



ORIGINAL RESEARCH PAPER

Health Science

A STUDY ON EFFECTIVENESS OF NEGATIVE SUBCUTANEOUS DRAIN IN REDUCING SURGICAL SITE INFECTIONS IN LAPAROTOMY WOUNDS

KEY WORDS: negative subcutaneous drain, surgical site infection, laparotomy

Dr. Abhi Unjia	3rd Year Resident, Department of General Surgery, Government Medical College, Surat, India
Dr. Sandeep Kansal	Additional Professor, Department of General Surgery, Government Medical College, Surat, India
Dr. Jay Chokshi	Assistant Professor, Department of General Surgery, Government Medical College, Surat, India

ABSTRACT Surgical site infection is one of the most common postoperative complications and third most frequently reported nosocomial infection, accounting for 12-16% of all nosocomial infections among hospitalized patients. Infectious complications are the main causes of postoperative morbidity in abdominal surgery. Wound infection is the most common form is superficial wound infection occurring within the first week of surgery. Negative suction drain in subcutaneous space has been shown to reduce the incidence of infection by evacuation of infected content, reduces and evacuation of collected seroma in subcutaneous space. Negative suction improves the healing capacity of the wound by reducing its bacterial load. Hence this study was carried out to evaluate the effectiveness of negative subcutaneous drain in reducing surgical site infection in laparotomy patients.

INTRODUCTION

Surgical site infection is one of the most common postoperative complications and third most frequently reported nosocomial infection, accounting for 12-16% of all nosocomial infections among hospitalized patients.(1)

Surgical site infection is the most frequent cause of infection in surgical patients accounting for 38-40%. SSI prolongs hospital stay and increases antibiotic prescribing and laboratory costs. Patients who develop infection are 60% more likely to spend time in an ICU, 5 times as likely to be readmitted and their mortality rate is twice that of non-infected patients(2)

The amount of bacterium in the wound, formation of hematoma, pool of effusion, potential subcutaneous dead space, disturbance of local circulation and the amount of bacterium in the surgical organ is related to the incidence of surgical site infection.

Negative suction in subcutaneous space has been shown to reduce the incidence of infection by evacuation of infected content, reduces and evacuation of collected seroma in subcutaneous space. Negative suction improves the healing capacity of the wound by reducing its bacterial load. Negative pressure providing a moist and protected environment, reducing peripheral oedema around the wound, stimulating circulation to the wound bed, decreasing bacterial colonization, increasing the rate of granulation tissue formation and epithelization.

Hence this study was carried out to evaluate the effectiveness of subcutaneous drain in reducing surgical site infection in laparotomy patients.

Aims And Objectives

Aim-

To compare complications of laparotomy wound like surgical site infection, serous discharge, seroma formation and wound dehiscence in patient with subcutaneous drain over no drain in subcutaneous tissue in laparotomy wound.

Objectives-

To evaluate and compare surgical site infection, seroma formation and wound dehiscence in the two groups:

- Group A: subcutaneous drain kept in laparotomy wound
- Group B: no subcutaneous drain kept in laparotomy wound.

Methodology

This is the retrospective study of 100 cases of patients who had undergone exploratory laparotomy under surgery department of tertiary care hospital during period of May 2021 to August 2022. All Case Papers are available at medical record department of tertiary care hospital of South Gujarat. With due permission of medical superintendent case papers has been made available for chart review. Data of case detail and postoperative complication like surgical site infection, seroma formation, wound dehiscence, hospital stay of the patient has been collected.

Study Design-

Retrospective data analytical Study.

Inclusion Criteria

- 1) Patients who had undergone exploratory laparotomy
- 2) Patient's age > 18 years.

Exclusion Criteria

- 1) Patient's age < 18 years
- 2) Accidental removal of drain
- 3) Death of patient in postoperative period due to systemic cause.

Sample Size:

100 patients undergoing exploratory laparotomy were to be included in the study, 50 patients in one group (with drain) and 50 patients in another group (without drain).

Group A: 50 patients with subcutaneous drain in laparotomy wound in surgery units

Group B: 50 patients with no subcutaneous drain in laparotomy wound in other surgery units

All patients will receive same preparations.

- 1) Surgical field disinfected by use of Povidone Iodine.
- 2) Injection Cefotaxime 1g i.v just before skin incision.
- 3) Skin incision made with scalpel.
- 4) Subcutaneous fat dissected with electrocautery.
- 5) Surgical instruments to be exchanged just before muscle closure.
- 6) Wound irrigated with saline just before skin closure.
- 7) Closure of abdominal wound with same technique in all cases, (rectus sheath closed with Prolene no.1 subcutaneous closed with Vicryl 2.0 and skin closed with Ethilon 2.0.)

