



A COMPARATIVE STUDY ON PREVENTION OF SURGICAL SITE INFECTION IN EMERGENCY LAPAROTOMY WITH AND WITHOUT THE USE OF SUBCUTANEOUS SUCTION DRAIN

General Surgery

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ABSTRACT

Background: Surgical site infections (SSIs) significantly increase postoperative morbidity, especially in emergency laparotomy procedures. Subcutaneous suction drains have been proposed as a method to reduce such complications. **Objective:** To assess the effectiveness of subcutaneous suction drains in reducing SSIs, wound complications, and hospital stay duration in emergency laparotomy cases. **Methods:** A prospective randomized study was conducted on 100 patients undergoing emergency laparotomy, equally divided into Group A (with subcutaneous drain) and Group B (without drain). Outcomes measured included incidence of SSIs, seroma, hematoma, postoperative pain, and duration of hospital stay. **Results:** The SSI rate was 12% in the drain group compared to 28% in the non-drain group ($p < 0.05$). Seromas were noted in 18% of patients without drains and 0% with drains. Hematoma incidence was 6% (without drains) vs 0% (with drains). Postoperative pain and hospital stay were also significantly reduced in the drain group ($p < 0.05$). **Conclusion:** Subcutaneous suction drains significantly reduce the incidence of SSIs and postoperative complications in emergency laparotomy and shorten hospital stay, suggesting their beneficial role in surgical wound management.

KEYWORDS

Surgical site infection, emergency laparotomy, subcutaneous drain, wound complications, postoperative morbidity.

INTRODUCTION

Surgical site infections (SSIs) remain a major postoperative complication, contributing significantly to patient morbidity, prolonged hospitalization, and increased healthcare costs. SSIs are defined as infections occurring within 30 days of a surgical procedure, or up to 90 days when involving deeper tissues or implants. They are broadly classified into superficial, deep incisional, and organ/space infections, with the latter often affecting tissues below the fascial layer.

Globally, the incidence of SSIs ranges from 0.5% to 15%, but in India, rates have been reported as high as 38%, especially in high-risk, contaminated procedures. Emergency laparotomy, frequently performed in the setting of peritonitis, trauma, or perforated viscus, carries an inherently higher risk due to the emergent nature of the pathology, contamination of the surgical field, and limited preoperative optimization. Common complications following such procedures include wound dehiscence, seroma, hematoma, and burst abdomen.

Efforts to minimize SSIs have included perioperative antibiotics, chlorhexidine skin preparation, proper hemostasis, and layered closure techniques. Recently, the use of subcutaneous suction drains has gained attention as an adjunctive method to reduce wound-related complications. These drains serve to eliminate dead space, evacuate fluid collections, and potentially prevent seroma and hematoma formation—thereby lowering the risk of infection.

Despite their theoretical benefits, the routine use of subcutaneous drains in emergency abdominal surgeries remains controversial, and evidence on their efficacy is varied. Our study was designed to evaluate the effectiveness of subcutaneous suction drains in reducing the incidence of SSIs and related wound complications in patients undergoing emergency laparotomy.

Aim and Objectives of the Study

Aim:

To assess the role of suction drain (subcutaneous) to prevent surgical site infection in case of emergency laparotomy

Objectives:

1. To compare the occurrence of SSI in emergency laparotomy surgeries with and without the use of Subcutaneous drains using the Southampton wound scoring.
2. To assess any incidence of wound dehiscence.
3. To assess duration of the hospital, stay.

MATERIALS AND METHODS

Study Centre: The study was conducted in the Department of General Surgery, Alluri Sitarama Raju Academy of Medical Sciences, Eluru after obtaining Institutional Ethics Committee approval.

Study Period: July 2022 – July 2024

Source Of Data: All patients undergoing emergency laparotomy procedure at Alluri Sitarama Raju Academy of Medical Sciences, Eluru

Sample Size: 100 patients randomised into two groups:

Group A (Subcutaneous drain placed) and Group B (No subcutaneous drain) having 50 patients each

T Tests-Means: Difference between two independent means (two groups)

Analysis: Apriori: Computer required sample size

Input:	Tail(s)	=	One
	Effectsized	=	0.5041
	α errprob	=	0.05
	Power(1- β errprob)	=	0.80
	AllocationratioN2/N1	=	1

Output: Noncentrality parameter $\delta=2.5205000$

Criticalt	=	1.6605512
Df	=	98
Samplesizegroup1	=	50
Samplesizegroup2	=	50
Totalsamplesize	=	100
Actualpower	=	0.8046047

Study Design: A Prospective randomized comparative study

Study Population: patients undergoing the emergency laparotomy surgery, who have fulfilled the inclusion criteria were selected for the study. The procedure was explained to them in detail and written consent was obtained.

