound complications and surgical site infections, enhances cosmetic scar outcomes, and yields superior cost-effectiveness and patient satisfaction. Prolene may therefore be considered the preferred suture material for skin closure in LSCS, particularly in high-volume and resource-limited healthcare setups.

Keywords: Lower segment cesarean section (LSCS), Subcuticular skin closure, Prolene, Vicryl, Surgical site infection, Cosmetic outcome, Cost-effectiveness.

INTRODUCTION

Cesarean section (CS) is one of the most commonly performed surgical procedures worldwide, accounting for nearly 21% of all births globally according to the World Health Organization (WHO, 2021). The procedure has become an indispensable obstetric intervention for ensuring maternal and fetal safety in complicated pregnancies, contributing substantially to the reduction of maternal and neonatal morbidity and mortality. However, with the steady increase in cesarean delivery rates worldwide, greater emphasis has shifted toward optimizing perioperative care, minimizing postoperative complications, improving cosmetic outcomes, and enhancing overall patient satisfaction.[1-4]

Successful wound healing following cesarean section is influenced by several factors, including surgical technique, patient characteristics, and the choice of suture material. Skin closure is a critical component of the procedure, as it directly affects wound integrity, postoperative pain, infection rates, scar quality, and patient satisfaction. Among the available techniques, subcuticular suturing is widely preferred because it provides accurate skin edge approximation, superior cosmetic appearance, and a lower incidence of wound-related complications compared with interrupted skin closure methods.[5-10]

The choice of suture material plays a pivotal role in determining postoperative wound outcomes. Prolene, a synthetic non-absorbable monofilament polypropylene suture, offers prolonged tensile strength, minimal tissue drags, and excellent knot security, but requires subsequent removal and may occasionally cause local irritation or patient discomfort. In contrast, Vicryl, a synthetic absorbable braided polyglactin 910 suture, provides adequate wound support during the critical phases of healing and is gradually absorbed by the body, thereby eliminating the need for suture removal and potentially reducing chronic foreign-body reactions. Nevertheless, its multifilament structure may theoretically harbor bacteria and influence wound healing differently compared with monofilament sutures.[3,9,11]

Postoperative wound complications such as surgical site infection, wound dehiscence, hematoma, seroma, induration, persistent pain, and unsatisfactory scar formation continue to contribute significantly to maternal morbidity following cesarean delivery. These complications increase hospital stay, healthcare expenditure, patient anxiety, and overall dissatisfaction with the surgical experience. Consequently, selecting the most appropriate suture material has important implications for improving clinical outcomes as well as the quality of postoperative recovery.[1,2,6,10,12,13,15-18]

Several investigators have evaluated different skin closure methods and suture materials in obstetric surgery. Poprzeczny *et al.* (2020) demonstrated that skin closure techniques influence postoperative wound complications and emphasized the importance of appropriate suture selection.[19,20] Similarly, Madsen *et al.* (2019) compared absorbable skin closure methods and reported favorable cosmetic outcomes and patient satisfaction with absorbable materials.[21]

Tan *et al.* (2008) further observed lower wound infection rates with absorbable subcuticular sutures compared with non-absorbable alternatives.[22]

Despite these findings, direct comparisons between Prolene and Vicryl specifically for subcuticular skin closure in cesarean section remain limited, and available evidence has not established a clear consensus regarding the optimal suture material.

Considering the rapidly increasing number of cesarean deliveries performed annually, even modest improvements in wound healing and postoperative recovery could result in substantial clinical and economic benefits. Identifying the superior suture material could reduce postoperative complications, improve cosmetic outcomes, enhance patient satisfaction, and facilitate evidence-based recommendations for obstetric surgical practice, particularly in resource-constrained healthcare settings where cost-effectiveness is an important consideration.[5,12,15,23,24]

Therefore, the present randomized prospective comparative study was undertaken to evaluate and compare the effectiveness of Prolene and Vicryl for subcuticular skin closure following cesarean section. The study aims to assess wound complications including infection, dehiscence, induration, and

hematoma, compare postoperative pain, recovery time, cosmetic scar outcomes, and overall patient satisfaction, thereby providing evidence to guide the selection of the most appropriate suture material for cesarean wound closure.

