

COMPARISON BETWEEN SKIN SUTURE AND STAPLER APPROXIMATION OF SKIN IN SURGICAL INCISION

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Abstract

Background: Sutures are typically used to close surgical incisions to the skin. Regular sutures can be substituted with skin staples to create a strong and healthy scar. The aim of this study is to assess the effects of staple approximation versus standard suturing of skin margins on wound healing. **Materials and Methods:** This comparative cross-sectional study was conducted at Department of General Surgery in SRM Medical College and Hospital, Trichy. This study was conducted among 60 patients who were posted for elective/ emergency surgeries require skin closure. They were randomly allocated into two groups (Group A and Group B) consisting of 30 participants each. Group A participants undergone standard skin suture and Group B participants undergone stapler skin suture. A detailed history of each patient was obtained starting with history of presenting symptoms and any co-existing, co-morbid conditions were recorded. A thorough general physical examination was done. All the patients were followed up after 48 hours and dressing was done regularly and both sutures are removed on day 10. The details collected were entered in Microsoft Excel and analysed using SPSS version 21. **Result:** In the present study in Group A there were 14 males and 16 females were there with mean age of 42.6 ± 8.4 years and in Group B there were 17 males and 13 females were there with mean age of 43.2 ± 7.4 years. The time required for skin closure was significantly less (less than five minutes) among the stapler group compared with standard skin suture techniques. Based on SBSE score in Group A around 63.33% had SBSE score <3 and in Group B around 86.67% had SBSE score <3 . The cosmetic outcome was assessed using SBSE scores, which were higher among the stapler group. The pain during staple or suture removal was measured in both groups using a pain score of less than or equal to 2. 82.35% of patients in the staples group and 17.64% of patients in the sutures group had a pain score of less than 2 and shows statistically significant. **Conclusion:** A staple approximation of the skin is the most advised closure method due to its shorter operating times, less pain, very few wound problems, and great surgical outcomes, which result in a fine scar and higher patient satisfaction.

INTRODUCTION

Tissue approximation accuracy is crucial for both the safe healing process and the successful operational correction of abnormalities. The main objectives of tissue repair for surgical skin incisions are quick strength gain, little tissue damage, low inflammation, and an appropriate scar. The placement and selection of the suture materials are just two of the many variables that affect healing. Accurately co-opting the dermal margins is especially important since inversion or eversion promotes inadequate healing.^[1]

The degree of accuracy and kind of tissue approximation affect the rate of tissue healing, the early and late complications that arise from surgical wounds after surgery, and the hospital's financial burden.

Currently, sutures, glues, clips, steritapes, staples and other materials or devices for approximating tissues are commonly used. The key to achieving a good wound healing is careful tissue dissection, suture material selection, wound closure techniques, and post-operative complications. Traditional skin sutures are associated with few complications.^[2-4]

Staples are a substitute for sutures and are typically composed of stainless steel, though there are some varieties that use absorbable materials. Surgical stapling was developed in 1908 by the Hungarian surgeon Humer Hulti. Staples potential benefits in surgical wound closure are associated with their minimal tissue reactivity. Due to the lack of exogenous material introduction and ensuing suppression of the local immune response, this increases the resistance to infection in infected wounds. Use of staples is assumed to decrease residual cross marks, wound width, duration to closure, and local inflammatory reaction.^[5,6] In view of this, this prospective study has been undertaken to highlight the outcomes of closure by staples and sutures.

Aim and objectives

- To compare traditional suturing of skin edges versus staple approximation and to evaluate the impact of these techniques on wound healing

Objectives

- To compare the duration of the closure required for stapler and suture closure
- To compare the effects of wound healing based on width, colour and hypertrophy
- To compare patient satisfaction and cosmetic outcome between the two techniques

MATERIALS AND METHODS

Study design: A Comparative cross-sectional study

Study area: Department of General surgery, SRM Medical College and Hospital, Trichy.

