

## ORIGINAL ARTICLE

# FREQUENCY OF WOUND INFECTION FOLLOWING SKIN CLOSURE WITH PROLENE, AFTER LOWER SEGMENT CESAREAN SECTION

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## ABSTRACT:

**Background:** Surgical site infection following lower segment cesarean section is a morbidity which can prolong the recovery process. Subcuticular suturing with prolene is one of the method favored for skin closure for many reasons. The objective of this study was to determine the frequency of wound infection following skin closure with prolene, after lower segment cesarean section.

**Materials & Methods:** It was a descriptive Study conducted in Department of Obstetrics and Gynaecology, Mardan Medical Complex, Mardan. This study was conducted from 1st January 2022 to 15th June 2022. A total of 97 pregnant women undergoing caesarean section delivery were included in the study. The same operation technique (Pfannenstiel technique) was used for all patients. Polypropylene (3.0 Prolene) was used as nonabsorbable suture material for skin closure. Post-operatively, all patients were followed up weekly and the final assessment of wound infection was done after 2 weeks.

**Results:** Age range in this study was from 20 to 35 years with mean age of  $27.930 \pm 2.33$  years, mean gestational age  $38.450 \pm 0.93$  weeks, mean parity  $1.390 \pm 1.23$  and mean duration of procedure was  $49.490 \pm 7.18$  minutes. Wound Infection was observed in 11.3% of patients.

**Conclusion:** Skin suturing with prolene is an effective method of suturing for reducing wound infection.

**KEY WORDS:** Caesarean section; Prolene suture; Wound infection; Pfannenstiel incision; non-absorbable suture.

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## INTRODUCTION

Cesarean section remains one of the most important surgical procedures which can be at many times, life saving for both mother and the fetus. The rate of cesarean section has been on the rise globally. The rate can be as high as 59.3% as in Dominic republic<sup>1</sup>, implying that more than half of babies there is

delivered through cesarean section. The procedure however is not without risks and complications, and the current rise does not reflect increased need but can be attributed many times to patient's or doctor's preference. In order to cut down indiscriminate use of the procedure, WHO recommends limiting the rate of cesarean section to not more than 10-15% in any setup.<sup>2</sup>

One of the many risks associated with cesarean delivery as a medical operation is surgical site infection (SSI). Worldwide, the prevalence of SSI varies from 3% to 15%.<sup>3</sup> Various factors contribute to variations in incidence including population characteristics and risk factors<sup>4</sup>, indications including elective or emergency procedures<sup>4</sup>, operative techniques and length of the procedure.<sup>5</sup> It is very important to address these since SSIs continue to contribute to maternal morbidity leading to prolonged hospital stay, multiple hospital visits, increased healthcare costs and

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greater socioeconomic implications, especially in resource limited settings.

In order to combat it, various methods have also evolved over time to minimize the risk of developing SSIs. These include antibiotics use<sup>4</sup>, instruments sterilization, minimal tissue handling, improving operative techniques and reducing operative time.<sup>6</sup> Regarding procedure related factors, attention has been paid to type of suture material used for sealing skin incision. Various sealing materials currently in use include absorbable (vicryl) and non-absorbable sutures (prolene) and staples. Studies have been conducted in the past comparing one skin closure material with the other. A 2012 Cochrane review on techniques and materials for skin closure in cesarean sections, based on 8 trials, revealed that incidences of wound infection were similar with absorbable subcuticular sutures and non-absorbable staples.<sup>7</sup> Response with staples was dependent on the type of skin incision, with increased risk of wound separation needing re-closure with non-absorbent staples.<sup>7</sup> Choudhury et al. in 2017 showed in their study that following closure of pfannensteil incision with subcuticular suture, there was less pain, better wound results and cosmesis, quicker recovery, shorter postoperative hospital stay as compared to closure with interrupted mattress sutures.<sup>8</sup> A study done in pediatric population showed better results with prolene (non-absorbable) regarding wound infection (6.7%) as compared to absorbable suture material vicryl (13.3%).<sup>9</sup>

Our study aimed to look at the effect of use on non-absorbable suture material prolene on the frequency of SSIs. There is sparse local data on use of prolene in cesarean section. Since cesarean section is a frequently performed procedure, any small benefit, detected by our study regarding use of prolene can have significant effect on patients' care in low resource country like Pakistan.

## MATERIALS AND METHODS

It was a descriptive Study conducted in department of Obstetrics and Gynaecology, Mardan Medical Complex, Mardan. This study was conducted from 1st January 2022 to 15th June 2022. By using reference study where proportion of wound infection is 6.7 %<sup>9</sup>, with 5% margin of error and 95% confidence level by using WHO sample size formula, sample size came out to be 97. Sampling technique was non-probability consecutive sampling. Inclusion criteria were women aged 20-35 years with singleton pregnancy, having gestational age of 37-40 weeks on LMP, undergoing Caesarean section delivery (Elective/Emergency). Exclusion criterias were h/o diabetes or any chronic illness, and consent refusal. Permission was taken from ethical committee of hospital. Ninety seven (97) women fulfilling the

inclusion criteria from indoor department of OBGYN were included in the study. Base line demographic information of patients (age, parity, gestational age, booking status and type of cesarean section) was taken. Informed consent was taken from women, ensuring confidentiality and fact that there was no risk involved to the patient while taking part in this study. Skin of the patients was cleaned with povidone iodine 3 to 4 minutes before the operation started. Prophylactic antibiotic (2nd generation cephalosporin) was administered in all patients right after cord clamping. The same operation technique (Pfannensteil technique) was used for all patients. Polypropylene (3.0 Prolene) straight needle was used as non-absorbable suture material for skin closure. Cesarean section site was cleaned with iodine solution and covered with sterile gauze and adhesive tape. Suture was removed at postoperative 7 to 10 days. Post-operatively, all patients were followed up weekly and the final assessment of wound infection was done after 2 weeks. Data was recorded on especially designed proforma. Data was analyzed with statistical analysis program (IBM-SPSS-version 20). Frequency and percentage was computed for qualitative variables like type of caesarean section, indications of caesarian section, booking status and wound infection. Mean  $\pm$ SD was presented for quantitative variables like age, gestational age, parity and duration of procedure. Chi square test was applied,  $p \leq 0.05$  was considered statistically significant.