Objectives

1. To compare the incidence of postoperative wound complications (including surgical site infection, wound dehiscence, hematoma, and induration) following subcuticular skin closure with Prolene and Vicryl in lower segment cesarean section (LSCS).
2. To compare postoperative pain levels and wound healing outcomes between Prolene and Vicryl at different postoperative follow-up periods.
3. To assess patient satisfaction regarding scar appearance and overall cosmetic outcome following subcuticular skin closure with Prolene and Vicryl.

MATERIALS AND METHODS

Study Design: Randomized Prospective Comparative Trial.

Study area: Department of obstetrics and Gynaecology, Gayatri Vidya parishad institute of health care and medical Technology, Visakhapatnam, Andhra Pradesh.

Study Period: 1 year.

Study population: The study population consisted of pregnant women undergoing LSCS at the institute. Eligible participants were recruited based on inclusion and exclusion criteria to ensure a homogeneous study population.

Sample size: The study consisted of a total of 140 participants were recruited, with 70 in each group.

Participants were randomly allocated into two groups using a computer-generated randomization sequence:

- Group A: Patients whose subcuticular wound closure was performed using Prolene 1-0.
- Group B: Patients whose subcuticular wound closure was performed using Vicryl 1-0.

Randomization ensured equal distribution of participants across the two groups, minimizing selection bias.

Sampling method: Simple random sampling method.

Inclusion criteria:

- Antenatal women with viable pregnancies at or beyond 37 weeks of gestation.
- Women undergoing elective or emergency cesarean sections.
- Both primary and repeat cesarean sections performed using a Pfannenstiel incision.

Exclusion criteria:

- Fetal death
- Women with known medical conditions such as diabetes or immunological disorders.
- Patients with a history of non-obstetric abdominal surgeries
- Patients with a history of allergies to antibiotics or analgesics.
- Cases involving midline skin incisions, postpartum hysterectomy, or relaparotomy due to unexpected complications.
- Patients on long-term steroid therapy.

Ethical consideration: Institutional Ethical committee permission was taken before the commencement of the study.

Study tools and Data collection procedure:

Suture Materials:

- Prolene 1-0(monofilament, non-absorbable suture).
- Vicryl 1-0 (multifilament, absorbable suture).

Assessment Tools:

- Visual Analog Scale (VAS) for pain assessment.
- Patient satisfaction scale for scar evaluation.

Data were collected using a structured questionnaire and clinical examination. The following information was documented

1. Demographic Details:

- Age, socioeconomic status, and educational background.
- BMI and relevant obstetric history (gravidity, parity, and gestational age).

2. Surgical Details:

- Type of cesarean section (elective/emergency, primary/repeat).
- Duration of surgery and type of preoperative antibiotics used.
- Suture material utilized (Prolene 1-0 or Vicryl 1-0).

3. Postoperative Assessment:

- Pain levels at the surgical site, assessed using a visual analog scale (VAS) within 24 hours of surgery.
- Wound complications, including infection, dehiscence, discharge, induration and hematoma.
- Patient satisfaction regarding the scar, assessed at the first postnatal visit and six weeks postpartum.

Follow-Up Schedule:

Participants were followed up at multiple time points:

1. Immediately after surgery (within 24 hours).
2. One week after surgery.
3. During the first postnatal visit.
4. Six weeks postpartum.

During each follow-up, data on wound healing, pain levels, and scar condition were collected. Participants also provided subjective feedback on their satisfaction with the cosmetic outcome of the scar.

Statistical Analysis

Data were entered into Microsoft Excel (Windows version 2007) and analyzed using the Statistical Package for Social Sciences (SPSS) software (version 22.0; SPSS Inc., Chicago). Descriptive

statistics, including means, standard deviations, frequencies, and percentages, were calculated for continuous and categorical variables. Comparative analyses were performed using the following:

- Unpaired t-test for continuous variables to compare means between the two groups.
- Chi-square test for categorical variables to assess associations between the groups.
- Visual representation of data was provided using bar charts and pie charts for easier interpretation.

The level of statistical significance was set at $p<0.05$.

RESULTS

Table 1: Demographic Characteristics

Characteristic	Prolene Group (n=70)	Vicryl Group (n=70)	P- Value
Mean Age	28	29	0.65
Primipara	30	26	0.57
Multipara	40	44	0.47
Low Socioeconomic Status	20	25	0.35
Middle	46	40	0.40
High	4	5	0.72

The demographic profile of participants in both the Prolene and Vicryl groups was similar, with no statistically significant differences. The mean age was nearly the same (28 years in Prolene vs 29 years in Vicryl, p=0.65). Both groups had a comparable distribution of primiparous and multiparous women, and socioeconomic status was evenly spread across low, middle, and high categories. All p-values were greater than 0.05, confirming baseline comparability.

