ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 07, 2024

"A study comparing cosmetic outcome by Nylon and Poliglecaprone-25 (monocryl) suture for skin closure in previous cesarean section women undergoing cesarean section"

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Abstract

Background: Cesarean section (CS) is one of the most common surgical procedures performed across the world and its trend has been increasing. For skin closure cosmetic appearance is important. The suture material used for cesarean sections should have cosmetically favourable outcomes.

Aim and objective: To compare the cosmetic outcome with either poliglecaprone-25 (3-0) or nylon (no.1) sutures among previous CS women undergoing CS through a transverse incision.

Method: This study was conducted in the Department of Obstetrics and Gynecology at National Institute of Medical Sciences, Jaipur, Rajasthan, after ethical committee clearance. Total 90 pregnant women were enrolled after taking consent, undergoing CS provided they fulfil inclusion criteria.

Result: In present study, no difference seen in both the groups with respect to BMI, hemoglobin concentration, duration of rupture of membrane, indication of caesarean, closure of subcutaneous layer. P value was significant with respect to age (p value= 000.3), hospital stay (p value=0.0003), OSAS (p value=0.003) and cosmesis (p value=0.005). PSAS not significantly different in both the groups (p value=0.10).

Conclusion: Our study concludes that absorbable subcuticular sutures i.e. poliglecaprone-25 have better outcomes with respect to cosmesis non-absorbable suture nylon.

Keyword: Cesarean section, cosmetic outcome, poliglecaprone-25, nylon suture.

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Introduction

Cesarean section (CS) is one of the most common surgical procedures performed across the world and its trend has been increasing.[1] The etymology of CS derives from the Roman legal code, the *lex Caesare.* The derivation of Caesar and caesarean is from the Latin verb *caedere* 'to cut'.[2]

Although the procedure for CS itself has been more or less standardized, consensus on skin closure techniques remain elusive. A Cochrane review found that there were insufficient data to recommend any technique or materials for skin closure in CS.[3] The use of suture material not always scientific and the choice of suture material has been largely empirical. One should learn the art and craft of surgery and tendency to use the suture materials from colleague.[4]

According to new research from the WHO, caesarean section continues to rise globally, now accounting for more than 1 in 5 (21%) of all child birth. This number is set to continue increasing over the decade, with nearly a third (29%) of all births likely to take place by cesarean section by 2030.[5]

The suture materials have evolved over the years, varying in their biochemical composition, constituent, knot security, elasticity and absorption, tensile strength, and tissue reactivity.[6] As growing choice of suture materials to use for skin closure, the effectiveness of the type of suture material used is unclear.

Comparison of subcuticular absorbable sutures and surgical staples in CS closure have been present in the literature and shows that the closure with subcuticular suture materials was more advantageous as they are associated with less immediate post-operative pain and are more cosmetically appealing at six weeks when compared with stapler sutures.[7] Initially polyglycolic acid was introduce and subsequently glycolide and lactide were combined to develop polyglactin-910, polyglactin-910 rapide and poliglecaprone-25.[8]

Absorbable sutures are placed into subcutaneous tissue to eliminate dead space and into the dermis to minimize tension during wound healing. These are subsequently absorbed by enzymatic degradation or hydrolysis.[7,8]

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The two widely used sutures for low-transverse CS skin closure are nylon and poliglecaprone-25. Poliglecaprone-25 is a synthetic monofilament absorbable suture prepared from copolymer of glycolide and epsilon-caprolactone. Absorption profile of pliglecaprone-25 is 91-119 days. Nylon is a synthectic non-absorbable monofilament suture composed of the long-chain aliphatic polymers, polyamide 6. Suture is dyed black or green to enhance visibility in tissue.

