

# Role of Negative Suction Drain in Subcutaneous Plane in Reducing Laprotomy Wound Infection

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**Abstract:** *Surgical site infection is one of the most common postoperative complications. Surgical site infection rate higher in abdominal surgery. Even after thorough peritoneal irrigation with normal saline, the incidence of wound infection is high. The authors have studied the effectiveness of putting a negative suction drain (Romo-Vac Drain) in the subcutaneous space in prevention of wound infection and wound dehiscence in patients of midline laparotomy. The patients were divided in two groups; group A, where a negative suction drain was put, and Group B, where no negative suction drain was put in the subcutaneous space at the time of closure of the abdomen after laparotomy. In group A, incidence of surgical site infection, seroma formation, wound dehiscence and hospital stay was remarkably lower as compared to Group B, where no drain was put in subcutaneous space.*

**Keywords:** Surgical site infection, Romo-Vac Drain, laparotomy, subcutaneous space.

## 1. Introduction

Surgical site infection is one of the most common postoperative complications, occurring in at least 5% of all patients undergoing surgery and 30-40% of patients undergoing abdominal surgery, depending on the level of contamination.<sup>1</sup> Development of a surgical site infection has a large impact on mortality and morbidity as well as healthcare costs, patient inconvenience and dissatisfaction.<sup>2,3</sup> 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.<sup>4</sup> Seroma formation is one of the complication after abdominal surgery. Seroma can lead to wound related complication, such as Abscess formation, Calcification of the seroma, Poor cosmetic result; unsatisfactory appearance of a surgical scar. Abdominal wound dehiscence is one of the complication after abdominal surgery, wound dehiscence is the parting of the layers of a surgical wound. Either the surface layers separate (wound gap) or the whole wound splits open, primary cause of wound dehiscence is infection and seroma formation, wound dehiscence has only wound gap small in size treated with regular dressing and heal itself. when wound dehiscence is deep use regular dressing, debridement of infected part and after granulation tissue formation secondary suturing done.<sup>5</sup> Negative suction in subcutaneous space has been shown to reduce the incidence of infection by evacuation of infected content, evacuation of collected seroma in subcutaneous space. Negative suction improves the healing capacity of the wound by reducing its bacterial load.<sup>6,7,8</sup>

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 epithelisation.<sup>9</sup>

## 2. Objective

The objective of this study was to evaluate and compare the wound infection, seroma formation, wound dehiscence with

subcutaneous negative suction drain and without subcutaneous drain in post laparotomy surgery.

## 3. Material and Methods

### 3.1 Type of Study

This is comparative and randomized study conducted in two groups.

### 3.2 Study Centre

MGM MEDICAL COLLEGE AND HOSPITAL AURANGABAD from 1<sup>st</sup> September 2013 to 1<sup>st</sup> October 2015

3.3 In this study all patients underwent radiological investigation like USG ABDOMEN and X ray abdomen standing, CT abdomen is not mandatory.

3.4 Use of appropriate antibiotic in each patient as required on general condition of patient.

3.5 Patients are randomly selected and divided in to two groups.

**In group A:** - 50 cases in which romovac negative suction drain (in fig1) is placed in subcutaneous plane at the time of closure of abdomen in laparotomy surgery

**In group B:** - 50 cases in which no negative suction drain is placed in subcutaneous space at the time of closure of abdomen in laparotomy surgery.

3.6 Closure of abdominal wound with same technique in all cases, (rectus sheath closed with ethilon loop no.1 subcutaneous closed with vicryl 2.0 and skin closed with ethilon 3.0.)

3.7 Use of appropriate romovac negative suction drain with in group A patient.

3.8 Daily observation of surgical site and drain quantity and content was done in post operatively.

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3.9 The drain was removed on post-operative day 3 or collection in drain was nil.

3.10 All patients were studied postoperatively in terms of surgical site infection, seroma formation and wound dehiscence.

3.11 The result from both the groups compared and analysed.

**Inclusion Criteria**

Age group between 16 years to 75 years' patients.  
 All laparotomy with midline incision performed at MGM MEDICAL COLLEGE AND HOSPITAL AURANGABAD.

**Exclusion Criteria**

Age < 16 year and > 75 year patients  
 Accidental removal of drain  
 All immunocompromised patients  
 Patients with co morbidities like diabetics, hypertension, bronchial asthma and tuberculosis  
 Patients who were in shock at the time of presentation.  
 Death of patient in postoperative period due to systemic cause.  
 Patients required ileostomy for surgical reasons.  
 patients suffering from malignancies.

**4. Results**

The data collected in the present study is analyzed statistically by computing the descriptive statistics viz., Mean, SD, and percentages. The data is presented in the form of tables and graphs. The measures of association between the qualitative variables are assessed using chi-square test. The inference is considered statistically significant whenever  $p \leq 0.05$ .

