



ORIGINAL RESEARCH PAPER

General Surgery

A COMPARATIVE STUDY OF SKIN STAPLES AND CONVENTIONAL SUTURES FOR ABDOMINAL SKIN WOUND CLOSURE

KEY WORDS: sutures, staples, surgical site infections, incision.

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ABSTRACT

The term surgery was coined from the earlier name chirurgery which means handwork. Wounds and their management are fundamental to the practice of surgery. Any elective abdominal surgical intervention will invariably result in a skin wound in order to gain access to underlying intra-abdominal pathology. The measures used to close the abdomen may vary from surgeon to surgeon. However, certain basic principles govern all abdominal closures. Ideal wound closure not only provides strength and a barrier to infection, but also leaves behind an inconspicuous scar. The principal aims of tissue repair after surgical skin incisions are rapid acquisition of strength, minimal tissue damage, no inflammation and an aesthetically acceptable scar, which is achieved by obliteration of dead space, layered tissue closure, and eversion of skin margins. For many years it has been possible to approximate the skin edges using sutures. Sutures have the disadvantage of consuming more time in applying with a cosmetically inferior scar. The surgical scar remains the only visible evidence of the surgeon's skill and not infrequently, all of his efforts are judged on its final appearance. Staplers were originally developed to address the perceived problem of patency i.e., security against leaks of blood or bowel contents in anastomosis in particular.

INTRODUCTION

The act of sewing is as old as Homo sapiens. In Sushruta Samhitha 600 BC, there is mention of suture material made from braided horsehair, leather strips, and vegetable fibres. This text describes in detail triangular, round bodied, curved, and straight needles..3.

It is widely accepted that both sutures and staples can achieve the basic goals of wound closure. Both methods endeavor to re-approximate the skin by creating a watertight, tension-free non-inverted opposition of the edges that promotes rapid healing and a cosmetically acceptable scar. Many studies have produced conflicting results regarding the efficacy, economics, rate of complications and cosmetic outcomes achieved when comparing these two closure methods for a variety of applications. Skin staples did not increase the occurrence of superficial SSIs following open laparotomies mainly consisting of clean-contaminated surgical procedures..2.

For many years it has been possible to approximate the skin edges using sutures. Historically, there were few surgical options for wound closure. From catgut, silk and cotton, there is now an ever-increasing array of sutures, approximately 5,269 different types, including antibiotic coated and knotless sutures.

Wide range of sutures in different sizes swaged to needles as fine as 30 microns..4. With the advancement of technology in the field of surgical sciences, we have variety of newer wound closure such as staples, adhesive tapes, Tissue glue that have changed the practice of surgery in a profound way.

Eldrup et al. analyzed 137 patients and concluded that mechanical sutures took 1/3rd of the time taken by conventional sutures ..5.

Halstedian teaching has emphasized gentle handling of the tissues and careful haemostasis to enhance healing to prevent infection..6.

Knot slippage is greater with monofilament suture..7.

Braided sutures suffer from producing the degree of drag through the tissues and by their capillary action, may cause tissue reaction at the stitch and can lead to stitch abscess..8.

Progressive hydrolysis of the nylon in vivo may result in gradual loss of tensile strength over time. So nylon suture should not be used in suturing when permanent retention of tensile is required..9, 10.

It has become necessary to know which method of wound closure is better for a particular patient and wound. The skin itself varies throughout the body in terms of its elasticity, thickness, speed of healing and tendency to scar. Hence, the observational study was undertaken with the objective of comparing skin staplers with skin sutures in abdominal skin wound closure.

AIMS AND OBJECTIVES

1. To study the total operative time required for conventional sutures and staple repairs.
2. To study the effect on wound healing and infection rate with the use of these techniques.
3. To study the cosmetic result of these two techniques.
4. To study the degree of patient satisfaction with these two techniques

PATIENTS AND METHODS

Source of data: Patients fulfilling the inclusion and exclusion criteria, who presented to the in-patient department of general surgery, Government General Hospital, Kurnool.