A study conducted by Cromi et al.[9] in 2012 comparing cosmetic outcome of various sutures for skin closure following CS. In this study patients were randomized to have skin closure following CS with either staples or 3 different types of subcuticular sutures (absorbable monofilament, non-absorbable monofilament, short term synthetic absorbable braided suture). Scar quality was evaluated 2 and 6 months post-operatively. The Vancouver Scar Scale, the patient and observer Scar assessment scale (POSAS) and visual analogue scale (VAS) were used as scar assessment tools. The found no difference in both subjective and objective scar rating across groups at 2 and 6 months post-operatively.

This study is planned to compare the cosmetic outcome between two sutures in previous CS women undergoing CS for skin closure; i.e Poliglecaprone-25 and Nylon.

AIMS AND OBJECTIVES

To compare the cosmetic outcome with either poliglecaprone-25 (3-0) or nylon (no.1) sutures among previous CS women undergoing CS through a transverse incision.

- Cosmetic appearance at 6 weeks
    1. Observer scar assessment scale (OSAS)
    2. Patient scar assessment scale (PSAS)

MATERIAL AND METHODS

This study was conducted in the Department of Obstetrics and Gynecology at National Institute of Medical Sciences, Jaipur, Rajasthan, after ethical committee clearance. Total 90 pregnant women were enrolled after taking consent, undergoing CS provided they fulfil following criteria;

INCLUSION CRITERIA

- Previous CS with transverse skin incision

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EXCLUSION CRITERIA

- Vertical skin incision
- Local skin infection at site of incision
- Chorio-amnionitis
- BMI >35
- Frank sepsis

METHODOLOGY

All women planned for emergency/elective CS were enrolled for recruitment in study after they satisfy inclusion criteria. Total 90 women were selected and grouped after taking informed consent to either of the two groups:

Group 1 (Poliglecaprone-25)

A total of 45 pregnant women were enrolled in this group and poliglecaprone-25 (3-0 monofilament absorbable suture) was used as subcuticular skin suture for closure of the skin.

Group 2 (nylon)

A total of 45 pregnant women were enrolled in this group and nylon (no.1 monofilament non-absorbable suture) was used for closure of the skin.

All the women in both the groups received common pre-operative and post-operative care. Antibiotic prophylaxis was given as per institutional protocol. Skin preparation was done with povidine–iodine. CS was performed under anesthesia as per institutional protocol.

STATISTICAL ANALYSIS: It was performed by SPSS 24 software for Windows and P value <0.05 was deemed statistically significant.

DISCUSSION: In the modern era of evidence-based medicine, there is insufficient evidence regarding wound infection rates, optimal cosmesis and pain to guide the surgeon in choosing skin closure in CS. For the cosmetic evaluation of scars, different methodologies have been

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used in different studies. The main advantage of this score is that it allows patient self-assessment for scars related to symptoms and physical characteristics.

Our study found that OSAS was statistically significantly better in the Poliglecaprone-25 group than in the Nylon group. Cosmetic evaluation of scar was done at 6 weeks postpartum by Observer scar assessment scale (OSAS) and Patient scar assessment scale (PSAS). The operating surgeon had no role in assessment of the scar. Scar was evaluated by dermatologist to the nature of suture used in women.

In our study, no difference seen in both the groups with respect to BMI, hemoglobin concentration, duration of rupture of membrane, indication of caesarean, closure of subcutaneous layer. P value was significant with respect to age (p value= 000.3), hospital stay (p value=0.0003), OSAS (p value=0.003) and cosmesis (p value=0.005). PSAS not significantly different in both the groups (p value=0.10).

Table 1: Mean age and BMI of women in the study

	Group 1(n=45)	Group 2(n=45)	P value
Mean Age (years)	25.09 ± 4.32	26.38 ± 4.81	0.09
Mean BMI (kg/m2)	26.38 ± 4.81	25.09 ± 4.32	0.09
Mean Haemoglobin (mg/dl)	10.42 ± 1.10	10.61±1.06	0.19

Data expressed as mean ±SD

The study found no statistically significant difference in age, BMI and hemoglobin concentration among women (p value=0.09,0.09 and 0.19)

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Table 2: Distribution of study subjects according to Status of Membrane

	Group1(n=45)	Group 2(n=45)	P value
Ruptured	18	19	0.43
Unruptured	27	126	

There is no statistical difference with respect to status of membrane in the study. (p value=0.43)

Table 3: Distribution of study subjects according to Indication of LSCS.

