Three techniques for skin closure in caesarean section (stapler, absorbable subcuticular, non-absorbable subcuticular suture)

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Abstract

Background & Objectives: Caesarean section is the most commonly performed surgery in obstetrics. Skin closure after surgery can have an important bearing on the post operative recovery. This study was done to compare the effect of skin closure technique and material on post Operative Swelling & induration, Wound discharge ,Cosmetic outcome (Vascularity, Height of wound), Satisfaction about scar & mean time for skin closure.

Methods: This study was conducted on 156 woman admitted to the labour room in SVBP Hospital associated to LLRM Medical college Meerut, from 1st June 2014 to 1st July 2015 who underwent caesarean section. Patients undergoing primary caesarean section with Pfannenstiel or Transverse incision were included. Patients were divided into three groups depending on the type of skin closure method (Group A-Surgical Staples, Group B-Non absorbable subcuticular stitch, Group C-Absorbable Subcuticular Stitch).

Results: In our study, swelling, induration & wound discharge were more in patients receiving staplers. Patients were most satisfied with the absorbable suture technique.

Interpretation & Conclusions: In terms of wound complications after 6 weeks of skin closure in caesarean section, satples, non absorbale & absorbable sutures have no major differences. Absorbale sutures for skin closure in caesarean section provide best results in terms of patient satisfaction about scar.

Key words: Skin closure, Caesarean section, Staplers, Sutures.

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Introduction

Some of the methods for skin closure at caesarean section include absorbable and nonabsorbable sutures, stainless steel staples (metal staples), absorbable staples, adhesive closure strips, and tissue adhesives.(1)

Suture materials (Absorbable or nonabsorbable) can be classified as monofilament or multifilament (braided), dyed or undyed, coated or uncoated. Several parameters, such as tensile strength, breaking strength, elasticity, capillarity and memory are used to describe physical characteristic of suture.(2) Absorbable sutures are placed into subcutaneous tissue to eliminate dead space and into the dermis to minimize tension during wound healing.(3,4) These are subsequently absorbed by inflammation, enzymatic degradation or hydrolysis.

Nonabsorbable sutures should be just tight enough to approximate, not strangulate tissues and can be used as deep sutures to provide prolonged mechanical support.(5)

Materials & Methods

This study was conducted on 156 woman admitted to the labour room in SVBP Hospital associated to LLRM Medical college Meerut, from 1st June 2014 to 1st July 2015 who underwent caesarean section. The authors did a prospective, observational, comparative study after approval from ethics committee. Detailed history of the patient was taken and complete medical and obstetrical examination done as per our department protocol for ante natal care. Patients undergoing caesarean section were included. Both Pfannenstiel and Transverse incision were included in study.

Exclusion criteria were presence of any moderate or severe systemic illness, BMI < 18 >30 kg/$m^{2,}$ chorioamnionitis or prolonged leaking > 18 hours. After written consent, eligible women was allocated randomly (using sealed envelope method) in three groups:- Group A (After Stitching the uterus, Rectus Sheath was stitched with suture vicryl No. 1 on round body needle, skin was stitched with surgical staples, brand-covidien), Group B (After Stitching the uterus, Rectus Sheath was stitched with suture vicryl No. 1 on round body needle, skin was stitched by subcuticular stiches with non absorbale suture prolene 2-0/nylon 2-0, brand- dolphin), Group C (After Stitching the uterus, Rectus Sheath was stitched with suture vicryl No. 1 on round body needle, Skin was Stitched with absorbable suture monocryl, brand-ethicon). In all groups subcutaneous fat layer was stitched, if >2.5 cm thick.

All surgeries were performed by consultant or Residents with at least two years of training experience. Only round body needles were used in the surgeries. All surgeries were done under spinal anesthesia. Each patient was assessed daily after surgery until discharge from the hospital.

Standardized wound evaluations was done at 3-4 days, 8-12 days, 4-6 weeks. Primary outcome was composite of wound dehiscence, disruption or infection within 4-6 weeks, secondary outcome was cosmetic score & patient scar satisfaction.

On 3rd post-operative day wound was opened and dressing was done. In group A, staples were removed after 5th post operative day. In group B and C patients were discharge from hospital after 3rd post operative day ,In group B stitches were removed between 8-12 post operative days. A standardized physical examination of the wound was performed by resident/ consultant. Induration was defined when subcutaneous tissue of wound became hard and firm on palpation.

In all groups of women cosmetic outcome was observed according to modified Hollander cosmesis scale (pliability was excluded from our study)

Modified Hollander cosmesis scale has following points-

Pigmentation
(0 = normal colour)
1 = hypopigmentation
2 = hyperpigmentation)

Vascularity (0 = normal)
1 = pink (slight increase in blood supply)
2 = red (significant increase in blood supply)
3 = purple (excessive local blood supply)

Height
(0 = normal
= < 2 mm
= > 2 mm and < 5mm
= > 5 mm)

For calculating speed of skin closure by different technique total length of all incision closed in each group was divided by total time required for closure of all incision in each group.

