



## REDUCING SURGICAL SITE INFECTION BY PLACING SUBCUTANEOUS DRAIN IN THE OBESE PATIENTS

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### ABSTRACT

#### Article History

Received: 18 April 2017

Revised: 25 May 2017

Accepted: 15 June 2017

Published: 4 July 2017

#### Keywords

Anastomotic leak

Bariatric surgery

Drain

Incision site infection

Infection

Intestinal bypass surgery

Jejunio-ileal bypass surgery

Obesity

Weight loss.

In this study the effect of placing subcutaneous drain in the incision site of obese patients undergoing bariatric surgery, on the rate of incision site infection was evaluated. 200 obese patients of both sexes included in the study on the basis of the inclusion and exclusion criteria. They were divided into two groups on the basis of their accessibility. For patients belonging to group II (study cases), subcutaneous drain was placed at the incision site. Follow up of the patients shows subcutaneous drain placed at the incision site reduces the rate of infection up to 2% which is significantly lower than the infection rate among patients for whom drain was not placed ( $P < .05$ ). In spite of emphasis to use sutures, drains and foreign bodies only with adequate indications to avoid surgical site infection and based on the merits of employing drain in evacuating the collected material to prevent infection, we recommend the use of subcutaneous drains in obese patients as incision infection may lead to longer hospitalization or readmission. As higher treatment expenditures and higher mortality rate are the consequences of infection, every effort to reduce the consequences rates following bariatric surgery in obese patients is valuable and advisable.

### 1. INTRODUCTION

Bariatric surgery causes weight loss by restricting food intake or interrupting the digestion. It is treatment of choice for severely obese people [1-3]. Any surgical procedure has the risk of infection [4]. Wound infection is not an uncommon cause of post-operative morbidity even after the mandatory protocol use of preoperative broad spectrum prophylactic antibiotic, which results in more post-operative pain as well as prolong stay in the hospital [5]. It is conventional to use any technique to reduce the risk of surgical site infection [5].

Anastomotic leak is a great challenge regarding diagnosis and treatment. Bariatric surgeons are concerned about delay in diagnosis of anastomotic leaks which may lead to serious consequences. The uncontrolled leaks may lead to sepsis that require operative interventions [6].

Drains are used to facilitate treatment and management of the leaks by evacuating the secretions and minimizing the chance of undrained collections. Drains may also minimize the chance of morbidity due to anastomotic leaks after bariatric surgery [6].

The present work has been undertaken with an aim to study the effect of placing subcutaneous drain in the incision site of obese patients in order to reduce the rate of incision site infection.

## 2. MATERIALS AND METHODS

### 2.1. Case Selection

Cases and methodology were the same as given by [Dehkhoda, et al. \[2\]](#). In brief, cases were 200 obese patients (43 men and 157 women) referring for bariatric surgery to Imam Reza & Shahryar hospitals- Tehran- Iran. All surgery recipients were operated employing jejuno-ileal bypass procedure with some modifications. The ethics committee number of this project is 9217. Demographic features of the patients are presented in Table I.

Inclusion criteria- Obese patients of both sexes, aged 16-55 years with BMI more than 40 or those having 100 lb more than ideal weight were included in the study.

Exclusion criteria- Patients aged more than 55 and less than 15 years, patients suffering from hypothyroidism and insulin-dependent diabetes, those with previous gastro-intestinal surgery excepting appendectomy or presence of any pathological disorder in digestive system, patients under treatment with corticosteroids and antibiotics, alcohol addicts, those suffering from fatty liver with grade II or more in sonography and all psychotic patients were excluded from the study.

Before surgery laboratory tests such as liver function tests, blood lipids, coagulation tests, blood sugar, renal function test, Complete Blood Count (CBC) tests for measuring Na & K levels, Electro Cardiogram (ECG) and chest X-ray were requested for all patients.

All patients were informed about the procedure of the operation and a consent form was signed.

