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Skin Staples and Conventional Suture for Abdominal Wound Closure: Cost and Surgeon's Time

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ABSTRACT

An incision is properly planned as to shape, direction and size. In general incisions are made along the normal skin lines. Skin management should be handled gently to minimize necrosis that may promote infection or delay wound healing. In closing wounds, sutures are either used in an interrupted or continuous fashion. The purpose of a suture is to hold tissues in apposition until the wound has healed sufficient enough as to be self-supportive. The study was conducted on 100 patients who undergoing elective surgery. Randomly selected patient, to receive either suture or staple repair. 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 <2 metric length of prolene due to bigger wounds, the cost was higher (Rs.177.00).

INTRODUCTION

Wound healing is a complex and dynamic process and is influenced by surgical technique. Optimal wound healing, with a minimal scar that compromises neither appearance nor function, is the desired result. This process is affected by both local and systemic factors. Many local conditions are readily controlled at the time of wound closure and several fundamental principles of surgical wound closure exist that should be adhered to in the management^[1]. An incision is properly planned as to shape, direction and size. In general incisions are made along the normal skin lines. Skin margins should be handled gently to minimize necrosis that may promote infection or delay wound healing^[2]. An incision is properly planned as to shape, direction and size. In general incisions are made along the normal skin lines. Skin management should be handled gently to minimize necrosis that may promote infection or delay wound healing^[3]. In closing wounds, sutures are either used in an interrupted or continuous fashion. The purpose of a suture is to hold tissues in apposition until the wound has healed sufficient enough as to be self-supportive^[4]. In wound closure, the surgical technique is quite important but a good scientific knowledge of different sutures and needles and how they perform will aid the surgeon to achieve optimum wound healing. Since suture technology has kept pace with advances in surgical techniques, it is imperative on the part of the surgeon not only to be fully aware of them but also to keep them in their surgical armamentarium^[5,6].

MATERIALS AND METHODS

The study was conducted on 100 patients who undergoing elective surgery. Randomly selected patient, to receive either suture or staple repair.

Method of Collection of Data:

During Operation: From operating surgeon.

Post Operatively: From patients input.

Supply of Suture and Staples: From pharmacy and company.

Follow Up Patients: Patients coming for follow up to outpatient Department After hospitalization.

Inclusion Criteria: Patients undergoing elective abdominal surgery, with clean wound.

Exclusion Criteria: Patients having lacerated wounds with skin loss.

RESULTS AND DISCUSSIONS

Table 1: Sex Distribution

Group	Males	Females
Staplers	33	17
Sutures	39	11

Table 2: Region of Incision

Group	Inguinal	Midline	Paramedian	Subcostal	Transverse	McBurney's
Staplers	10	07	03	04	03	23
Sutures	11	06	02	06	02	23

Table 3: Time Factor

Time factor		
Time	Staplers	Sutures
Sec/cm	11	45

Table 4: Group vs Cost

Group	A (1-5cms)	B (1-5cms)	C (1-5cms)
Staplers	Rs 60.90	Rs 90.80	Rs 300
Sutures	Rs 88.50	Rs 88.50	Rs 177

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 nine year and the oldest was 65 years old, with a median age of 25 years. The suture group has a nine-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 33 patients whose wound length belonged to group A (<5cm), 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^[7,8]. 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 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 <2 metric length

of prolene due to bigger wounds, the cost was higher (Rs.177.00). In the study by Ranaboldo *et al.*, the rate of wound closure was 8 seconds/cm with stapler and 12.7 seconds/cm with sutures. In our study, for a four-centimeter wound, the time taken with stapler was about 45 seconds whereas a similar wound required 3 minute with suture. Thus, there was a saving of 135 seconds or two and a quarter minutes. This is comparable with several other studies. Kanagaye observed that staplers were six times faster than standard sutures. Eldrup *et al.*, analyzed 137 patients and concluded that mechanical sutures took one third of the time taken by conventional sutures. Meiring *et al.*, have recorded that there was 80% time saving, whereas Harvey and Logan have reported 66.6% time saving with the use of staplers. Medina dos Santos *et al.*, found in a prospective trial that the mean skin closure time with staple was 5 minutes and 25 minutes with nylon suture. For analysis of the cost factor, the wounds were divided into three groups depending on the length (>5cm, 5cm-10cm and more than 10cm) 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 11 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. This difference in cost has been well document by earlier studies as we. Ranaboldo has concluded after studying 48 patients that, the cost of stapler use is five times higher than suturcs. However, 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.

CONCLUSION

- The average time taken for wound closure with staple was 11 seconds and with suture was 45 seconds per centimeter of wound length.
- The average cost of using staple was higher than silk suture.
- But in group A type of wound, the cost difference was slight, whereas the time saved and cosmetic appearance were significant and hence staples appeared to be more beneficial.

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