



ABDOMINAL SKIN INCISION CLOSURE WITH NON- ABSORBABLE SUTURES VERSUS STAPLES- A COMPARATIVE STUDY

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KEYWORDS :

INTRODUCTION

The act of sewing is as old as Homo sapiens. In Susruta Samhitha 600 BC there is mention of suture material made from animal sinews, braided horsehair, leather strips, and vegetable fibers.

For many years it has been possible to approximate the skin edges using suture however sutures have the disadvantages of consuming more time and 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

Wound closure is as important as any other action performed by the surgeon.

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 comparison between skin sutures and skin staplers. The skin stapling devices have revolutionized surgery for the purpose of rapid closure of abdominal wounds.

Objectives Of The Study:

- 1. To study the time taken for skin closure.
- 2. To study the effect on wound healing with the use of nonabsorbable sutures & Staples.
- 3. To Compare post-operative pain between the 2 methods
- 4. To study the post operative wound complications
- 5. To study the cosmetic results of 3-0 polyethylene and Skin staples.

Selection criteria

Inclusion criteria:

- patients undergoing elective abdominal surgery, with clean wounds.
- patients with age more than 12 years and age less than 65 years

Exclusion criteria:

- Patients having diabetes mellitus (DM)
- Patients with immune compromised status like AIDS/HIV infection
 - Patients having severe comorbidities, i.e., shock, septicemia, failure of other organ

Methodology

- Study Period:** 1 Year. June 2022 to May 2023
- Study Design:** Randomized control study .
- Place of Study:** Kanachur Institute of Medical Science.
- Ethical Considerations:** The study was conducted following approval from the institutional ethics committee, and informed consent was obtained from all participants

Pain Assesemnt

The measure of pain was based on the patients scoring on the day of suture/staple removal and on 30th day after surgery according to numerical rating scale from 0 to 10.

Surgical Site Infection-

if present was classified as per classification given by CDC by means of scoring system. Scoring of surgical site was done against a total score of five.

Cosmesis

The cosmesis of the scar was rated on 30th day after surgery by the patient and an observer scar assessment scale v2.0 from 0 to 10.

RESULTS

- The study conducted at our hospital included a total of 149 patients, of which two patients refused to participate in the study. Of the final 147 patients analyzed in the study, 74 patients underwent closure of incision by non- absorbable sutures and the remaining 73 patients underwent closure of incision by staples.
- The study population analyses showed that majority of them were between the age group of 20-40 years (56%), females contributed to about 55% of study population.
- A significant share of the population was urban (60%), middle class (54%) and degree holders. About 29% of them were diabetic, 18% were hypertensive, 6% were steroid users, 12% were anaemic, 21% of them had other

serious systemic illness and five patients were retroviral positive

- The overall analysis of the SSI scores between the methods of closure of the skin incision showed mean SSI score of 1.722 ± 0.1044 and 1.237 ± 0.1115 respectively in sutured and stapled wounds. The differences in the means were statistically significant with p value of 0.0018 (Figure 1).
- The sub group analysis showed significant SSI score mean differences in Non- steroid users, middle and high socio economic status population, incision of length between 5-10cm and clean wounds.
- In these sub groups the use of staples for skin incision closure reduced the SSI score significantly.
- In other sub groups, the difference of SSI score between the use of sutures and staples for skin incision closure was not significant. Summarised in Sequential Diagram 2 and Table 2

Table 1: SSI associated with method of closure in other published studies

STUDY	SUBGROUP	RESULTS
CURRENT STUDY	INCISION OF LENGTH < 5 CM 5-10 CM > 10 CM AND CLEAN AND CONTAMINATED WOUNDS	STAPLES REDUCE SSI
STOCKLEY ¹⁶	NOT DONE	STAPLES SHOWED INCREASED INCIDENCE OF SSI
TUULI ¹⁹	NOT DONE	STAPLES SHOWED INCREASED INCIDENCE OF SSI
IVAZZO ¹⁰	NOT DONE	STAPLES SHOWED DECREASED INCIDENCE OF SSI
ROTH ¹²	NOT DONE	STAPLES SHOWED DECREASED INCIDENCE OF SSI
LENINHAN ¹⁷	NOT DONE	STAPLES SHOWED DECREASED INCIDENCE OF SSI
RICHARD ¹⁸	NOT DONE	STAPLES SHOWED DECREASED INCIDENCE OF SSI
CHANDRESH EKAR ²⁸	CLEAN WOUNDS	STAPLES SHOWED DECREASED INCIDENCE OF SSI
HEMMING ²⁸	NOT DONE	EQUIVOCAL