### 2.2 Grouping of Patients

In order to reduce the skin infection after jejuno ileal bypass surgery, patients were equally divided into two groups on the basis of their accessibility:

Group I included 100 patients with no subcutaneous drain placed at the incision site and for 100 patients of Group II drain was placed at the incision site of their skin.

### 2.3. Operation Procedure

In the operation room, after operation was over and the fascia was closed, a corrugated drain (Supa co., Iran) was placed subcutaneously in patients belonging to group II (20 men and 80 women) (Fig 1 and 2); adipose tissue was sutured in 2 layers by Vicryl 2/0 thread and the compression bandage was applied on pre incision site; while skin was stitched without placing drain in 100 patients (22 men and 78 women) of the control group. Surgical procedure was the same in the two groups. Prior to anaesthesia patients of both groups received ceftriaxone (1gr/iv/bid) which continued till discharge. After discharge ciprofloxacin (BID) and oral metronidazole (TDS) were prescribed for a week.



**Fig-1.** A corrugated drain is being placed at the incision site at the end of operation by Dr. S. Dehkhoda, surgeon of the project,



**Fig-2.** Drain placed at the incision site of the skin of obese patients by surgeon of the project.

#### 2.4. Patients' Assessment and follow up

Patients were watched especially for any sign of infection daily during first week and weekly up to one month. Corrugated drain was left in place for one week post-operation. Wounds were cared for in a similar fashion, without any difference in dressing, etc. in the two groups. Any change in patients' conditions were recorded.

In case of infection, under local anaesthesia, half of the incision site was opened, rinsed with normal saline. 2-3 times. Rinsing with normal saline continued for 5-7 days along with intravenous cefazolin (1 gr/IV/6±D) controlled the infection. Soon after, surgical site was sutured. Microbiological identification and antibiotic susceptibility test were carried out for proper treatment.

Statistical analysis was performed using SPSS software. Two independent samples T test was used to assess the effect of placing subcutaneous drain on surgical site infection in the patients.  $p < 0.05$  indicates its significance.

### 3. RESULTS

200 obese persons (43 men & 157 women) aged 16-55 years underwent bariatric surgery. No significant difference was observed in mean age ( $P=0.34$ ), weight ( $P=0.53$ ), height ( $P=0.53$ ) and BMI ( $P=0.129$ ) of patients of the two groups (Table I).

20 patients (4 men and 16 women) were infected after surgery in the first group and only 2 women in second group had incision site infection. To study the effect of placing subcutaneous drain in reducing surgical site infection in the patients we used comparison of proportion test.

**Table-I.** Effect of drain on Infection rate at surgical site of skin of patients

Grouping	Gender	Mean Age (year)	Mean Weight(Kg)	Mean Height(Cm)	Infection Rate	Infection sign
Group I (No Drain)	100 (22M+78W)	29.6±60	129.04±18.8	164±12.7	20 (16W+4M)	Er& Ed (7) Er&P (13)
Group II (With Drain)	100 (20M+80W)	29.8±90	130.6±16.7	162±11.6	2 (2W)	Er& Ed& T (2)
Total	200 (42M+158W)					

W=Woman M=Man Er=Erythma Ed=Edema T=Tenderness Er&P= Erythma&Pus

P value of  $p < 0.05$  indicates that its effect is significant. To find out the correlation between drain and surgical site infection, we used Pau-Kendal correlation test. Surgical site infection rate of patients belonging to first group was 10 times more than infection rate in incision site of second group which indicates a significant difference ( $p < 0.05$ ).

In all the infected cases cellulitis was observed. The common signs of infection among patients of either group were erythema, edema and severe tenderness surrounding the incision site. In some cases, infection was accompanied with pus secretion. Out of 20 infected cases belonging to group-I, in 13 cases dermal changes (i.e. erythema, edema, and cellulitis) were accompanied by varying amount of pus.