Results

The incidence of Swelling & induration was 2 patients [4%] in group C, 11 patients [21.1%] in group A and in 4 patients [7.5] of group B but it was not statistically significant. [p=0.057, Chi^2=3.56]. The post op Wound discharge was observed in 6 [11%] patients in group A and in 3[5.6] patients in group B, 1[2%] patients in group C, it was statistically not significant. [p=0.122, Chi^2=2.35]

On 15th Post operative day, Hyperpigmentation was seen in 11 [21.1%] patients with Stapler and in 3 [5.5%] with Non-absorbable subcuticular suture but not in Absorbable subcuticular suture. The difference was statistically significant. [p=0.005 Chi^2=7.6]

Hypopigmentation was seen in 4 [7.6%] patients of group A and in 1 [1.8%] patient of group B and not in group C, but it was statistically not significant. [p=0.097 Chi^2=2.8].

At 6 week, Hyperpigmentation was seen in 5[9.6 %] patients of group A and in 1[1.9%] patient of group B and not in group C, but diference was statistically not significant. [p=0.084 Chi^2=2.97].Hypopigmentation was seen only in 1 [1.8%] patient with Stapler and none in group B, C but it was statistically not significant. [p=0.74 Chi^2=0.51].

On 15th post operative day, purple vascularity was seen only in 1 [1.9%] patient with Stapler and none in group B, C. It was statistically not significant. [p=0.12 Chi^2=2.3].Red vascularity was seen in 2 [3.8%] patients of group A only. Pink vascularity was observed in 5 [9.6%] patients of group A and in 1 [1.8 %] patient of group B, C. At 6th week, pink vascularity was observed only in 1 [1.9%] of staplers but none in non absorbable and absorbable sutures it was statistically not significant. [p=0.49, Chi^2=0.47].

Majority of the cases with Absorbable sub cuticular suture were very satisfied [46, 92%] but only 5 [9.6%] and 30[55.5%] stapler and Non absorbable sub cuticular suture patients were very satisfied respectively. At 6 weeks, height of wound was normal in all cases of Non-absorbable or Absorbable suture but height was between 2-5 mm in 1[1.9%] patient of stapler.

46 [92%] patients of Absorbable sub cuticular suture were very satisfied, 4 [8.0%] were satisfied. With non absorbable subcuticular suture, 30[55.5%] were very satisfied, 20[37.1%] were satisfied. With stapler use, only 5 [9.6%] were very satisfied and 32 [61.5%] were satisfied. This difference was statistically significant. [p<0.001, Chi^2=47.5].

Average Speed of skin closure by stapler was 13.04 cm/min, by subcuticular absorbable it was 2.01 cm/min and with subcuticular nonabsorbable average speed was 2.01 cm/min.

Observations

(N denotes number of patients)-

Table 1: Post Operative Swelling & induration

Type of Suture material	Absent N[%]	Present N[%]	Total
Stapler	41 [78.8%]	11 [21.1%]	52
Non absorbable sub cuticular suture	50 [92.5%]	4 [7.5%]	54
Absorbable sub cuticular suture	48 [96%]	2 [4%]	50
Total	139 [89.1]	17 [10.9%]	156

Table 2: Post Operative Wound discharge

Type of Suture material	Absent N [%]	Present N [%]	Total
Stapler	46 [88.4%]	6 [11.6%]	52
Non absorbable sub cuticular suture	51 [94.4 %]	3 [5.6%]	54
Absorbable sub cuticular suture	49 [98.0%]	1 [2.0%]	50
Total	146 [93.5 %]	10 [6.5%]	156

Table 3: Pigmentation on15th day

Type of Suture material				Total
	Normal N[%]	Hypopigmentation N[%]	Hyperpigmentation N[%]	
Stapler	37 [71.1%]	4 [7.6%]	11 [21.1%]	52
Nonabsorbable subcuticular sature	50 [92.5%]	1 [1.8%]	3 [5.5%]	54
Absorbable subcuticular sature	50 [100%]	0	0	50
Total	137 [87.8%	5 [3.2%]	14 [8.9%]	156

Table 4: Pigmentation at 6 week

Type of Suture material				Total
	Normal N[%]	Hypopigmentation N[%]	Hyperpigmentation N[%]	
Stepler	46[88.4%]	1 [1.8%]	5 [9.6%]	52
Nonabsorbable subcuticular sature	53[98.1%]	0 [0.0%]	1 [1.9%]	54
Absorbable subcuticular sature	50[100.0%]	0	0	50
Total	149[95.5%]	1[0.64%]	6[3.8%]	156