Inclusion Criteria:

- Age more than 18 years
- Patients having class II, class III and class IV surgical wound
- All cases of peritonitis, trauma and other surgical emergencies

Exclusion Criteria

- Age less than 18 years and above 75 years.
- Patients having class I surgical wounds.
- Patients who have died in immediate postoperative period.
- Immunocompromised state.

A prospective comparison study by using systemic random selection to divide patients into two groups prior to surgery. 50 patients in Group A had a subcutaneous closed suction drain, whereas 50 patients in Group B did not have one. This study covered all patients who met the inclusion criteria and presented with a surgical emergency. A thorough clinical history of the patient was acquired following the collection of the necessary demographic information. There was a thorough

inspection, both local and general, and if necessary, proper resuscitation was done with crystalloids and blood products. The necessary tests were performed, including USG abdomen, chest x-ray, abdominal x-ray, and routine blood examinations.

METHODOLOGY

- The drainage amount from the mini vac 8F drain was recorded every 24 hours. Dressings are done under sterile precautions each day
- The collection will be assessed for sensitivity and culture if it is found on the surgical site.
- Sensitive antibiotics given.
- Every day, the drainage amount was noted.
- The drain was removed when the output was less than 5 millilitres in a 24-hour period
- Prior to discharge from hospital, sutures were removed (alternating on days 8 and 10)

OBSERVATION AND RESULTS

Allocation Of The Sample

A prospective comparison study by using systemic random selection to divide patients into two groups prior to surgery. 50 patients in Group A had a closed subcutaneous suction drain, whereas 50 patients in Group B did not have one.

Demographics

A total of 100 patients were enrolled, with age distribution as follows: 15% were 21–30 years, 30% were 31–40 years, 35% were 41–50 years, and 20% were 51–60 years. The age distribution between the groups was comparable, and no significant association was found between age and wound complications ($p = 0.934$).

The cohort included 66 males and 34 females. Drain placement was not significantly associated with gender ($p > 0.05$).

Body Mass Index (BMI)

Of the 100 patients, 75 had a BMI < 35 , and 25 had BMI ≥ 35 . Subcutaneous drains were more commonly used in patients with higher BMI. Only 2% of patients with BMI ≥ 35 did not have a drain, indicating a preference for drain placement in obese patients, though formal statistical analysis was not reported.

Wound Complications

Wound complications occurred in 28% of the total population. Group B (no drain) had a significantly higher rate of wound complications (42%) compared to Group A (drain) at 14% ($p < 0.05$).

Seroma and Hematoma

Seroma was observed in 9% of all patients—exclusively in the no-drain group (18%), with none in the drain group ($p < 0.05$). Hematoma occurred in 3% of the total cohort, all in the no-drain group (6%), with none in the drain group; however, this was not statistically significant ($p > 0.05$).

Surgical Site Infection (SSI)

The overall incidence of SSI was 20%. SSIs were significantly lower in the drain group (12%) compared to the no-drain group (28%) ($p < 0.05$).

Postoperative Pain

Pain was significantly reduced in patients with subcutaneous drains compared to those without ($p < 0.05$).

Length of Hospital Stay

Patients with subcutaneous drains had a significantly shorter hospital stay (mean 7.70 ± 1.44 days) compared to those without drains (mean 9.12 ± 2.51 days; $p < 0.001$).

DISCUSSION

Surgical site infections (SSIs) are among the most common causes of postoperative morbidity and mortality, particularly following emergency laparotomy. Despite adherence to aseptic protocols and antibiotic prophylaxis, the contaminated nature of these surgeries—often involving Class III or IV wounds—predisposes patients to higher infection risks. Hematoma and seroma formation, often due to unobliterated dead space, provide ideal media for bacterial proliferation.

incidence of SSIs and associated wound complications. The drain group had fewer seromas (0% vs 18%), hematomas (0% vs 6%), and overall wound complications (14% vs 42%) compared to the no-drain group. These findings support the hypothesis that eliminating dead space and fluid accumulation improves wound outcomes.

Our results are consistent with previous studies, including those by Arun K et al. and Harish R et al., which demonstrated lower SSI rates and improved healing in patients managed with subcutaneous drains. Although demographic variables like age, gender, and BMI were comparable between groups, complications were markedly lower in the drain group, further emphasizing the effectiveness of this intervention.

Limitations include the relatively small sample size and single-center design. Additionally, not all known risk factors for SSI—such as glycemic control, nutritional status, and smoking history—were included in the analysis.

CONCLUSION

Subcutaneous suction drains appear to significantly reduce surgical site infections, seroma formation, and length of hospital stay following emergency laparotomy. Their use may offer a simple, cost-effective strategy to improve postoperative outcomes, particularly in high-risk contaminated wounds. Larger multicenter trials are warranted to confirm these findings and refine patient selection criteria.

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In this study, subcutaneous suction drains significantly reduced the