

**THE RELATIVE EFFECTIVENESS OF SUBCUTANEOUS SUCTION DRAINS AND A CONTROL GROUP WITHOUT DRAINS IN PREVENTING SURGICAL SITE INFECTIONS AFTER EMERGENCY ABDOMINAL SURGERY**

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**ABSTRACT**

**Background:** Significant morbidity, death, and healthcare expenditures are linked with surgical site infection (SSI), a postoperative wound complication often seen after open abdominal surgery. In order to avoid fluid collection and seroma development, a subcutaneous suction drain is placed to minimize the void area under the skin. **Objective:** To evaluate the relative effectiveness of subcutaneous suction drains and a control group without drains in preventing surgical site infections after emergency abdominal surgery. **Method:** This prospective study was carried out at tertiary medical college and hospital from June 2020 to June 2022 where All of the 200 patients admitted to emergency department who underwent laparotomy within 72 hours of admission and above 18 years were included in the study. Where in group-A, 100 drain cases were included and in group-B another non drain patients were included. **Results:** During the study, where in group-A 31% cases were belong to  $\leq 30$  years age group followed by 27% in 31-40 years, 22% in 41-50 years age group. whereas in group-2 31% cases were belonging to  $\leq 30$  years age group followed by 25% in 31-40 years, 24% in 41-50 years age group. there is no major observation was noticed. In addition, majority were male. In group-A 52% had diabetes, 48% had hypertension. Followed by in group-B 60% had diabetes, 40% had hypertension. In addition in group-A 38% had obesity and 55% had history of smoking. Whereas in group-B 31% had obesity and 51% had history of smoking. Besides that, in group-A, acute appendicitis seen in 22% followed by appendicular perforation seen in 15% cases whereas in group-B cholecystitis with choledocholithiasis seen in 20% cases, followed by acute appendicitis seen in 19%. The incidence of surgical site infection in drain group was lower than the no drain group (26% vs 53%), which was statistically significant ( $p$  value 0.001). Moreover in drain group patients had to stay in less days in hospital than no drain group ( $8.80 \pm 2.01$  vs  $12.10 \pm 1.05$ ). **Conclusion:** From our study we can conclude that, a statistically significant function for subcutaneous drains in lowering the rate of surgical site infections after emergency abdominal surgery.

**KEYWORDS:** Surgical site infection (SSI), subcutaneous suction drains, abdominal surgery.

**INTRODUCTION**

Surgical site infections are a common and serious consequence after surgery (SSIs). Infections known as SSIs occur when germs penetrate tissues within 30 days after superficial layer surgery and within 60 days after deeper layer surgery. Two subcategories of SSIs exist: incisional and organ/space. Even though incisional SSIs only occur at surgical sites, they are further classified as either superficial or profound. The epidermis and superficial fascia are affected by superficial SSIs, whereas the fascial and muscle layers are infected in

deep SSIs. Within 30 or 90 days following surgery, organ/space SSIs may infect any tissue underneath the fascial layer that was involved in the operation.<sup>[1-3]</sup>

Higher morbidity and mortality, patient pain and discontent, increased healthcare expenditures, and wound-related issues are all attributable to surgical site infections. Three many potential causes of SSI have been found. Tobacco use, excess body fat, diabetes, poor diet, environmental pollution, improper use of antibiotics as prophylaxis, etc. are all major contributors.<sup>[4]</sup>

There are three different kinds of surgical site infections (SSI): those that occur in the skin and subcutaneous tissue, those that develop in the fascia and muscles, and those that occur in organs or spaces that are touched or manipulated during surgery.

There are four common practices that are known to lower the incidence of SSI, including hand washing, minimizing shaving, skin preparation, and antibiotic prophylaxis.

The risk of SSI is increased when there is serous fluid, haematoma, or dead space present in the incisional wounds since these things provide for ideal culture medium.<sup>[5-6]</sup>

The objective of this study was to compare the efficacy of subcutaneous suction drains versus no drain group response of surgical site infections in post emergency abdominal surgical wounds.

