



COMPARATIVE STUDY OF SKIN STAPLES AND CONVENTIONAL SUTURES FOR ABDOMINAL SKIN WOUND CLOSURES

General Surgery

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ABSTRACT

Introduction : The ideal abdominal wound closure provides strength and a barrier to infection. In addition, the closure should be efficient, performed without tension or ischemia, comfortable for the patient, and aesthetic. Present study aimed to compare skin staples with conventional suturing for abdominal skin closure. **Material and Method:** This comparative observational study was conducted among the patients coming to Department of General Surgery, Aarupadai Veedu Medical College and Hospital, undergoing elective abdominal surgery who were willing to participate in the study by giving informed and written consent. Patients were grouped based on type of skin closure done, group A are patients with skin staples in elective abdominal surgery and group B are the patients with conventional suture method of skin closure in elective abdominal surgery. Both the group were assessed for the duration of skin closure, the outcome of wound assessed using ASEPSIS score on 3rd, 5th and 7th post-operative day and wound Cosmesis was assessed using Modified Hollander Cosmesis scale on 7th day, after 2 weeks, 6 weeks and on 3rd month of wound healing. All the statistical analysis were analysed using SPSS v21 operating on windows 10. **Results:** In our study total 120 patients undergoing elective abdominal surgeries were included with 60 patients in each group. The mean age and gender distribution between both groups was found to be similar with no significant difference. On comparison of number of staples and number of sutures used, it was significantly higher in staple group than suture group ($p < 0.05$). On comparison of duration of closure it was significantly lower in staple group than in suture group ($p < 0.05$). ASEPSIS score at different point of follow-up showed there is significantly lower mean score among patients in staple group compared to suture group ($p < 0.05$). On comparing wound score using Modified Hollander Cosmesis scale, the mean score was significantly higher in staple group than in suture group ($p < 0.05$). The complications at different point of follow-up was also significantly lower in staple group than suture group ($p < 0.05$). The degree of patient satisfaction was also significantly higher in stapler group than in suture group. **Conclusion:** The present study documented a significant better outcome in patients who underwent skin closures with staples than with conventional sutures in view of duration of closure, ASEPSIS score, Modified Hollander Cosmesis score, complications and patient satisfaction.

KEYWORDS

Staples, Suture, ASEPSIS, Modified Hollander Cosmesis.

I. INTRODUCTION:

The suturing of any incision or wound needs to take into consideration the site and tissues involved and the technique for closure should be chosen accordingly. Therefore the correct choice of suture technique and suture material is vital, but will never compensate for inadequate operative technique, and for any wound to heal, there must be a good blood supply and no tension on the closure.¹

For many years it has been possible to approximate the skin edges using sutures. However, sutures have the disadvantages of consuming more time in applying with a cosmetically inferior scar. The use of automatic stapling device for skin closure has become more popular of late to overcome these disadvantages. At the present time and cost effectiveness of these is debatable.^(2,3)

Surgical site infections (SSIs) are infections of the tissues, organs, or spaces exposed by surgeons during performance of an invasive procedure. SSIs are classified into incisional and organ/ space infections, and the former are further sub-classified into superficial (limited to skin and subcutaneous tissue) and deep incisional categories.^(4,5) SSIs are serious operative complications that occur in approximately 2% of surgical procedures and account for some 20% of health care-associated infections.⁶

Skin staples are better alternatives to conventional sutures in head and neck cancer surgery as they offer ten times faster wound closure, cost effectiveness and similar results to sutures in terms of patients comfort, aesthetic outcome and complication rate.⁷ Our present comparative observational study aimed to compare skin staples with conventional suturing for abdominal skin closure.

II. MATERIAL & METHODS:

This was a comparative study, carried out in the Department of General

Surgery, Aarupadai Veedu Medical College and Hospital, Pondicherry. Duration of the study 2 years.

