Original Resear	Volume - 12 Issue - 11 November - 2022 PRINT ISSN No. 2249 - 555X DOI : 10.36106/ijar General Surgery A COMPARATIVE STUDY OF SKIN STAPLES AND CONVENTIONAL SUTURES FOR ABDOMINAL SKIN WOUND CLOSURE
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(ABSTRACT) Aims ar results, j	Id objectives : The objectives of the study were to study the operative time, the effect on wound healing, cosmetic patients acceptance and total cost with the use of sutures and staples. Methods: The study was conducted on 100

patients who were undergoing elective surgery from August 2020 to July 2021 in our institute. The patients were randomly selected to receive either suture or staple. **Results:** The study group included 50 patients who underwent wound closure by staplers and 50 patients underwent suturing. The commonest region of the surgical wounds was Mc Burneys site. The time taken for wound closure using staplers showed statistically significance difference over closure with suture, it took the stapler 4 times less duration to perform wound closure. The average cost of using stapler was higher than suturing. The appearance of the scar among the staple group was good in 90% of those who returned for follow up at 1 month, 10% had average scar. The patients acceptance was better in staple group with less pain during removal as compared to suture group. P-value calculated using students unpaired T-test. P<0.0001 which was highly significant. **Conclusions:** Staples did not cause excess wound pain and allows saving in time with better cosmetic results.

KEYWORDS : conventional sutures, staplers, abdominal wound closure.

INTRODUCTION

The principal aims of tissue repair after surgical skin incisions are rapid acquisition of strength, least tissue damage, no inflammation and an aesthetically acceptable scar. For many years, it has been possible to approximate the skin edges using sutures. Sutures have the disadvantage of consuming more time and a cosmetically inferior scar.

- Methods employed for mechanical wound closure include staples, tape, adhesives and sutures. The development of mechanically satisfactory skin staples appears to represent an important advance in rapid and effective means of closing long skin incisions.
- The most commonly used methods used for skin closure are surgical staples and sutures. Both methods act to hold the skin edges together while healing occurs. Surgical material being a foreign body implanted in the human tissue elicits foreign body tissue reaction.
- During wound closure, a sterile field and a meticulous aseptic technique are critical to minimize the risk of wound infection. Staples are said to be associated with increased tension along the incision line making them unsuitable for reconstructive flap surgery. Complications such as wound dehiscence, infection have considerable impact on the recovery of the patient, causing increased morbidity, delayed discharge, increased cost and reduced satisfaction.
- The present study is undertaken to compare wound healing and time duration, cosmetic outcome, patient satisfaction and cost analysis between skin staples and conventional suture for abdominal skin closure.

CASE STUDY

- Source of data: The present study is a prospective study consisting of 100 cases admitted in King George Hospital, Visakhapatnam, during the period from September 2020 to September 2021 for elective or emergency abdominal surgeries.
- Method of collection of data: A time bound prospective study was conducted on patients who underwent elective or emergency abdominal surgeries during the study period from september2020 to september 2021.Data was collected regarding wound healing and time duration, cosmetic outcome, patient satisfaction and cost analysis between skin staples and conventional suture for abdominal skin closure.
- Study type: Prospective study
- Inclusion criteria: Patients undergoing elective or emergency abdominal surgeries with clean wounds.
- Exclusion criteria: Patients having lacerated wounds with skin loss. Patients aged less than 13 years of age.

 Statistical analysis: All continuous variables were expressed as mean and number of percentages were used for categorical variables. Chisquare test and students t test and multivariate logistic analysis were used. P<0.05 was considered statistically significant.

RESULTS

- This study was conducted in the Department of Surgery, King George Hospital, Visakhapatnam, during period of September 2020 to September 2021. The study groups included 50 patients who underwent wound closure by staplers and 50 patients who underwent the prolene suturing.
- Among the stapler group, the youngest patient was aged thirteen year and the oldest was 65 years old, with a median age of 25 years. The suture group has a thirteen year old patient as the youngest and 75 year old patient as the oldest. There were 33 males and 17 females in the stapler group while there were 39 male and 11 females in the suture group.
- The commonest region of the surgical wounds in this study was Mcburneys, 23 in staplers and 23 in suture group. The regional distribution of surgical wounds in the suture group was mid line 06, Mcburney's 23, subcostal 06, transverse 02, paramedian 02 and inguinal 11. The regional distribution of surgical wounds in the staples group was mid line 07, Mcburney's 23, subcostal 04, transverse 03. paramedian 03 and inguinal 10
- Among the stapler group, there were 33patients whose wound length belonged to groupA(<5 cm), 07 in group B (5-10 cm) and 10 patient in group C (>10 cm). Among the suture group, there were 34, 08 and 08 patients in groups A, B and C. There were no statistically significant differences between the two groups, with respect to patients' age, sex and wound length.
- The time taken for wound closure using staplers showed statistically significant difference over prolene suture closure. It took the stapler five times less duration to perform wound closure. With staplers the average time taken was 11 seconds whereas with prolene suture, the time taken was 45 seconds per centimeter of wound length.
- The difference between the two techniques was most striking in the group C wounds, which were longer than 10 cm. Among group A wounds also there was a statistically significant difference between the stapler and suture groups. The average time taken for application of stapler in group C wound was 60 seconds whereas for the suture group, it was 240 seconds.
- Subjective quantification of the pain during suture removal showed that most of the patients registered score of 5 and 6. Among the stapler group of patients most of the patients registered