	Group1(n=45)	Group 2(n=45)	P value
Elective	27	26	0.41
Emergency	18	19	

There is no statistical difference with respect to Indication of LSCS in the study. (p value=0.41)

Table 4: Subcutaneous Fat Layer Closure in Study Subjects.

	Group1(n=45)	Group 2(n=45)	P value
Subcutaneous Fat Layer Closure	29	30	0.42

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The study did not find a statistically significant difference in subcutaneous layer closure (p value=0.42

Table 5: Distribution of study subjects according to Duration of Hospital Stay.

	Group1(n=45)	Group 2(n=45)	P value
≤3 days	43	43	0.0003
≥4 days	2	2	

There was a statistically significant difference concerning duration of hospital stay (p value=0.0003

Table 6: Mean OSAS Score in the Study.

	Group1(n=45)	Group 2(n=45)	P value
Mean OSAS Score	10.4 ± 3.58	12.6 ± 3.68	0.003

The scar in Group 1 (Poliglecaprone-25) showed better OSAS than in Group 2 (Silk) and was statistically significant (p value=0.003

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Table 7: Mean PSAS Score in the Study.

	Group1(n=45)	Group 2(n=45)	P value
Mean PSAS Score	10.69 ± 4.59	12.04 ± 5.89	0.10

There was no statistical difference seen in both the groups (p value=0.10)