- 8) Subcutaneous drain placed along the entire length of subcutaneous tissue. Use of appropriate No. 10 IFT (infant feeding tube) negative suction drain within group A patient.
- 9) Exit of the drain should be separated from the main wound.
- 10) Daily observation of surgical site and drain quantity and content was done in post operatively. 11) Daily sterile dressing done in the post operative period.
- 12) The contents in the drain is measured daily and drain is emptied daily.
- 13) The outcome is measured with the following parameters such as seroma, serous discharge, surgical site infection and wound dehiscence
- 14) All the patients are discharged only after the subcutaneous drain is removed.
- 15) Seroma is collection of clear fluid in the incision site. It is identified by discharge of clear immature fluid from the wound.
- 16) Surgical site infection is identified with drainage of frank pus from the wound with or without clinical features of infection. Culture may be positive or negative.

Data Analysis

Table 1: Age distribution

Table-1 shows the age distribution of the patient in study.

NO.	AGE(YEARS)	GROUP A	GROUP B	TOTAL	%
1	18-30	13	9	22	22
2	31-45	13	23	36	36
3	46-60	12	14	26	26
4	61-75	12	4	16	16

The mean age of this study was found to be 44.14 years with a standard deviation of 14.76 years. Youngest patient in the study was 20 years and oldest patient was 70 years.

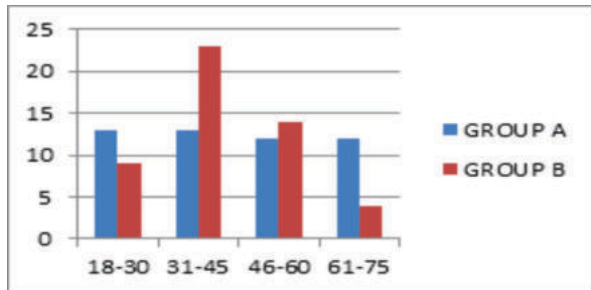


Table 2: Gender distribution

	Frequency	%
Male	79	79
Female	21	21
Total	100	100

Table 2 shows the gender distribution of the patients in the study. 79% represent males and 21% represent females in the study.

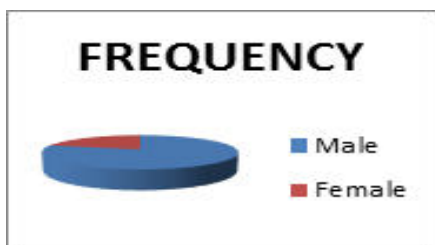


Table 3: Subcutaneous drain with mean age

Subcutaneous drain	N	Mean+SD
Age Group A	50	45.36+16.17
Group B	50	42.92+13.28

Table 3 shows the subcutaneous drain with mean age among the patients in the study. Mean age of the patients with subcutaneous drain (Group A) was 45.36+16.17 and Mean

age of the patients without subcutaneous drain (Group B) was 42.92+13.28.

Table 4: Wound complication — Surgical site infection (SSI) among patients with subcutaneous drain

Subcutaneous drain	Surgical site infection (SSI)		P value
	Yes	No	
N=100			0.04
Group A	1	49	
Group B	6	44	

Table 4 shows the association of wound complications — surgical site infection (SSI) among patients with subcutaneous drain in the study. Patients having subcutaneous drain (GROUP A) with wound complication Surgical site infection (SSI) were present in 2% and absent in 98%. Patients not having subcutaneous drain (GROUP B) with wound complication — Surgical site infection (SSI) were present in 12% and absent in 88% and it is statistically significant (P<0.05) using chi-square test

Surgical site infection (SSI)

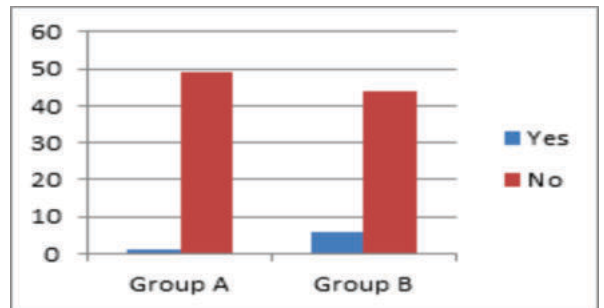
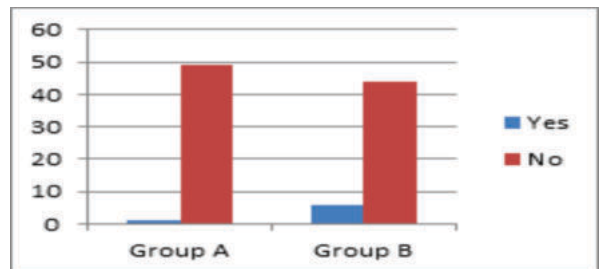