Study duration: Three months

Study population: Patients who were admitted for elective and emergency surgeries requiring skin closure

Inclusion criteria

- All patients undergoing elective / emergency surgeries requiring skin closure
- Patients willing to give consent

Exclusion criteria

- Traumatic wound patients
- Age <18 yrs
- Patients undergoing secondary suturing

Sampling technique: Purposive sampling

Sample size: 60 patients

Study instrument: A semi structured questionnaire

Operational definition: Stony brooks scar evaluation system (SBSE)

Scar Category	No. of Points*
Width	
>2 mm	0
≤2 mm	1
Height	
Elevated or depressed in relation to surrounding skin	0
Flat	1
Color	
Darker than surrounding skin (red, purple, brown, or black)	0
Same color or lighter than surrounding skin	1
Hatch marks or suture marks	
Present	0
Absent	1
Overall appearance	
Poor	0
Good	1

Data collection: Data was collected in Department of General Surgery in SRM Medical College and Hospital, Trichy. This study was conducted among 60 patients who were posted for elective/ emergency surgeries require skin closure. They were randomly allocated into two groups (Group A and Group B) consisting of 30 participants each. Group A participants undergone standard skin suture and Group B participants undergone stapler skin suture. A detailed history of each patient was obtained starting with history of presenting symptoms and any co-existing, co-morbid conditions were recorded. A thorough general physical examination was done. All the patients were followed up after 48 hours and dressing was done regularly and both sutures are removed on day 10.

Data analysis: Data was entered in Microsoft excel 2019 and analysed using software SPSS (Statistical Package of Social Sciences) version 21. Continuous variables and categorical variables were interpreted using frequencies (mean±SD) and proportions (%).

Ethical issues: Participants were informed about the study and informed consent was obtained. This study was presented to Institutional Ethical Committee of SRM Medical college and Hospital, Trichy.

RESULTS

This study was conducted among 60 patients divided into two groups and Group A-they applied standard skin suture techniques (n = 30) and Group B-stapler skin sutures (n = 30). [Table 1] describes baseline characters of age, gender and comorbid illness.

[Figure 1] shows the type of incision made among patients. The most used incision was McBurney's incision among the two groups.

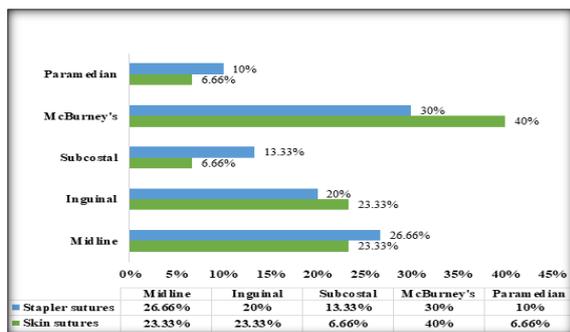


Figure 1: Type of Incision

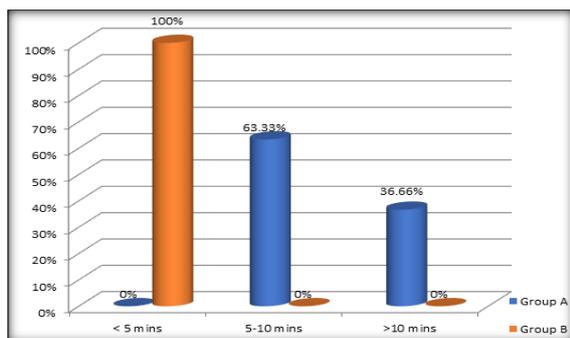


Figure 2: Duration of suturing

[Figure 2] shows the time required for closure of incisions. The stapler method requires time of less than five minutes for all patients irrespective of surgery and incision.

[Figure 3] shows the cosmetic outcome assessed using SBSE scores which include the variables of width, height, color, suture marks, and overall appearance. The stapler sutures had higher proportion scores than three.

[Table 2] describes the association between variables among two groups. The time required for skin closure was significantly less (less than five minutes) among the stapler group compared with standard skin suture techniques. The cosmetic outcome was assessed using SBSE scores, which were higher among the stapler group. The significantly higher proportion had SBSE scores of more than three among the stapler group. A higher proportion of patients experienced pain scores more than two among the standard skin suture group compared with the stapler group.

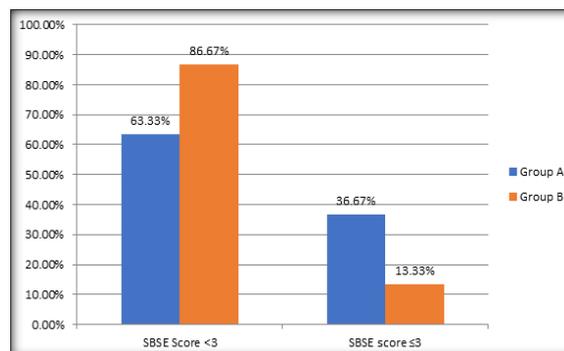


Figure 3: Cosmetic outcome

Table 1: Baseline characteristics of the patients (n = 60).