In a study conducted by Varghese *et al.*,⁷ comparing skin sutures and skin staples in abdominal surgical wound closure, proportion of wound infection parent article among staple group, was found to be 38.09% and among suture group was 16%. Using this data, minimum sample size required for the study was calculated as 60 in each group.

Patients undergoing elective abdominal surgery and willing to participate in the study by giving informed and written consent were included. Patients having lacerated wounds with skin loss were excluded.

After correction from the IRC & IEC, convenient sampling of patients undergoing elective abdominal surgeries, attending OP and IPD services during the study period mentioned, fulfilling the inclusion and exclusion criteria already listed above were recruited for the study, after obtaining informed written consent under the guidance of the guide and co-guide. The nature, purpose and their roles in the study was explained in details, including the information that their non-participation in the study would not affect the quality of their treatment that they are to receive and that they are free to exit the study at any time. After assuring that their responses would remain confidential, an informed written consent for the same was obtained from all participants. Data were collected using a pre-tested semi-structured proforma to collect sociodemographic details about the patients participating in the study. Patients based on convenience sampling were divided into Group A & Group B. Pre operatively in both the groups detailed history was taken and routine investigations like were done. Pre-operative shaving of the parts was done and a pre-operative antibiotic one hour prior to surgery was given. In both the groups, after the surgical procedure is finished, the duration of skin closure was documented. In both the groups the outcome of the wound is assessed

at 3rd, 5th and 7th postoperative days using ASEPSIS SCORE. The wound is assessed for cosmesis on 7th postoperative day using Modified Hollander Cosmesis scale which has six clinical variables. Any complications or infections if present were observed in both the groups. Patients were followed up after 2 weeks, 6 weeks and 3 months to see the wound healing and cosmesis. All the statistical analysis were analysed using SPSS v21 operating on windows 10.

III. Statistical Analysis

All the patient data was collected on Microsoft windows excel sheet, and the statistical analysis was performed on the SPSS v21 operating on windows 10. The descriptive data were summarised as mean, median and proportion, frequency. The summarised data were represented using the tables and figures. The mean differences between the continuous variables of two groups were assessed using the student-test and for categorical data chi-square test was used. The p-value of <0.05 was considered statistically significant.

IV. RESULTS:

In present study total of 120 patients were divided as 60 in each group and between the groups the mean age was not significantly different. On assessment of distribution of patients according to gender, there was male preponderance overall with no significant difference in distribution.

Table 1: Comparison of the number of staples/ sutures and duration of skin closure between the groups

	Staples		Sutures		p-value
	Mean	SD	Mean	SD	
Number of staples	16	8	11	7	0.01*
Duration for closure sec	151	121	365	283	0.01*

Table 1 shows comparison of the number of staples/ sutures, it was significantly higher in staple group compared to suture and the duration of closure was significantly lower time duration in staple group compared to suture group.(p<0.05)

Table 2: Mean comparison of the ASEPSIS Score between the groups

ASEPSIS score	Staples		Sutures		p-value
	Mean	SD	Mean	SD	
POD3	11.72	6.63	13.45	7.77	0.191
POD5	9.27	5.08	11.43	7.14	0.05*
POD7	4.10	2.99	5.87	4.96	0.02*

Table 2 shows assessment of ASEPSIS score at different point of follow-up, there is significant lower mean score among the patients in suture group compared to the staple group.(p<0.05)

Table 3: Showing the mean Modified Hollander Cosmesis scale between the groups

Modified Hollander Cosmesis scale	Staples		Sutures		p-value
	Mean	SD	Mean	SD	
POD3	5.62	0.58	4.92	1.01	0.01*
POD5	5.73	0.55	4.65	1.23	0.01*
POD7	5.47	0.85	4.37	1.28	0.01*
POD14	5.82	0.47	4.40	1.32	0.01*
PO 6weeks	5.85	0.40	4.52	1.36	0.05*
PO 3 months	5.87	0.39	4.65	1.38	0.01*