Table 5 —Wound complication —Seroma formation among patients with subcutaneous drain

Subcutaneous drain	Seroma formation		P value
	Yes	No	
N=100			0.02
Group A	1	49	
Group B	7	43	

Subcutaneous drain Seroma formation P value N=100 Yes No 0.02 Group A 1 49 Group B 7 43 Table 5 shows the association of wound complications — seroma formation among patients with subcutaneous drain in the study. Patients having subcutaneous drain (GROUP A) with wound complications — seroma formation was present in 2% and absent in 98%. Patients not having subcutaneous drain (GROUP B) with wound complication — seroma formation was present in 14% and absent in 86%. And it is statistically significant (P<0.05) using chi-square test



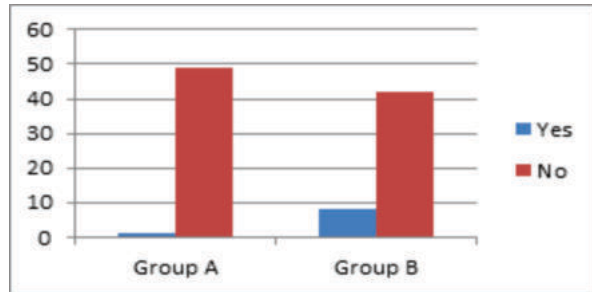
Seroma formation

Table 6 — Wound complication — wound dehiscence among patients with subcutaneous drain

Subcutaneous drain	Wound dehiscence		P value
	Yes	No	
N=100			0.01
Group A	1	49	
Group B	8	42	

Table 6 shows the association of wound complications — wound dehiscence among patients with subcutaneous drain in the study. Patients having subcutaneous drain (GROUP A) with wound complications — wound dehiscence were present

in 2% and absent in 98%. Patients not having subcutaneous drain (GROUP B) with wound complication — wound dehiscence were present in 16% and absent in 84%. And it is statistically significant ($P < 0.05$) using chi-square test.



Wound dehiscence



Figure showing collection of seroma in negative subcutaneous drain thus preventing sutures to open up due to seroma

DISCUSSION

Surgical site infection, seroma formation, and wound dehiscence is the most common complication in laparotomy surgery. Development of a surgical site infection has a large impact on mortality and morbidity as well as healthcare costs, patient inconvenience and dissatisfaction. Infectious complications are the main causes of postoperative morbidity in abdominal surgery. Wound infection: the most common form is superficial wound infection occurring within the first week of surgery. The use of negative suction drain in subcutaneous plane has been shown to reduce the incidence of surgical site infection, seroma formation, and wound dehiscence

In a study conducted by Y. Sumi et al in Japan, Surgical site infection in drain group was 16.7% and 56.5% in no drain group (3). A study conducted in India by Gupta et al showed surgical site infection in 24% in drain group and 50% in no-drain group (4).

The present study shows that surgical site infection is 2% in study group and 12 % in control group shows significant differences between two groups and also low as compare to Y.Sunni et al and Gupta et al study. Nisar Ahmad et.al study shows Seroma formation in surgical wound after laparotomy surgery was 16.74% in study group in which negative suction drain placed in subcutaneous plane and 72 % in control group in which no drain used

SUMMARY AND CONCLUSION

The study included 100 patients undergoing exploratory laparotomy. The patients were randomized into two groups

Group A : subcutaneous drain kept in laparotomy wound

Group B : no subcutaneous drain kept in laparotomy wound.

In drain group, a subcutaneous drain was kept after sheath closure before closing the skin which was brought out by a

separate incision away from the laparotomy wound inferiorly and laterally. In no-drain group , direct skin closure was done after sheath closure.

Daily observation of surgical site and drain quantity and content was done post-operatively. The drain was removed on post-operative day 3 or when drain output was nil.

The incidence of surgical site infection, seroma formation and wound dehiscence was compared in the two groups.

The results from the present study show that use of subcutaneous drain during laparotomy surgery, reduces the incidence of postoperative surgical site infection, seroma formation, wound dehiscence. Which all over effects the total hospital stay of patients, patient morbidity, reduces the cost of treatment, better cosmetic results. Although is a small study which needs a larger series to prove advantage of subcutaneous drain in laparotomy wounds.

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