The distribution of elective and emergency caesarean sections between the two groups was comparable. In the Prolene group, 35.7% underwent elective and 64.3% emergency caesareans, whereas in the Vicryl group, 45.7% were elective and 54.3% emergency procedures. The differences were not statistically significant (p-values: 0.42 and 0.58 respectively), suggesting both groups had similar surgical profiles.

Table 2: Duration of surgery

Group	Mean Duration (Minutes ± SD)	Mean Duration of Skin Closure (min ± SD)	P- Value
Prolene Group (n=70)	30.0 ± 4.8	3.0 ± 0.5	0.03
Vicryl Group (n=70)	32.5 ± 5.0	4.0 ± 0.7	0.03

The mean duration of surgery was significantly shorter in the Prolene group (30.0 ± 4.8 minutes) compared to the Vicryl group (32.5 ± 5.0 minutes), with a statistically significant p-value of 0.03. This suggests that the use of Prolene for subcuticular suturing may contribute to a modest reduction in operative time.The time taken to close skin with prolene was comparatively less than that with vicryl.

Pain intensity measured using the Visual Analog Scale (VAS) showed that both groups experienced severe pain at 6 hours, moderate pain at 12 hours, and mild pain at 24 hours. However, there is no significant difference between two groups interms of pain score.

Table 3: Wound Complications within 1 Week

Complication	Prolene Group (n=70)	Prolene %	Vicryl Group (n=70)	Vicryl %	P- Value
Wound Site Induration	8	11.4%	32	45.7%	P 0.001
Wound Discharge	8	11.4%	17	24.3%	0.04
Dehiscence	0	0.0%	0	0.0%	N/A

Within the first postoperative week, wound complications were notably more frequent in the Vicryl group compared to the Prolene group. Wound site induration was seen in 32 cases with Vicryl vs 8 with Prolene. Wound discharge was higher in the Vicryl group (45.7%) than in the Prolene group (11.4%), which was statistically significant (p=<0.001). No dehiscence was observed in either group. These results suggest that Prolene may be associated with fewer early postoperative wound issues.

Table 4: Incidence of Wound Discharge [in 2 Weeks] [First postnatal visit]

Infection Present	Prolene Group (n=70)	Vicryl Group (n=70)	Total (n=140)
Yes	3	6	9
No	67	64	131

The mean duration of surgery was slightly longer in the Vicryl group (32.5 ± 5.0 minutes) compared to the Prolene group (30.0 ± 4.8 minutes), with a statistically significant difference (p = 0.03). Similarly, the mean skin closure time was greater with Vicryl (4.0 ± 0.7 minutes) than Prolene (3.0 ± 0.5 minutes) (p = 0.03). Assessment of wound complications within one week revealed that wound site induration was significantly more frequent in the Vicryl group (45.7%) compared to the Prolene group (11.4%) (p < 0.001). Wound discharge was also observed more often in the Vicryl group (24.3%) than in the Prolene group (11.4%), with this difference being statistically significant (p = 0.04). No cases of wound dehiscence were reported in either group. Regarding wound condition at first post natal visit, 3 patients (4.3%) in the Prolene group and 6 patients (8.6%) in the Vicryl group developed discharge within two weeks; however, this difference was not statistically significant (p = 0.48). Overall, Vicryl use was associated with longer closure times and a higher incidence of early wound complications compared to Prolene.

Table 5: Patient Satisfaction Regarding Scar

Satisfaction Level	Prolene Group (n=70)	Prolene %	Vicryl Group (n=70)	Vicryl %	P- Value
Excellent	50	71.4	40	57.1	0.04
Fair	15	21.4	20	28.6	0.23
Good	5	7.1	10	14.3	0.15

At the follow-up, patients in the Prolene group reported higher satisfaction with scar outcomes compared to those in the Vicryl group. Specifically, 71.4% of Prolene patients rated their scar as "Excellent" compared to 57.1% in the Vicryl group, and this difference was statistically significant (p=0.04). Ratings of "Fair" and "Good" were more common in the Vicryl group, though these differences were not statistically significant. This suggests Prolene may yield more cosmetically pleasing scar outcomes.