## RESULTS

About 97 patients were included in the study. Age range in this study was from 20 to 35 years with mean age of  $27.930 \pm 2.33$  years, mean gestational age  $38.450 \pm 0.93$  weeks, mean parity  $1.390 \pm 1.23$  and mean duration of procedure was  $49.490 \pm 7.18$  minutes. Frequency and percentage of type of cesarean section is shown in Table-1. Wound Infection was observed in 11.3% patients, more commonly after emergency cesarean section. The most common risk factor of patients getting infected after emergency cesarean sections were poor progress in labour (41%) and PROM (25%). Stratification of Wound Infection with respect to duration of procedure ant type of cesarian section is shown in Tables 2 and 3.

**Table 1: Frequency and %age of patients according to type of C-section (n=100)**

Type of C-section	Frequency	Percentage
Elective	36	37.1%
Emergency	61	62.8%
Total	97	100%

**Table 2: Stratification of Wound Infection with respect to duration of procedure.**

Duration of procedure (mins)	Wound Infection		p-value
	Yes	No	
≤45	3(3%)	26(26.8%)	0.69
>45	9(9.3%)	59(60.8%)	
Total	12(12.3%)	85(87.6%)	

**Table 3: Stratification of Wound Infection with respect to type of C section.**

Type of C-section	Wound Infection		p-value
	Yes	No	
Elective	1(1%)	35(36%)	0.041
Emergency	10(10.3%)	51(52.6%)	
Total	11(11.3%)	85(88.6%)	

The result shows that there is a significant difference in wound infection after emergency vs elective cesarean section,  $\chi^2 (1, n=97) = 4.174, p < .05$ .

## DISCUSSION

In modern day practice, skin suturing after any surgery is required to provide maximal wound integrity, while offering good cosmetic results as well. For this reason, various types of suturing materials and techniques have evolved, and have been a subject of research. Our study looked into frequency of wound infection while using prolene for skin suturing after cesarean section. In our study, the overall rate of infection after prolene use was 11.3%. This rate is almost double the rate noted by Umar et al in their study on pediatric population (6.7%).<sup>9</sup> The high incidence in our study can be accounted for by the fact that our study involved post cesarean section patients. Of these, there was a significantly high incidence of infection in those who were operated in emergency ( $p < .05$ ). In the study by Bhawana et al, where results of skin suturing with vicryl vs prolene after caesarian section was compared in a sample of 200 patients.<sup>10</sup> Of these, 53% of their patients had elective cesareans, among whom, the incidence of wound infection was 1.8%. The infection rate was 10.5% in emergency cesarean section group. These figures are similar to as in our study. Their study also showed that wounds stitched with prolene performed relatively better than vicryl. Hasdemir et al had even a higher incidence of SSI (14.9%) after cesarean section.<sup>11</sup> However; they had included diabetic as well as non-obstetric cases in their study, probably accounting for a higher rate of infection. A study from Kuwait reported much lower rates of infection following cesarean section, reflecting better healthcare services and good patients' status, with post-emergency cesarean patients still having more

than double the rate of infection as compared to elective cesareans (1.56% vs 0.53%).<sup>12</sup>

In our study the most common risk factor for surgery in emergency cesarean section patients getting infected were poor progress in labor (41%) and premature rupture of membranes (25%). In a study conducted in Oman, prolonged membranes rupture was the major cause (17%) of infection post c section, while prolonged labor, implying multiple vaginal examinations was found to be associated in 9.47% of cases.<sup>13</sup> Gashaw et al also showed significant association of prolonged labor and premature rupture of membranes with risk of developing surgical site infection.<sup>14</sup> A local study from Karachi quoted PROM to be associated with 17.8% of wound infection post cesarian.<sup>14</sup> Hence, from the results from all these studies, prolonged labor and PROM are the major obstetric related contributors to developing SSIs.

Length of procedure did not appear to affect the incidence of infection significantly in our study ( $p > .05$ ). Same was noted in study from Ethiopia where association with duration of surgery did not reach significance.<sup>14</sup> However a study from Kosovo, found duration of procedure of more than one hour to be significantly associated with SSI post-surgery ( $p = 0.000, 95\% \text{ CI}; 0.054-0.338$ ).<sup>15</sup>

Our study has few limitations. It included both emergency and elective cesareans. Even though effectiveness of prolene can clearly be demonstrated from results of elective cases, having an even bigger sample size and limiting the study to only elective surgeries can remove the effect of contribution of emergency situation and risk factors. Also studies comparing it with other suture materials can compare the qualities even further and are recommended.

## CONCLUSION

Skin suturing with prolene is an effective method of suturing for reducing wound infection.

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#### CONFLICT OF INTEREST

Authors declare no conflict of interest.  
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#### AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: AA, NH, AR  
Acquisition, Analysis or Interpretation of Data: AA, NH, AR, SA, MA, NU  
Manuscript Writing & Approval: AA, NH, AR, SA, MA, NU, HA

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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