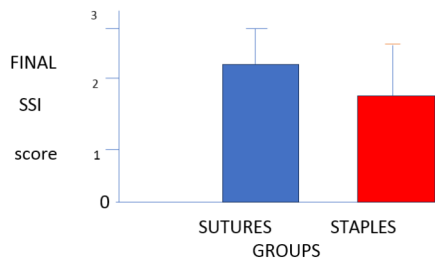


Figure 1: Final SSI score analysis between sutures and staplers

Table 2: Level of comfort associated with method of closure in other published studies

STUDY	SUBGROUP	RESULTS
CURRENT STUDY	INCISION OF LENGTH < 5 CM	STAPLES REDUCE PAIN

	5-10 CM > 10 CM AND CLEAN AND CONTAMINATED WOUNDS	
CHANDRESH EKAR ²⁸	CLEAN WOUNDS	STAPLES WERE ASSOCIATED WITH MORE PAIN
CHAVAN ²³	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN
KARBHARI ³⁰	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN
STOCKLEY ¹⁶	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN
ELDRUP ⁷	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN
SLADE ⁹	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN
IVAZZO ¹⁰	NOT DONE	STAPLES WERE ASSOCIATED WITH MORE PAIN

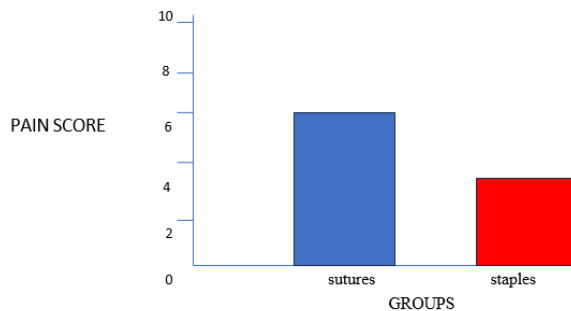


Figure 2: Pain score analysis between sutures and staplers.

Result(contd)

- The level of comfort or in other words the pain experienced by the patient in the form of pain score analysis between the two methods of skin incision closure showed mean score of 6.014 ± 0.2032 and 4.260 ± 0.2128 respectively in sutured and stapled wounds. The differences in the means were statistically significant with p value of < 0.0001 (Figure 2). The sub group analysis showed significant pain score mean differences in incision of length less than 5cm, between 5-10cm

Result(contd)

- The cosmetic score analysis between the methods of closure of the skin incision showed mean cosmesis score of 6.203 ± 0.1539 and 5.205 ± 0.1891 respectively in sutured and stapled wounds. The differences in the means were statistically significant with p value of < 0.0001 (Figure 3).
- The sub group analysis showed significant cosmesis score mean differences in younger age group, middle and high socio economic status population, length of incision less than 5cm, more than 10cm, clean and clean contaminated wounds.

Result(contd)

- In these sub groups the use of staples for skin incision closure resulted in a cosmetically superior scar with better patient acceptance.
- In other sub groups, the difference of pain score between the use of sutures and staples for skin incision closure was not significant.

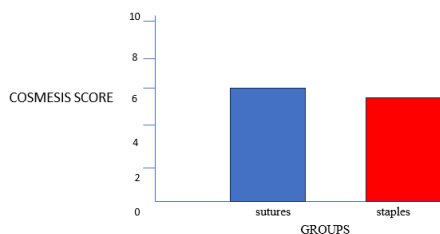


Figure 3: Cosmesis score analysis between sutures and staples.

CONCLUSION:

- The results of this study illustrated the fact that the use of staples in closure of skin incision in laparotomy case especially in selected subgroup of population significantly reduces the surgical site infection, hence slashing the use of antibiotics and in turn has the potential to reduce the incidence of antibiotic resistance.

Conclusion(contd)

- The use of staples to close skin incision in laparotomy cases also improves the perception of cosmetic appearance of scar to the patient and significantly reduces the level of discomfort and adds to the comfort of patient by reducing the pain experienced by the patient.

DISCUSSION

- The mean time saving of 80% was possible with stapling devices and was 2.7 times faster than conventional methods.¹¹
- comparing the use of staples verses suture for surgical procedures went to support staples theoretically as well as practically as it reduced the operative time and reduction in the operative time has the potential⁵
- In most of the articles reviewed were also having an overall similar view when comparing the cost of using staples against conventional methods. Staple were indeed more expensive than using conventional closure methods.^{5,11,1}

Discussion(contd)

- Incase of cosmesis comparing the use of staples verses suture for surgical procedures went to support staples.^{8,17,18}
- With respect to infection/inflammation the study favours use of staples in evaluated types of surgeries in reducing wound infection.⁷

Discussion(contd)

- the same was also seen in a meta-analysis comparing the use of staples verses suture for surgical procedures went to support staples theoretically as it reduced the operative time and reduction in the operative time has the potential.¹⁰
- When it came to pain and satisfaction there was an overall agreement in the fact that staples were associated with more pain and discomfort to patients.^{7,9,10}

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