Table 3 shows assessment of the wound score using Modified Hollander wound score scale, the mean score was significantly higher in the staple group compared to suture group, with better scores.(p<0.05)

Table 4: Comparison of the complication between the groups

Complication	Staples		Sutures		p-value
	Mean	SD	Mean	SD	
POD14	0.15	0.52	0.63	1.06	0.01*
PO 6 weeks	0.07	0.25	0.18	0.39	0.01*
PO 3 months	0.00	0.00	0.10	0.30	0.01*

Table 4 shows assessment of complications at different point of time, there is significant lower mean level in staples group compared to the suture group.(p<0.05)

Table 5: Showing the comparison of degree of patients satisfaction between the groups

	Staples		Sutures		p-value
	Mean	SD	Mean	SD	
Degree of patients satisfaction	2.75	0.47	2.53	0.81	0.07

Table 5 shows present study, on assessment of degree of patients satisfaction, it was significantly higher among the patients in staples group compared to the patients in suture group.(p<0.05)

V. DISCUSSION AND CONCLUSION

In present study total 120 patients fulfilling inclusion criteria are included after obtaining the informed consent and divided into two groups based on the suture method. 60 patients in group A used staples for closure and 60 patients in group B with sutures used for closure. Between the groups the mean age was not significantly different. On assessment of distribution of patients according to gender, there was male preponderance overall with no significant difference in distribution. In similar to present study by Varghese *et al.*, found no significant difference in the mean age between the groups, with mean age in staple group was 50yrs and suture group was 48yrs, also majority of the patients were male with comparable gender between the groups.⁷ Kathare *et al.*, also documented male preponderance in their study with no significant difference in distribution between the groups.³

On comparison of the number of staples/ sutures it was significantly higher in staple group compared to suture and the duration of closure was significantly lower time duration in staple group compared to suture group.(p<0.05) Wound closure with staples is nearly three times quicker, saving time, but has a lower tensile strength of scar tissue than sutures.⁸ Krishnan *et al.*, stated that given that there may be no difference in efficacy between the two skin closure methods and the methodological constraints of the included research, writers should start thinking about the cost and logistical consequences of utilising staples or sutures for skin closure.⁹ In concordance Huda *et al.*, documented the average time for closure in the suture group is 277.14 seconds versus 77.2 seconds (p = 0.0001) in the stapler group out of 48 suture vs 45 stapler instances.¹⁰ In another study by Kathare *et al.*, the time required for wound closure with staplers demonstrated a statistically significant difference when compared to suture closure; the stapler took 4 times less time to complete wound closure.³

On assessment of Asepsis score at different point of follow-up, there is significant lower mean score among the patients in suture group compared to the staple group.(p<0.05) On assessment of the wound score using Modified Hollander wound score scale, the mean score was significantly higher in the staple group compared to suture group, with better scores.(p<0.05) n assessment of complications at different point of time, there is significant lower mean level in staples group compared to the suture group.(p<0.05) In present study, on assessment of degree of patients satisfaction, it was significantly higher among the patients in staples group compared to the patients in suture group.(p<0.05)

In concordance Huda *et al.*, concluded that stapler closure takes the least amount of time with no statistically significant difference in wound infection, post-op discomfort, pain during removal, and scar outcomes in both groups.¹⁰ In contrast to present study, Feng *et al.*, documented Sutures proved to give greater cosmesis and patient satisfaction than staple closure, which was related with a shorter operation duration. Sutures and staples both had a comparable rate of dehiscence. There was no substantial publication bias between studies. A research found that subcuticular sutures and staples for skin closure had equal SSI rates in individuals following abdominal surgery.¹¹ In the present study, skin staplers versus sutures in abdominal wound closure, we found that incidence of post-operative wound infection was more with skin sutures. Staples provided better cosmesis than sutures and they save operative time as compared to sutures. Hence, we conclude that staples are associated with low incidence of wound complications, provides good cosmetic outcome, takes considerably less time for skin closure and also patients have better satisfaction with staples than sutures.

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