

# International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614  
ISSN (E): 2522-6622  
© Gynaecology Journal  
www.gynaecologyjournal.com  
2019; 3(1): 150-153  
Received: 12-11-2018  
Accepted: 16-12-2018

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## Efficacy of different types of sutures materials used in the wound closure of pfannenstiell skin incision by subcuticular technique in cesarean section

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DOI: <https://doi.org/10.33545/gynae.2019.v3.i1c.26>

### Abstract

Caesarean Section is one of the oldest and commonest major surgical procedures in obstetrics. Although the outcomes of surgical skin closure may be influenced by the indication for the procedure, the location of the surgical site, and associated intraoperative and postoperative complications, the goal of any skin closure technique is to produce appropriate skin approximation and adequate healing with minimal wound complications, scarring, pain, and cost. The present study was conducted to study the efficacy of different types of suture materials used in the wound closure of Pfannenstiell skin incision by subcuticular technique in caesarean section. Randomized prospective comparative hospital based study done in department of Obstetrics and Gynaecology of Dr DY Patil Medical College and Hospital, Pune, Maharashtra from July 2016 to Sep 2018. Total 150 women underwent lower segment caesarean section for various indications. The selected patients were divided into three groups by randomization. Randomization was done serially, in the order of first case in group A, second in Group B, third case in Group C. conducted a study comparing the suture materials and reported that absorbable and nonabsorbable sutures have similar short-term outcomes. In this study we found that there was no significant difference in terms of wound complication. It was also noted that there was better wound healing tendency with non absorbable material.

**Keywords:** Cesarean section, Pfannenstiell skin incision. Subcuticular technique, suture material

### Introduction

Caesarean Section is one of the oldest and commonest major surgical procedures in obstetrics [1-2]. The use of sutures for tissue approximation is the oldest and still the most common form of wound closure. Although the outcomes of surgical skin closure may be influenced by the indication for the procedure, the location of the surgical site, and associated intraoperative and postoperative complications, the goal of any skin closure technique is to produce appropriate skin approximation and adequate healing with minimal wound complications, scarring, pain, and cost [3]. The subsequent apposition is important for wound healing by primary intention and to reduce postoperative morbidities. The wound closure materials have evolved over the years, varying in caliber, biochemical composition, constituent, knot security, elasticity and absorption, tensile strength, and tissue reactivity [4]. Until recently, catgut and silk were the two main natural sutures used in Obstetrics. It is an absorbable suture but has been withdrawn from use in UK due to the risk of cross infection with slow viruses. Polyglactin 910 sutures are absorbable, synthetic, usually braided and are degraded by slow hydrolysis and are absorbed at a reliable and constant rate for approximately two to three weeks [5]. 90% Glycolide + 10% L-lactid is an absorbable, synthetic suture material made of a copolymer 90% Glycolide and 10% L-lactid. The absorption time varies in between 7 to 10 days post-operatively [5]. Non absorbable nylon suture is a monofilament composed of the long-chain aliphatic polymers Nylon 6 and Nylon 66. While nylon is not absorbed, progressive hydrolysis of the nylon *in vivo* may result in gradual loss of tensile strength over time, hence it should not be used where permanent retention of tensile strength is required.

Wound complications following Cesarean Section is common and ranges from 3% to 15%, with an average of about 6%. These cases translate into a substantial portion of the population, and hence there is a load on the financial resources of health-care system due to prolonged

hospitalization and delayed recovery. The effect of various suture materials also affects the outcome of suture healing.

Thus, the present study was conducted to study the efficacy of different types of suture materials used in the wound closure of Pfannenstiel skin incision by subcuticular technique in caesarean section.

### Aims and Objectives

1. To compare different types of subcuticular suture materials used for Pfannenstiel skin closure.
2. To compare the postoperative complications with different types of suture used.
3. To assess the cosmetic outcome

### Materials and Methods

It was a randomized prospective comparative hospital based study done in department of Obstetrics and Gynaecology of Dr DY Patil Medical College and Hospital, Pune, Maharashtra from July 2016 to Sep 2018 after approval of institutional ethics committee.

### Inclusion criteria

All patients undergoing elective or emergency caesarean delivery for various indications and subcuticular skin closure of Pfannenstiel incision were included in the study with proper written and informed consent. Patients with previous caesarean scar showing keloid formation or hypertrophic scar, local skin infection, abdominal drain in situ, diabetic, HIV and immunocompromised patients were excluded from the study.