Microbial examination of the collected pus revealed presence of Staphylococcus and E.coli in infected cases. Antibiotic susceptibility test were carried out for proper treatment.

The results of the present study showed a significant difference ( $P < 0.05$ ) in the post operation surgical site infection between the two groups (Table I).

### 4. DISCUSSION

Incidence of obesity is increasing rapidly in most parts of the world [7-10]. In Iran also, obesity has reached epidemic proportions; over 60% of the population are overweight and more than 25% are somehow affected [11, 12].

In 2001–2004 66% of the American population between the ages of 20 and 74 years were overweight and 32% were obese [11, 13].

For morbid obesity, non-surgical treatments are rarely effective [14]. In the present study, obese patients had tried various treatments for weight loss prior to surgery but in vein and majority of them suffered progressive obesity and obesity related health problems.

Anastomotic leaks, although rare, are one of the most common major postoperative complications of bariatric operations [1]. Many surgeons have reported the rate of anastomotic leaks of less than 1% [7] while some reported higher rates [6, 15, 16]. Though according to some researchers, surgical site infections comprises up to 20% of all healthcare-associated infections. About 5% of patients undergoing an operation develop surgical site infection [5]. In the present study, 20% cases for whom drain was not placed faced incision site infection while by placing drain in the incision site, it reduced to 2%.

Anastomotic leaks from surgical site in the skin dispose the incised skin to bacterial growth and infection and its consequences [5]. According to Ramsey, the general philosophy regarding the care of bariatric surgery patients is to minimize interventions [16]. Good surgical technique is the best way to avoid surgical site infection. Sutures, drains and foreign bodies should be used only with adequate indications [17].

Surgeons should not be dissuaded from diagnosis or control of an anastomotic leak which is a formidable diagnostic and therapeutic challenge. Surgical drains facilitate the non-operative management of anastomotic leaks. The volume of the effluent fluid in the drain is usually very small. The small volume of the effluent is easily evacuated by the surgical drains, avoiding the need for operative intervention to control the leak [6].

Drains are commonly used in surgery but skin placed drains are not practiced very often. In spite of believes that by using sutures, drains and foreign bodies, surgeons break local barrier defense mechanisms [17] drain use after gastric bypass is still practiced by many bariatric surgeons [18].

In the present study, out of 200 obese patients operated, 22 (11%) (18 women and 4 men) cases faced infection at the incision site of their skin; out of which in 13 cases pus was present in addition to erythema, as the infection sign. In cases of patients for whom drain was not placed, infection appeared in the form of erythma and pus while in cases for whom drain was placed the only sign of infection was erythema indicating that the severity of infection is also reduces by using drain.

Chousleb, et al. [1] in his study aimed to assess if the drain placement provides additional therapeutic advantages in the management of patients with leaks after gastric bypass bariatric surgery. He concluded that the use of drain may provide added safety in the postoperative care of these patients and help deal with its complications [1].

To overcome the serious consequences of drainage collection beneath the skin, the surgically placed corrugated drain is an instrument in facilitating treatment of the leak in our study. The incision site inserted drain evacuate the collected material promptly, thereby minimizes the chance of undrained collections. We adopted this practice for the obese patients undergoing bariatric surgery leading to perceived reduction in length of hospital stay and patients' well-being. After all, the most important outcome of treating obesity is improvement in health conditions [6].

## 5. CONCLUSIONS

In spite of emphasis to use sutures, drains and foreign bodies only with adequate indications, according to our findings based on the merits of employing drain in evacuating the collected material to prevent infection, we recommend the use of skin placed drain to reduce the post operation wound infection in obese patients; as drain, by draining the secretions and preventing dead space formation, reduces the rate of infection at the incision site, thereby reduces the consequences rates in these patients.

**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declare that they have no competing interests.

**Contributors/Acknowledgement:** The authors are grateful to all patients who voluntarily participated in the study and allowed us to publish its outcome.

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