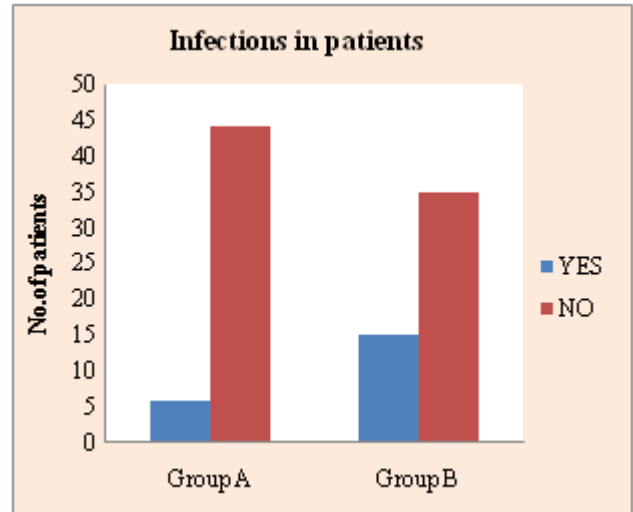
**4.1 Post-Operative Wound infection**

The total number of wound infected during post-operative period for Group A it is 12% and for Group-B it is 30 %, after statistical analysis it is found that the post-operative wound infection is significant Chi-square value 4.88,  $P=0.027$ .

Table 1: Distribution of patients according to

**Table 1: Infection in Groups:**

Infection	Group A		Group B		Chi-square test	p-value
	No. of Patients	%	No. of Patients	%		
YES	06	12.0	15	30.0	4.88	P=0.027 S
NO	44	88.0	35	70.0		
Total	50	100	50	100		



**4.2 Post-Operative Wound Seroma Formation**

The total number of seroma in wound during post-operative period for group A it is 16% and for group B it is 42%, after statistical analysis it is found that the post-operative seroma in wound is significant chi-square value 8.53,  $P=0.001$ .

Table 2 can be depicted graphically as shown below

**Table 2:** Distribution of patients according to SEROMA in Groups:

seroma	Group A		Group B		Chi-sq. test	p-value
	No. of Pats.	%	No. of Pats.	%		
YES	08	16.0	21	42.0	8.53	P=0.001
NO	42	84.0	29	68.0		
Total	50	100	50	100		

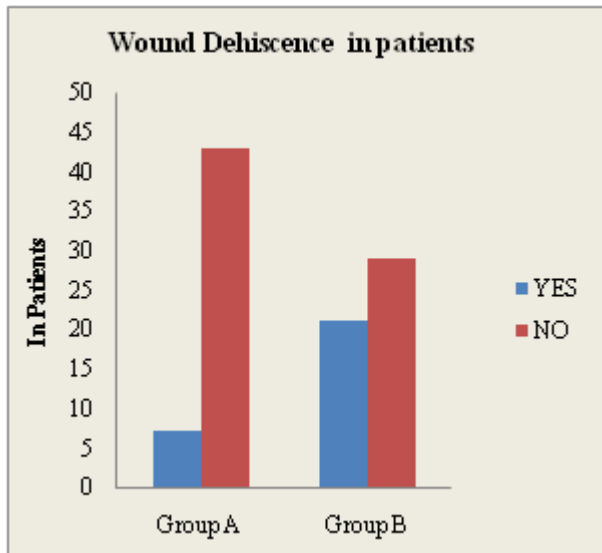
**4.3 Post-Operative Wound dehiscence**

The total number of wound dehiscence in wound during post-operative period for group A it is 14% and for group B it is 42 %, after statistical analysis it is found that the post-operative wound dehiscence in wound is significant chi-square value 9.72,  $P=0.002$ .

Table 3 can be depicted graphically as shown below

**Table 3:** Distribution of patients according to WOUND DEHISCENCE in Groups:

Wound D.	Group A		Group B		Chi-sq. test	p-value
	No. of Patients	%	No. of Pats.	%		
YES	07	14.0	21	42.0	9.72	P=0.002 S
NO	43	86.0	29	68.0		
Total	50	100	50	100		



## 5. Discussion

Surgical site infection, seroma formation, and wound dehiscence is the most common complication in post 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.

Yagnesh vaghani et.al<sup>10</sup> study shows, surgical site infection rate was 25% in study group and 57.7% in control group. Another study was done by Takaaki Fujii et.al at Department of General Surgical Science, Graduate School of Medicine, Gunma University Japan<sup>11</sup>. In this study surgical site infection rate was 14.3% in study group, and 38% in control group.

In our study surgical site infection is 12% in study group and 30% in control group shows significant differences between two groups and also low as compared to Yagnesh vaghani et.al and Takaaki Fujii 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 use<sup>12</sup>. Ramsey et.al<sup>13</sup> study from April 2001 to 2004 shows that seroma formation in surgical wound 10.6% in control group and 9.8% in study group.

In our study seroma formation in study group is 16% and in control group is 42% shows significant between two groups. Ramsey et.al<sup>13</sup> study shows that wound dehiscence in study group was 21.8% and in control group was 15.3% which is not significant in this study.

In our study wound dehiscence in study group is 14% and in control group is 42% which show significant in two groups.

## 6. Conclusion

The results from the present study show that use of negative suction drain in subcutaneous plane during midline incision laparotomy surgery, reduces the incidence of postoperative surgical site of infection, seroma formation, wound dehiscence.

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