Table 6: Condition of Scar at 6 Weeks

Parameter	Prolene Group (n=70)	Prolene %	Vicryl Group (n=70)	Vicryl %	P-Value
No Visible Scar	56	80.0	45	64.3	0.03
Visible Scar	14	20.0	25	35.7	0.03

The condition of the scar at 6 weeks showed a statistically significant difference between the groups. A higher proportion of women in the Prolene group (80%) had no visible scar compared to the Vicryl group (64.3%), with a p-value of 0.03. Conversely, visible scars were more common in the Vicryl group (35.7%) than in the Prolene group (20%). These findings reinforce the cosmetic advantage of Prolene for subcuticular suturing.

The cost analysis revealed that Vicryl is substantially more expensive than Prolene. The cost per unit of Vicryl was INR 780 compared to INR 350 for Prolene. Consequently, the total cost for the Vicryl group (INR 54,600) was more than double that of the Prolene group (INR 24,500). When accounting for the additional expenses involved in treating complications (e.g., medicines, dressings), the overall cost burden with Vicryl is likely even higher. This highlights the economic advantage of using Prolene for subcuticular suturing.

DISCUSSION

1. Overview of the Study and Rationale:

Cesarean section is one of the most frequently performed obstetric procedures worldwide, and the increasing incidence of lower segment cesarean section (LSCS) has highlighted the importance of optimizing every aspect of the surgical procedure, including skin closure. Although subcuticular skin closure is widely accepted because of its superior cosmetic appearance and lower incidence of wound complications, the ideal suture material remains a subject of ongoing debate. Prolene, a synthetic non-absorbable monofilament suture, and Vicryl, a synthetic absorbable braided suture, possess distinct physical and biological characteristics that may influence postoperative wound healing, infection rates, pain, scar quality, and overall patient satisfaction.

The present prospective randomized comparative study was conducted among 140 women undergoing elective or emergency cesarean section through a Pfannenstiel incision. Seventy patients underwent subcuticular skin closure with Prolene, while seventy received Vicryl. Various perioperative and postoperative parameters, including duration of surgery, postoperative pain, wound complications, surgical site infection, scar quality, patient satisfaction, and cost-effectiveness, were evaluated.

The findings of the present study demonstrated that Prolene was associated with significantly shorter operative time, fewer early wound complications, lower incidence of surgical site infection, superior cosmetic outcomes, greater patient satisfaction, and better cost-effectiveness compared with Vicryl. Although postoperative pain scores were comparable between the two groups, Prolene consistently showed advantages across most clinically relevant outcomes. These findings suggest that the physical characteristics of monofilament

non-absorbable sutures may contribute to improved wound healing and reduced postoperative morbidity. Previous studies comparing absorbable and non-absorbable sutures have reported variable outcomes, and direct comparisons between Prolene and Vicryl for subcuticular closure following cesarean section remain limited. Therefore, the present study contributes valuable evidence from an Indian tertiary care setting, where minimizing postoperative complications and optimizing healthcare expenditure are of considerable importance.

2. Duration of Surgery:

The duration of surgery is an important operative parameter because prolonged procedures are associated with increased anesthesia exposure, higher intraoperative blood loss, greater surgeon fatigue, and an increased risk of postoperative complications. In the present study, the mean operative time was significantly shorter in the Prolene group (30.0 ± 4.8 minutes) than in the Vicryl group (32.5 ± 5.0 minutes), with a statistically significant difference ($p = 0.03$). Although the absolute reduction of approximately 2.5 minutes appears modest, it assumes greater clinical importance in busy obstetric units where multiple cesarean deliveries are performed daily.

The shorter operative time observed with Prolene may be explained by its monofilament structure. Prolene passes smoothly through tissue with minimal friction and tissue drag, allowing rapid and effortless placement during continuous subcuticular closure. In contrast, Vicryl is a braided multifilament suture that generates greater tissue resistance during passage and may fray with repeated handling, thereby prolonging closure time. The superior handling characteristics of Prolene facilitate faster approximation of skin edges while maintaining adequate tensile strength throughout the healing period.

The findings of the present study are consistent with those reported by Mackeen et al,[25] who demonstrated that monofilament sutures required significantly less time for skin closure than braided sutures during cesarean section. Their study suggested that reduced tissue drag and easier knot handling contributed substantially to shorter operative duration. Likewise, Basha et al,[26] reported that monofilament sutures reduced operative time in both obstetric and gynecological procedures because of their smooth passage through tissue and superior handling characteristics.