Table 5: Vascularity on 15th day

Type of Suture material					Total
	Normal N[%]	Pink N[%]	Red N[%]	Purple N[%]	
Stapler	44 [84.6%]	5 [9.6%]	2[3.8%]	1 [1.9%]	52
Nonabsorbable subcuticular sature	53 [98.1%]	1 [1.8%]	0	0	54
Absorbable subcuticular sature	49[98%]	1 [2.0%]	0	0	50
Total	146 [93.5%]	7 [4.4%]	2[1.3%]	1 0.64%]	156

Table 6: Vascularity on 6th week

Type of Suture material					Total
	Normal N[%]	Pink N[%]	Red N[%]	Purple N[%]	
Stapler	51 [98.1%]	1 [1.9%]	0	0	52
Non absorbable subcuticular sature	54 [100.0%]	0	0	0	54
Absorbable sub cuticular sature	50 [100.0%]	0	0	0	50
Total	155 [99.35%]	1 [0.64%]	0	0	156

Table 7: Height of stitch line at 6th week

Type of Suture material	Normal N[%]	>2mm& <5mm N[%]	>5mm N[%]	Total
Stapler	51 [98.1%]	1 [1.9%]	0	51
Nonabsorbable subcuticular sature	54 [100.0%]	0	0	54
Absorbable subcuticular sature	50 [100.0%]	0	0	50
Total	155 [99.4%]	1[0.6%]	0	156

Table 8: Satisfaction about scar

Type of Suture material				Total
	Neutral N[%]	Satisfied N[%]	Very satisfied N[%]	
Stapler	15 [28.8]	32 [61.5]	5 [9.6]	52
Non absorbable subcuticular suture	4 [7.4]	20 [37.1]	30 [55.5]	54
Absorbable subcuticular suture	0	4 [8.0]	46 [92.0]	50
Total	19 [12.2]	57 [36.5]	83 [53.2]	156

Table 9: Mean time for skin closure [min]

Type of material for skin closure	Mean time for skin closure [min]	± Std. Deviation	No of patients
Stapler	1.26	0.64	52
Nonabsorbable subcuticular sature	7.36	2.15	54
Absorbable subcuticular sature	7.42	2.48	50

The data was compiled and analyzed using statistical software SPSS IBM (Chicago) version 21. Unpaired student t test was applied for comparing means for quantitative data and chi square test was applied for qualitative data. The test was considered significant if $p<0.05$, at 95% confidence level.

Discussion

The overall mean age of all patients was 24.7 ± 2.8 years. The mean age of all patients was 24.7 ± 2.8 years. Majority of the patients were in the age group of 25-29 years 77 [49.4 %] followed by 20-24 years 66 [42.9 %] and only 11[7.1 %] patients were in the age group of >30 years. The mean age of all groups was not significantly different, thus were comparable. [p>0.05].

Majority of the patients were primi gravida 95 [60.4 %] followed by gravida 2- 31[20%], remaining 30 [20%] patients were multigravida. The gravidity was evenly distributed in all the groups.[p>0.05] The commonest indication of LSCS was fetal distress seen in 61 [39.6 %] cases followed by Mal presentation in 45 [29%] and CPD in 31 [20%] cases. Sixteen cases [10.4%] were of NPOL and one case [0.6%] of placenta previa.

In our study, swelling, induration & wound discharge were more in patients receiving staplers. Dana Figueroa et al also observed that disruptions longer than 1 cm were more frequent in women with staples (6.2% vs. 0%, P=0.009) as were disruptions of depth deeper than 0.5 cm (4.5% vs. 0.6%, P=0.037) (6). Krunal Patel et al in their study observed that surgical site infection was more in patients receiving staplers than subcuticular stitch(7). Chanderdeep Sharma et al studied cosmetic outcome after skin closure with 'staples' or 'subcuticular sutures' in emergency Cesarean section on 136 women. They observed that post op pain & wound complications were comparable but patient with staples had an increased hospital stay(8). Dhanya mackeen et al observed that closure of the skin incision with suture significantly decreases wound separation, without significant differences in pain, patient satisfaction or cosmesis.(9) We observed no significant difference in groups in terms of pigmentation, Vascularity, Height at 15 days & 6 weeks. This might imply that suture material & stapler used in our study did not affect the stitch line healing.

Krunal Patel et al observed that mean modified hollander score of patients in their study had no significant change in between groups. Patient satisfaction about scar showed significant difference. This could be due to visible staplers during dressing change which might have a psychological impact on patient. Brown BC et al stated that patient-rated scar severity are correlated with psychosocial distress rather than objective severity rating.(10)

In our study, mean time of skin closure was minimum in stapler group. This is understandable as staple doesnt require knot fixing & cutting. However, clinical relevance of less time with staplers requires to be validated. L. Meiring et al included 40 patients for comparison between stapler and vertical mattress, he found that speed of wound closure with stapler is 11.64 cm/min and with vertical mattress suture it is 3.78 cm/min.(11) Rousseau JA et al did a randomized, controlled trial of 101 women. They reported less pain, shorter operative time when sutures were used.(12) Limitations of our study are small sample size, no evaluation of post op pain & observation period of 6 weeks only.

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