### Study Design

Total 150 women underwent lower segment caesarean section for various indications. The selected patients were divided into three groups by randomization. Randomization was done serially, in the order of first case in group A, second in Group B, third case in Group C and so on. Group A: The patients where polyglactin 910 was used for subcuticular skin closure. Group B: where 90% glycolide + 10% L-lactide suture material was used for skin closure. Group C: where non-absorbable nylon was used. Each group was containing 50 patients. All the patients had standard routine preoperative preparation. Caesarean section was performed by standard technique after prophylactic perioperative antibiotics using Pfannenstiel incision and respective suture material was used for subcuticular skin closure as per the group to which the study participant belonged. All cesarean sections were done by qualified obstetricians as per the standard hospital protocols. Study outcome were evaluated in terms of wound complications post-operative pain, analgesic requirement, patient satisfaction, cosmetic outcome.

### Data Analysis

All the patient were given questionnaire preoperatively and post operatively. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0. Collected data was analysed by frequencies, percentages, mean, and standard deviation. Chi-square test was use to find the significance difference of type of LSCS, parity, complications, cosmetic result, patients satisfaction between Group A, Group B and Group C. ANOVA test was use to find the significance difference of age, duration of surgery, skin closure time, wound length, haemoglobin level between Group A, Group B and Group C. P value less than or equal to 0.05 was considered significant.

### Results (table)

Total 150 patients were included in this study. They were randomized into three groups with 50 patients each. Group A: where polyglactin 910 was used for subcuticular skin closure Group B: where 90% glycolide + 10% L-lactide suture material was used for skin closure. Group C: where non-absorbable nylon was used. Most of the patients were younger with mean age Mean age of  $25.12 \pm 2.78$  yrs,  $24.82 \pm 3.31$  yrs and  $25.18 \pm 3.71$  yrs respectively. Previous LSCS was the most common indication for LSCS (36.67%) and was followed by Breech (7.33%) and Non Reassuring Fetal Status (6.67%). The mean duration of surgery in Group A was  $49.68 \pm 5.53$  min, while in Group B and Group C was  $50.36 \pm 6.36$  min and  $49.84 \pm 6.37$  min. The difference observed in the duration of surgery in Group A, Group B and Group C was not statistically significant. The mean skin closure time of Group A was  $7.26 \pm 1.45$  min while that of Group B and Group C was  $7.40 \pm 0.99$  min and  $7.50 \pm 1.19$  min and the difference was not statically significant. Patients with rise in temperature were more in Group C (10%) followed by Group A (8%) and Group B (4%). Induration was observed among 14% women of Group A and Group C each and among 4% women of Group B. No case of wound discharge was observed in Group B while in Group C discharge from wound was seen in 6% cases and 2% in Group A. Itching at skin closure site was reported by 12% women from Group A, 8% each from Group B and Group C. Post-operative pain was seen commonly in Group C (22%) followed by Group A (14%) and Group B (8%). There were five cases of wound dehiscence in the study patients, 2 (4%) in Group A, 2 (4%) in Group B and 1 (2%) in Group C. the difference in three groups was not statistically significant. The cosmetic outcome in different types of suture materials was also studied and it was seen that just line without any postoperative scar was observed in all the cases of Group A and Group B (100% each) while just line without any postoperative scar was observed in 98% women of Group C. No case of mild ridge with change in colour was observed in Group B while 8% women from Group B and 6% women from Group C reported mild ridge with change in colour. When the cosmetic outcome among the Group A, Group B and Group C was compared; no statistically significant difference was observed. Satisfaction wise distribution of wound closure of Pfannenstiel skin incision by subcuticular technique in caesarean section with different type of suture material was also compared and it was seen maximum in the Group B (98%) followed by Group A (94%) and Group C (90%) respectively. But the difference observed was not statistically significant.

### Discussion

There is lack of data in terms of best method for skin closure in caesarean section. Various studies were done comparing staple with sutures and study showed sutures caused lesser infection rate and wound dehiscence (7). In this study various suture material were used and randomized to see the results. Although there were case reports of suture material used but no randomization was ever done. This was the first study of its kind where three arms were formed and randomized. Mean age of woman in the study were young population and mostly primiparous who came for caesarean section. Skin closure time in most of studies have shown to have no impact on final outcome of surgery as was also seen in this present study. (8) The mean skin closure time of group A was  $7.26 \pm 1.45$  min

while that of group B and group C was  $7.40 \pm 0.99$  min and  $7.50 \pm 1.19$  min, respectively and the difference was not statically significant. Wound length was not found to be a significant criteria in terms of final outcome of surgery whether absorbable or nonabsorbable suture is used. Verma *et al.* also did not find any significant difference.