Figure 1**:** Cosmesis at 6 weeks post-operative in the study

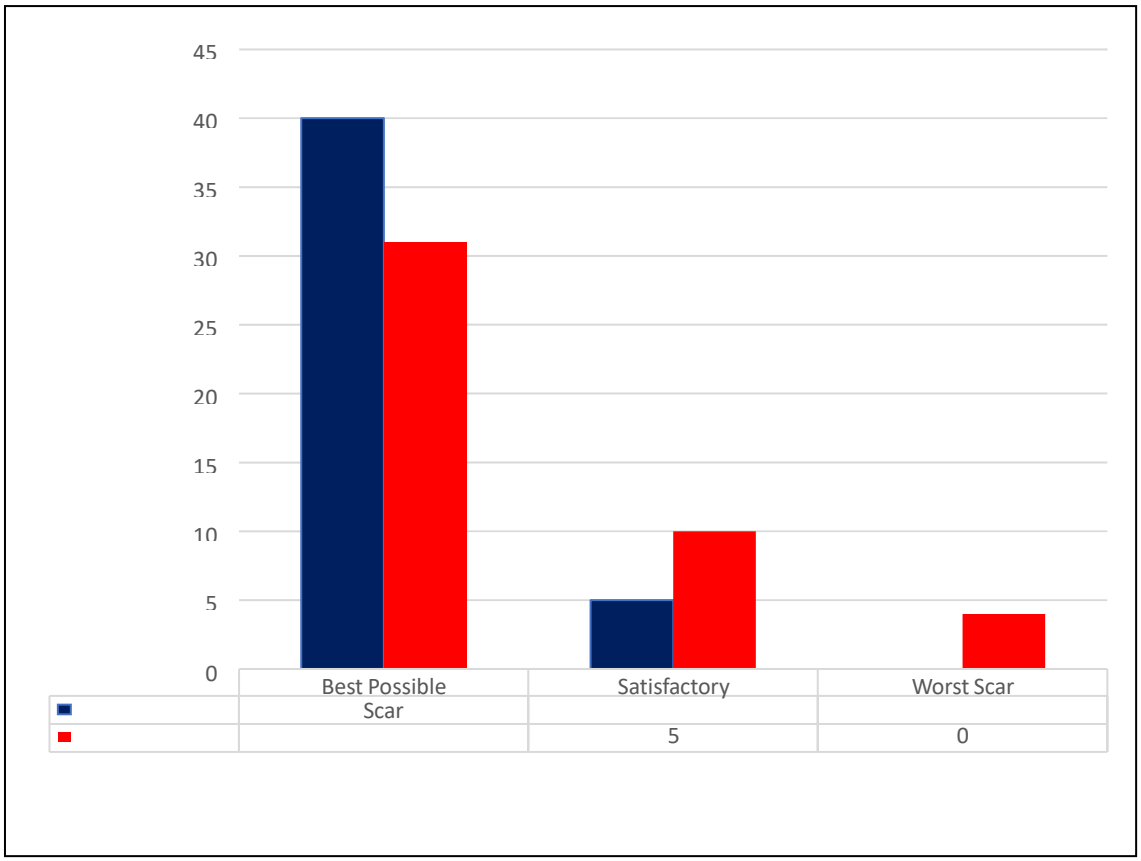

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Table 8**:** Cosmesis at 6 weeks post-operative in the study

	Group1 (n=45)	Group 2 (n=45)	P value
Best possible scar	40	31	0.005
Satisfactory	5	10	
Worst scar	-	4	

Group 1 (n = 45) Group 2 (n = 45) P - value Best Possible Scar 40 (88.88%) 31(68.88%) Satisfactory 5 (11.12%) 10 (22.22%) 0.005 Worst Scar - 04 (08.90%) In Group 1 (Poliglecaprone-25), 88.88 % (40/45) and in Group 2 (Silk), 68.88 % (31/45) women had the best possible scar at six weeks postoperatively. In Group 1 (Poliglecaprone-25), 11.12 % (5/45) and in Group 2 (Silk), 22.22 % (10/45) women had satisfactory scars at six weeks postoperatively. In Group 1 (Poliglecaprone-25), there were no patients and in Group 2 (Silk), 08.90 % (4/45) women had the worst scar at six weeks postoperatively. There was a statistically significant difference concerning COSMESIS in both the groups in the study. (p value=0.005)

Our result was consistent with the results observed by Fleisher J et al.[10] They conducted a trial in 2018 evaluating patient satisfaction and patient and physician assessment for skin closure for CS with subcuticular absorbable suture vs nonabsorbable staples. Their study observed that patient satisfaction was statistically significant in women who received subcuticular absorbable suture closure rather than staples. Also, cosmesis was found statistically significantly better in the suture group than staples.

Sharma C et al.[11] (2014) conducted a randomised trial to compare skin closure's cosmetic outcomes using staples or subcuticular sutures made of Poliglecaprone-25. The primary measure of interest was the cosmetic result, evaluated by PSAS and OSAS six weeks after the surgery. They found that the aesthetic outcome of using staples was significantly superior to

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using subcuticular sutures (PSAS and OSAS: p-value 0.022 and 0.000, respectively), and patients who received Poliglecaprone-25 had a significantly shorter hospital stay compared to those who received staples, p value=0.001. Therefore, they determined that staples are the preferred approach for closing the skin in emergency Cesarean sections, as they are notably superior to subcuticular sutures in terms of cosmetic outcome, surgical duration, and length of hospital stay

Limitation

Follow up of the patient was done only up to 6 weeks and hence long-term evaluation of scar is not there in our study.

Conclusion: In our study, no difference seen in both the groups with respect to age, BMI, hemoglobin concentration, duration of rupture of membrane, indication of caesarean, closure of subcutaneous layer. P value was significant with respect to hospital stay (p value=0.0003), OSAS (p value=0.003) and cosmesis (p value=0.005). PSAS not significantly different in both the groups (p value=0.10).

Hence, our study concludes that absorbable subcuticular sutures i.e. poliglecaprone-25 have better outcomes with respect to cosmesis non-absorbable suture nylon.

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