S No	Variables		Group A (n = 30)	Group B (n = 30)
1	Age	31 – 40 years	5 (16.66%)	6 (20%)
		41 – 50 years	6 (20%)	8 (26.66%)
		51 – 60 years	12 (40%)	9 (30%)
		> 60 years	7 (23.33%)	7 (23.33%)
2	Gender	Male	14 (46.66%)	17 (56.66%)
		Female	16 (53.33%)	13 (43.33%)
2	Comorbid	Nil	18 (60%)	19 (63.33%)
		Hypertension	2 (6.66%)	1 (3.33%)
		Type II DM	6 (20%)	4 (13.33%)
		HT & Type II DM	4 (13.33%)	5 (16.66%)

Table 2: Association between variables among two groups

S No	Variables		Skin sutures	Stapler sutures	p value
1	Time required for closure	< 5 minutes	0 (0%)	30 (100%)	0.001
		5 – 10 minutes	19 (100%)	0 (0%)	
		> 10 minutes	11 (100%)	0 (0%)	
2	Cosmetic outcome	SBSE score > 3	19 (63.33%)	26 (86.67%)	0.036
		SBSE score ≤ 3	11 (36.67%)	4 (13.33%)	
3	Discharge on 10th postoperative day	Present	5 (71.42%)	2 (28.57%)	0.227
		Absent	25 (47.16%)	28 (52.83%)	
4	Pain score during removal	VAS score > 2	24 (92.3%)	2 (7.69%)	<0.001
		VAS score ≤ 2	6 (17.64%)	28 (82.35%)	

DISCUSSION

In the present study in Group A there were 14 males and 16 females were there with mean age of 42.6 ± 8.4 years and in Group B there were 17 males and 13 females were there with mean age of 43.2 ± 7.4 years. In the present study it was found that in staples group, time required for skin closure was <5mins in all the cases whereas in sutures group, no case completed

skin closure in <5 minutes. The time required for skin closure was significantly less (less than five minutes) among the stapler group compared with standard skin suture techniques. Based on SBSE score in Group A around 63.33% had SBSE score <3 and in Group B around 86.67% had SBSE score <3. The cosmetic outcome was assessed using SBSE scores, which were higher among the stapler group.

Our study is comparable to study conducted by Naireen et al,^[7] study stated that the mean time for closure in the staples group was 104 seconds, while in the sutures group it was 546 seconds. Another study by Chavan et al^[8] study also stated that the mean time for closure in the staples group was 60 seconds and in the Kanagaye et al,^[8] study, it was 65 seconds and in the sutures group it was 397 seconds which is also comparable to our study report.^[9]

The cosmetic outcome in the present study is comparable with studies of Karbhari et al,^[10] with 90% good outcome in staples and 60% in sutures group, Another study by dos Santos et al,^[11] with 80% in staples and 68% in sutures group which is also in consistent with our study report. Naireen et al also found that 88% in staples group shows good outcome and 56% in sutures group which is also comparable to our study report.

In the current study, pain during staple or suture removal was measured in both groups using a pain score of less than or equal to 2. 82.35% of patients in the staples group and 17.64 % of patients in the sutures group had a pain score of less than 2 and shows statistically significant. Our study report is similar to a study conducted by Ketan Vagholkar et al,^[12] also found that standard suture patients had higher pain levels than stapler patients, a finding that was statistically significant and added support to the staple procedure ($p < 0.05$).

Another study by Batra J et al stated that the mean VAS score for pain on removal in suture group was 2.15 ± 0.9 while in stapler group was 2.21 ± 0.8 which is in contrast to our study report.^[13]

Parameshwara C M et al,^[14] conducted a study and found that Visual analog score is used to assess post-operative pain. In both elective and emergency situations, the use of sutures resulted in a higher immediate post-operative pain score than the use of staples. Approximately 58% of elective cases with suture closure had a pain level of three or above, compared to only 18.6% of groups with stapler closure which is also comparable to our study report.

CONCLUSION

Our study's findings suggest that skin closure using a stapler is preferable to traditional skin sutures because it is cost-effective, easier to administer, and requires less time. Patients also experience less pain while removing the stapler, which also improves aesthetic results. We conclude that skin staplers can

be utilized in surgically incised wounds that are electively cleaned and free of contamination.

Limitations

- The larger sample size might be considered for generalising results.
- Single centre study.

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