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- The cost of the procedure with stapler depended on the length of the wound. For group A wound, the average cost was Rs.59.85, for group B it was Rs. 89.70 and for group C it was Rs. 300. The cost of prolene suture was Rs.88.50 (2 metric length) for majority of the cases. In 04 cases, which required more than 2 metric length of prolene due to bigger wounds, the cost was higher (Rs.177.00).
- The appearance of the scar among the staple groups was good in 90% of those who returned for follow up at one month, 10% had average scar, with widening or hypertrophy of the scar with itching. The cosmetic appearance of the scar was good. In 60% of the cases in the suture group, with 30% with average and 10% poor scars. The average saving of just over three minutes in closing a 15cm wound with staples could be extrapolated to a gain of 15-20 minutes on an average operating list. Apart from the more efficient use of theatre time, the psychological effect of rapid wound closure at the end of a long operation on surgeon and theatre staff was very evident during this trial. Continuous sutures save some time but have been shown to take two minutes longer than staples over 15 cm.

DISCUSSION

- Wound closure is as important as any other action performed by the surgeon. And apart from the need for producing a healthy and strong scar, it is the surgeon's responsibility to ensure its aesthetically pleasing physical appearance. Skin staples are an alternative to regular sutures in offering this advantage. The present study has helped to highlight the benefits of skin stapler.
- In the present study, there was no significant difference between the results of application of staplers or sutures at various anatomic regions. The commonest region of the surgical wounds in this study was Mcburney's, 23 in staplers and 23 in suture group. The scar appearance was good in 90% of the patients who were available for follow up, which is similar to other studies.
- In the present study, the time taken to complete wound closure was significantly less with the use of staplers as compared to sutures. The average time required to approximate one centimeter of wound was 11 seconds with the stapler whereas with silk suture, it was 45 seconds, more than four times longer.
- For analysis of the cost factor, the wounds were divided into three groups depending on the length (less than 5 cm, 5cm to 10cm and more than 10 cm) and were named groups A, B and C respectively. The average cost of using skin stapler for group A wound was Rs.71, for group B it was Rs.91 and for group C it was Rs.300. The cost of stapler use in general was significantly higher as compared to prolene sutures, which had a cost of only Rs.88.50 per wound on average.
- In the present study, on comparing the cost of using stapler in group A wounds alone showed no major difference. The benefit of time saved in this group alone (60 seconds with staplers versus 240 seconds with sutures) was significant. Enough to outweigh the minor cost difference. The cosmetic appearance of the wound was also better with use of staplers.
- To summarize, considerable alteration has taken place from the conventional skin suture technique and switch over to the new era of cosmoses, in the forum of skin stapling to achieve a near virgin scar less skin.

Table -2



Graph-2: Bar graph showing sex distribution



Table-5

Time Factor

	Time Factor				
Time	Staplers	Sutures			
Sec / cm	п	45			

Graph-5: Bar graph showing time factor



Table-7

Groups Vs Cost

Groups	Staples	Sutures
A (WL-up to 5cm)	Rs. 60.90	Rs. 88.50
B (WL - 5 to 10 cms)	Rs. 90.80	Rs. 88.50
C (WL > 10 cms)	Rs. 300.00	Rs. 177.00

Graph-7: Bar graph showing groups Vs cost



CONCLUSION

Staples did not cause excessive wound pain. Local staple removal was unnecessary to allow drainage of moderately infected wounds. Routine staple removal was no more difficult nor painful than suture removal No difference was found in the final grading of wounds between the groups. So the merits of stapling come down to its convenience, rapidity and cost. Staplers were well liked by operators and resulted in a substantial and worthwhile saving in time for wound closure. Stapled skin closure is not as uneconomic as previously believed.

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