### OBJECTIVE

To evaluate the relative effectiveness of subcutaneous suction drains and a control group without drains in preventing surgical site infections after emergency abdominal surgery.

### METHODOLOGY

This prospective case series was conducted at tertiary hospital from June 2020 to June 2022. A prospective consecutive 30 days interventional study of 200 subjects (n= 100 drain group-A and 100 no-drain groups-B).

All of the 200 patients admitted to emergency department who underwent laparotomy within 72 hours of admission and above 18 years were included in the study. The demographic data of the patients and the diagnostic criteria were collected. Other data including ASA classification. Smoking history, use of prophylactic microbial agents, the type and duration of surgery, clinical evaluation of wound (considered infected were recorded on a data sheet.

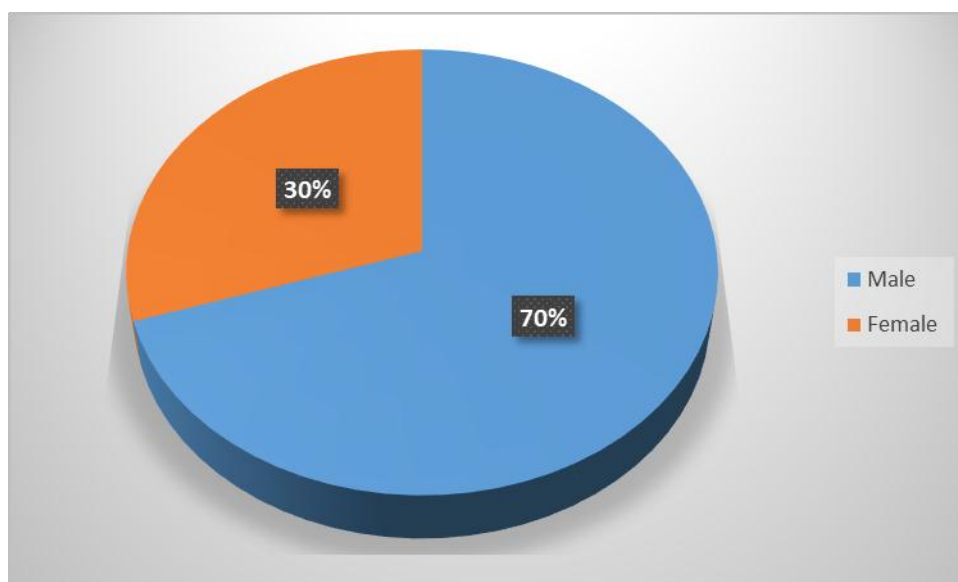
### RESULTS

In table-1 shows age distribution of the patients where in group-A 31% cases were belong to  $\leq 30$  years age group followed by 27% in 31-40 years, 22% in 41-50 years age group. whereas in group-2 31% cases were belonging to  $\leq 30$  years age group followed by 25% in 31-40 years, 24% in 41-50 years age group. there is no major observation was noticed. The following table is given below in detail.

**Table-1: Age distribution of the patients.**

Age group	Group A, N	Group A, %	Group B, n	Group, %
$\leq 30$ years	31	31	31	31
31-40 years	27	27	25	25
41-50 years	22	22	24	24
>50 years	20	20	19	19

In figure-1 shows gender distribution of the patients where 70% were male, 30% were female. The following figure is given below in detail.



**Figure-1: Gender distribution of the patients.**

In table-2 shows co morbidities of the patients where in group-A 52% had diabetes, 48% had hypertension. Whereas in group-B 60% had diabetes, 40% had hypertension. In addition in group-A 38% had obesity

and 55% had history of smoking. Whereas in group-B 31% had obesity and 51% had history of smoking. The following table is given below in detail.

**Table 2: co morbidities of the patients.**

Co morbidities	Group-A, %	Group-B, %
Diabetes	52	60
Hypertension	48	40
Obesity	38	31
History of smoking status	55	51

- Multiple responses were noticed.