While studying the complication in the study it was seen that patients with rise in temperature were more in Group C (10%) followed by Group A (8%) and Group B (4%). Induration was observed among 14% women of Group A and Group C each and among 4% women of Group B. No case of wound discharge was observed in group B while in Group C discharge from wound was seen in 6% cases and 2% in Group A. Itching at skin closure site was reported by 12% women from Group A, 8% each from Group B and Group C. Postoperative pain was seen commonly in Group C (22%) followed by Group A (14%) and Group B (8%). Thus the complication rate was more in Group C followed by Group A and least in Group B; but there was no statistically significant difference noted in the complication.

Hasdemir PS<sup>[8]</sup> observed no difference between groups in terms of postoperative pain, need for additional analgesic use, late phase pain, and itching at the scar. Although the cosmetic results tended to be better in the non-absorbable group in primary surgery patients, there was no significant difference in the visual satisfaction of the patients. The findings were also comparable with findings of Uikey PA<sup>[6]</sup>, Priyanka Verma<sup>[7]</sup> and Urvashi Vats<sup>[9]</sup> where complication rate was less in absorbable suture material as compared to nonabsorbable.

The cosmetic outcome in different types of suture materials was also studied and it was seen that just line without any post-operative scar was observed in all the cases of Group A and Group B while just line without any post-operative scar was observed in 98% women of Group C. No case of mild ridge with change in colour was observed in Group B while 8% women from Group B and 6% women from Group C reported mild ridge with change in colour but not statistically significant as  $P > 0.05$ . Priyanka Verma<sup>[7]</sup> observed better cosmetic outcome with absorbable sutures as compared to non absorbable suture material. Urvashi Vats<sup>[9]</sup> compared the efficacy of poliglecaprone 25, polyglactin 910, and polyamide, as subcuticular skin stitches in post-caesarean women. The number of patients having wound discharge and induration was significantly more ( $P < 0.05$ ) in group 2 where polyglactin suture was used as compared to poliglecaprone and polyamide. Uikey PA<sup>[6]</sup> and Hasdemir PS<sup>[8]</sup> also reported similar findings in their studies.

Sheety *et al.*<sup>[10]</sup> in their 5-year retrospective review of 102 adult patients with hand lacerations observed and compared the quality of scar formation in the scars repaired with 5-0 vicryl (polyglactin 910) versus those repaired with 5-0 nylon (non-absorbable). They recommended that the absorbable suture material as an acceptable alternative to the non-absorbable sutures. Breed *et al.*<sup>[11]</sup> compared the possible influence of two absorbable suture materials on the formation of scar tissue in women undergoing reduction mammoplasty. The scars were examined after periods of 2 weeks, 3 months, and 1 year. The monofilament poliglecaprone 25 produced significantly narrower scars than polyglactin 910. Ooster *et al.*<sup>[12]</sup> in their randomized control trial compared polyglycolic acid and monofilament polyglyconate sutures for abdominal fascial closure after laparotomy in patients with suspected impaired wound healing. Wound infection demanding surgical intervention was found in 7% of patients with polyglyconate and 16% with polyglycolic acid sutures ( $P 0.04$ ). Parell and Becker

<sup>[13]</sup> compared absorbable with non-absorbable sutures in the closure of facial skin wounds and found no significant difference between the areas closed with prolene and those closed with vicryl rapid. Satisfaction wise distribution of wound closure of Pfannenstiel skin incision by subcuticular technique in caesarean section with different type of suture material was also compared and it was seen maximum in the Group B (98%) followed by Group A (94%) and Group C (90%) respectively. But the difference observed was not statistically significant ( $p=0.24$ ). Similar findings were also reported by Priyanka Verma<sup>[7]</sup> and Gaertner *et al.*<sup>[14]</sup> in their study.

Tan *et al.*<sup>[15]</sup> conducted a study comparing the suture materials and reported that absorbable and nonabsorbable sutures have similar short-term outcomes but nonabsorbable sutures have a disadvantage of requirement of removal. Additionally, late-term itching at the scar site was seen more frequently in absorbable suture material group possibly due to the late absorption of this kind of suture material.

**Limitation:** The study was conducted for a limited period of time hence the long term follow up was not possible in this study and the number of subjects in each group was smaller. A large number of subjects is needed and study should be multi centric for better comparison and statistical significance.

### Conclusion

In this study we found that there was no significant difference in terms of wound complication. It was also noted that there was better wound healing tendency with non absorbable material but this did not affect patient satisfaction rate.

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