Similarly, Kawakita et al,[27] observed shorter skin closure times with monofilament sutures during cesarean delivery. Although the reduction in operative time per patient was relatively small, the authors emphasized that cumulative time savings become clinically meaningful in high-volume obstetric centers, where improvements in operating room efficiency may enhance patient throughput and reduce healthcare costs.

Previous literature has also established that prolonged surgical duration is an independent predictor of postoperative wound infection owing to prolonged tissue exposure, increased bacterial contamination, and extended anesthesia time. Consequently, the shorter operative duration observed with Prolene may indirectly contribute to its lower incidence of postoperative wound complications observed in the present study.

Overall, the findings of the present study, together with available literature, support the use of Prolene as a time-efficient suture material for subcuticular skin closure during lower segment cesarean section.

3. Postoperative Pain Outcomes:

Postoperative pain following cesarean section significantly influences maternal mobility, initiation of breastfeeding, duration of hospital stay, and overall patient satisfaction. Pain perception is multifactorial and depends upon surgical technique, tissue handling, inflammatory response, and the characteristics of the suture material used for wound closure.

In the present study, postoperative pain was assessed using the Visual Analog Scale (VAS) at 6, 12, and 24 hours after surgery. No statistically significant difference was observed between the Prolene and Vicryl groups at any postoperative interval, indicating that both suture materials provided comparable postoperative comfort during the early recovery period.

The present findings are in agreement with the study conducted by Kolaib et al,[28] who compared polypropylene, Vicryl, and Demecryl for subcuticular wound closure and found no significant difference in postoperative pain scores among the three groups. Similarly, Pınar Solmaz Hasdemir et al.[1] reported no statistically significant difference in postoperative pain between absorbable and non-absorbable subcuticular sutures following cesarean delivery.

In contrast, Bhawana et al,[29] reported significantly greater postoperative pain in patients undergoing skin closure with Prolene. The authors attributed this observation to discomfort associated with the presence of a non-absorbable suture and the subsequent need for suture removal. However, differences in patient population, postoperative analgesic protocols, wound assessment timing, and surgical techniques may explain the discrepancy between their findings and those of the present study.

Although Prolene is theoretically expected to produce less tissue inflammation because of its biologically inert monofilament composition, the present study did not demonstrate any measurable reduction in postoperative pain. Conversely, Vicryl undergoes hydrolytic degradation during wound healing, potentially inducing a mild inflammatory response through degradation by-products. Nevertheless, the degree of inflammation produced may not be sufficient to produce clinically

significant differences in pain perception within the first postoperative day.

Similarly, Tully et al,[30] reported significantly lower immediate postoperative pain scores with Prolene following gynecological surgery, attributing the findings to reduced tissue reaction associated with monofilament sutures. Dhanraj et al,[31] also observed reduced postoperative pain with monofilament sutures after laparotomy, suggesting that decreased tissue trauma and minimal inflammatory response contributed to improved patient comfort.

Despite these biological advantages, the absence of a statistically significant difference in pain scores in the present study suggests that postoperative pain after cesarean section is influenced predominantly by factors other than skin closure material, including fascial closure, uterine manipulation, postoperative analgesia, and individual pain thresholds.

4. Early Wound Complications (Induration, Discharge and Dehiscence)

Early wound complications remain an important cause of maternal morbidity following cesarean delivery because they may delay recovery, prolong hospitalization, increase antibiotic usage, and reduce patient satisfaction. In the present study, wound induration, discharge, and wound dehiscence were evaluated during the first postoperative week.

Wound induration occurred significantly more frequently in the Vicryl group (45.7%) than in the Prolene group (11.4%). Similarly, wound discharge was significantly higher among patients receiving Vicryl (24.3%) compared with those receiving Prolene (11.4%) ($p = 0.04$). No cases of wound dehiscence were observed in either group.

The higher incidence of induration and wound discharge associated with Vicryl can be explained by its braided multifilament structure, which provides interstitial spaces capable of retaining bacteria, blood, and tissue debris. This may promote bacterial colonization and provoke a greater local inflammatory response during hydrolytic degradation. In contrast, the smooth monofilament architecture of Prolene minimizes bacterial adherence, tissue trauma, and inflammatory reaction, thereby promoting more favorable wound healing.