In table-3 shows pathological status of the patients where in group-A, acute appendicitis seen in 22% followed by appendicular perforation seen in 15% cases, jejunal perforation seen in 15% cases, duodenal perforation seen

in 14%. Whereas in group-B cholecystitis with choledocholithiasis seen in 20% cases, followed by acute appendicitis seen in 19%, appendicular perforation seen in 17% cases, duodenal perforation seen in 13%. The following table is given below in detail.

**Table 3: Pathological status of the patients.**

Pathological status	Group-A, %	Group-B, %
Acute appendicitis	22%	19%
Acute cholecystitis	12%	9%
Cholecystitis with choledocholithiasis	10%	20%
Appendicular perforation	15%	17%
Duodenal perforation	14%	13%
Gastric perforation	12%	11%
Jejunal perforation	15%	11%

In table-4 shows infection status of the patients where there were no severe complications associated with the insertion of the suction drain. The incidence of surgical site infection in drain group was lower than

the no drain group (26% vs 53%), which was statistically significant (p value 0.001). The following table is given below in detail.

**Table-4: Infection status of the patients.**

% of patients that developed infection	Group-A, %	Group-B, %	P value
	26%	53%	0.001

In table-5 shows mean days of hospital stay where in drain group patients had to stay in less days in hospital

than no drain group (8.80±2.01 vs 12.10±1.05). The following table is given below in detail.

**Table 5: Mean days of hospital stay.**

Mean hospital stays	Group-A	Group-B	P value
	8.80±2.01	12.10±1.05	0.001

## DISCUSSION

One study indicated that individuals who had a subcutaneous drain were 14 percent less likely to develop SSIs than those who did not. They also found that whereas the cases group included 26 patients younger than 40 and 24 patients older than 40, the controls had 28 patients younger than 40 and 22 patients older than 40. The ages of the participants in the two groups were similarly distributed. Cases had a mean age of 40.94 ±15.10 while controls had a mean age of 39.54 ±10.54. The average ages of the two groups did not vary significantly from one another.<sup>[6]</sup>

Whereas in our study in group-A 31% cases were belong to ≤30 years age group followed by 27% in 31-40 years,

22% in 41-50 years age group. whereas in group-2 31% cases were belonging to ≤30 years age group followed by 25% in 31-40 years, 24% in 41-50 years age group. there is no major observation was noticed. Which was supported by one study.<sup>[7]</sup>

Similarly, Sugiura et al. found that SSI was common in obese patients. Indeed, this agrees with the results of our investigation. Patients with hypertension or diabetes did not seem to be at increased risk for SSI.<sup>[8]</sup>

Which was quite similar to our study where we found that, in group-A 52% had diabetes, 48% had hypertension. Whereas in group-B 60% had diabetes, 40% had hypertension. In addition in group-A 38% had

obesity and 55% had history of smoking. Whereas in group-B 31% had obesity and 51% had history of smoking.

In addition, in our study in group-A, acute appendicitis seen in 22% followed by appendicular perforation seen in 15% cases, jejunal perforation seen in 15% cases, duodenal perforation seen in 14%. Whereas in group-B cholecystitis with choledocholithiasis seen in 20% cases, followed by acute appendicitis seen in 19%, appendicular perforation seen in 17% cases, duodenal perforation seen in 13%. Which was similar to other studies.<sup>[7-8]</sup>

In our study there were no severe complications associated with the insertion of the suction drain. The incidence of surgical site infection in drain group was lower than the no drain group (26% vs 53%), which was statistically significant (p value 0.001).

Which was quite similar to other study where those who were drain group developed 24% of SSI whereas 46% in non-drain group developed SSI.<sup>[9]</sup>

In addition, in our study in drain group patients had to stay in less days in hospital than no drain group (8.80±2.01 vs 12.10±1.05). Moreover, other study found similar results had been noticed where mean duration of hospital stay was 6days in drain group and 10days in non-drain group.<sup>[10]</sup> which was supported by other studies too.<sup>[11-13]</sup>

## CONCLUSION

From our study we can conclude that, a statistically significant function for subcutaneous drains in lowering the rate of surgical site infections after emergency abdominal surgery.

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