Inclusion criteria:

1. Patients undergoing abdominal surgeries with clean and clean contaminated wounds.
2. Patients undergoing both elective as well as emergency surgeries.
3. Patients willing to participate in the study.

Exclusion criteria:

1. Patients having lacerated wounds with skin loss.
2. Contaminated and dirty wounds.
3. Patients unwilling to participate in the study.

Methods:

A total of 50 patients were categorised in to suture and staple groups with 25 each. In staple group, wound closure was done with skin staples, while in suture group; wound closure was done with prolene using interrupted sutures.

Following selection of subjects and after obtaining informed consent about proposed study data was collected from

- 1) Operating surgeon during operation,
- 2) Patients post operatively regarding pain,
- 3) Follow up of patients in outpatient department after hospitalisation.

The subjects in each group were further categorized based on wound length to group A (<5 cm), group B (5-10 cm) and group C (>10 cm). All the data were collected, tabulated and statistical analysis done.

RESULTS

The number of males(=13) and females (=12) were same in both staples and sutures. Number of patients in age groups 10-20years were 3, 4 in 20-30 , 9 in 30-40, 5 in 40-50, 4 in 50-60 years age groups.

1]type of incision

In the present study, out of 50 cases, the commonest type of incision for surgical wound creation was McBurney s incision; 10 in staplers and 10 in suture group. Midline incision was given in 7 cases in each group, inguinal incision was given in 5 cases in each group, sub-costal incision was given in 2 cases in each group, and paramedian incision was given in one case in each group.

2]Classification based on length of wounds:

Wounds are classified based on the length of incision as Group A, <5 cm with 11 cases in staples and 12 cases in sutures group; Group B, 5-10 cm with 13 cases in staples and 11 cases in sutures group and Group C, >10 cm with 1 case in staples and 2 cases in sutures group.

GROUP	GROUP A <5cm	GROUP B 5-10 cm	GROUP C >10 cm	TOTAL
STAPLES	11 (44%)	13 (52%)	1 (4%)	25 (100%)
SUTURES	12 (48%)	11 (44%)	2 (8%)	25 (100%)

3]Time required for closure

Time required for skin closure was classified as <5 min, 5-10 min, 10-15 min and >15 min. In staples group, time required for skin closure was <5 min in all the cases whereas in sutures group, 10 cases completed skin closure in <5 min, 7 cases in 5-10 min, 6 cases in 10-15 min and 2 cases in > 15 min.

4] Post-operative complications:

In staples group, 3 cases presented with seroma and 2 cases with infection whereas in suture group, seroma was seen in 5 cases and infection in 4 cases. Staphylococcus aureus is the most common organism that was grown in culture in both groups. The chi-square statistic is 0.0259. The p-value is 0.872081. The result is not significant at p < 0.05.

COMPLICATIONS	STAPLES (N=25)	SUTURES (N=25)
Wound seroma	3 (12%)	5 (20%)
Wound infection	2 (8%)	4 (16%)
TOTAL	5 (20%)	9 (36%)

5]Wound healing:

Wound healing with primary intention seen in 80% of cases in staples and 68% of cases in sutures group. The chi-square statistic is 0.9356. The p-value is 0.333425. The result is not significant at p < 0.05.

6] Cosmetic outcome

In staples group, fine scar was seen in 80% of cases and in

sutures group, fine scar was seen in 68% of cases. The chi-square statistic is 0.9356. The p-value is 0.333425. The result is not significant at p < 0.05.

7] Pain score during removal of staples / sutures:

Pain while removal of staples or sutures is tabulated by using pain score with <2 and >2 in both the groups. In staples group, pain score was <2 in 88% of patients and in sutures group, it was 24%. The chi-square statistic is 20.7792. The p-value is < 0.00001. The result is significant at p < 0.05.

CONCLUSION:

Staples results are better in achieving a healthy and finer scar when compared to sutures group.

- In terms of patients “acceptance of scar, we conclude that staples have good acceptance in clean elective cases.
- Staples are cheaper in comparison to sutures in larger incisions.
- The wound closure time was much less in staple group.
- Routine staple removal was not difficult or painful than sutures group.
- Staples did not cause excessive wound pain.

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