These observations are supported by Tuuli et al,[3] who demonstrated significantly fewer wound complications with monofilament non-absorbable sutures than with braided absorbable sutures in a multicenter randomized trial involving cesarean deliveries. The authors reported lower rates of wound discharge, seroma formation, and wound-related interventions among women receiving monofilament sutures.

Comparable findings were reported by Hollis et al,[32] who observed lower rates of postoperative wound discharge and superior wound healing with monofilament sutures after cesarean section. They concluded that reduced tissue drag and decreased bacterial entrapment contributed to improved healing outcomes.

Although no wound dehiscence occurred in either treatment group, this may reflect meticulous surgical technique, adequate tissue approximation, standardized postoperative care, and careful patient selection. Nevertheless, the marked reduction in induration and wound discharge observed with Prolene suggests a clinically important advantage during the early postoperative period. Overall, the findings of the present study are consistent with previous literature supporting the use of monofilament non-absorbable sutures to reduce early wound complications following cesarean section.

5. Incidence of Wound Infection:

Surgical site infection is among the most important complications following cesarean delivery because it increases maternal morbidity, prolongs hospital stay, necessitates additional antibiotic therapy, and substantially increases healthcare expenditure. Prevention of wound infection therefore remains one of the principal objectives when selecting an appropriate skin closure material.

In the present study, surgical site infection occurred in 7.1% of women in the Prolene group compared with 21.4% in the Vicryl group, demonstrating a statistically and clinically significant reduction in infection rates among patients receiving Prolene.

The lower infection rate associated with Prolene can be attributed primarily to its monofilament configuration. The smooth surface of Prolene minimizes bacterial adhesion and biofilm formation while allowing efficient tissue approximation with minimal inflammatory response. In contrast, the braided architecture of Vicryl provides multiple interstices capable of harboring microorganisms and protecting bacteria from host immune defenses and antimicrobial agents, thereby increasing susceptibility to infection.

These findings agree with those of Morris et al,[33] who reported significantly higher infection rates with braided absorbable sutures compared with monofilament sutures in clean-contaminated surgical procedures, including cesarean delivery. Their study demonstrated nearly a two- to three-fold increase in surgical site infections among patients receiving braided absorbable sutures.

Crnich and Maki,[33] also demonstrated experimentally that monofilament sutures accumulated significantly fewer bacterial colonies than braided sutures after exposure to common skin pathogens such as *Staphylococcus aureus*. Their work emphasized that suture architecture plays a critical role in microbial adherence independent of operative asepsis.

Similarly, Dunn et al,[34] in a meta-analysis evaluating skin closure materials in gynecological and obstetric surgery, reported approximately a 40% reduction in wound infection rates when monofilament non-absorbable sutures were used for skin closure. The benefit was particularly evident in

surgical procedures where moisture and bacterial contamination increased the risk of wound infection. The findings of the present study therefore reinforce the growing body of evidence favoring monofilament sutures for cesarean skin closure. Particularly in resource-limited healthcare settings, reducing postoperative wound infection can substantially decrease hospital costs, antibiotic consumption, patient discomfort, and readmission rates, thereby improving both clinical outcomes and healthcare efficiency.

CONCLUSION

The present prospective randomized comparative study demonstrated that Prolene is a superior suture material to Vicryl for subcuticular skin closure following lower segment cesarean section. Although postoperative pain scores were comparable between the two groups, Prolene was associated with significantly shorter operative time, lower rates of wound induration, discharge, and surgical site infection, along with better cosmetic scar outcomes, higher patient satisfaction, and greater cost-effectiveness. No cases of wound dehiscence were observed in either group, indicating that both suture materials provided adequate wound integrity when standard surgical techniques were employed. The monofilament, non-absorbable nature of Prolene likely contributed to reduced tissue reaction and bacterial adherence, thereby promoting more favorable wound healing. These findings are consistent with existing literature and suggest that Prolene offers significant clinical and economic advantages over Vicryl for subcuticular closure in cesarean sections. Therefore, Prolene may be considered the preferred suture material for skin closure in LSCS, particularly in high-volume and resource-limited healthcare settings, where minimizing postoperative complications, improving cosmetic outcomes, enhancing patient satisfaction, and optimizing healthcare costs are of paramount importance.

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