

Use of Subcutaneous Closed Drainage System in Obese Patients Undergoing Abdominal Hysterectomy

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Summary

A prospective study was conducted of 150 obese patients undergoing abdominal hysterectomy at ITCGH Hospital, Sion, Mumbai - 22. The aim of the study was to evaluate the role of subcutaneous closed suction drain in relation to wound disruption and infection after hysterectomy in these obese patients. Fifty patients with drain were compared with 50 patients each of subcutaneous closure with synthetic suture and no closure of subcutaneous tissue. The wound disruption occurred in nine patients in no closure, five in closure and only one in drainage group. Overall wound complications were much less in study group.

Introduction

Disruption of the abdominal incision is a major source of morbidity after gynecological surgery. Infection, hematoma or seroma formation can disrupt skin and subcutaneous tissue closure or necessitate opening of the incision for drainage. DeValle et al (1992) reported 2.5% to 29.7% incidence of wound infection and complication following obstetric and gynecological surgery. Apart from increasing hospital stay necessitating resuturing, wound disruption has serious psychological or economic implications on patients and her family members.

It is important to identify risk factors and treatment modalities that can decrease the incidence of these complications. Obesity has been identified as a strong independent risk factor for wound complications. Reported incidence of wound infection and complications is as high as 29.7% in obese patients as compared to only 7% in non-obese patients (Pitkin, 1976). The vascular supply to the subcutaneous fat is relatively

poor, making this tissue susceptible to infection after contamination with pathogens. Serous fluid collection and hematoma, even minimum blood collection increase the risk of infection. The risk of wound complications increases with increase in thickness of subcutaneous fat. Although closure of subcutaneous fat may decrease serous fluid collection, additional suture material may increase the risk of wound infection.

Aims and Objectives

The purpose of this study was to determine whether placing the subcutaneous closed suction drainage system decreased the wound disruption rate without increasing the rate of wound infection.

Material and Methods

A prospective study comparing placing of subcutaneous closed suction drainage system during abdominal wall closure after abdominal hysterectomy in obese patients, with other methods i.e. either no

closure or closure of subcutaneous fat with synthetic suture material was carried out over a period of two years at L.T.M.G. Hospital, Sion, Mumbai.

Total 150 patients undergoing abdominal hysterectomy were included in this study. All patients with at least 4 cms of subcutaneous fat found at a time of surgery were eligible for the study. Patients of radical hysterectomy, metastatic ovarian tumor, pelvic abscess or infection, prolonged surgery or excessive bleeding during operation requiring blood transfusion were not included. Also patients with chronic lung disease or postoperative ileus or distention were excluded from the study. But patients with previous scar and controlled diabetes mellitus were included in this study.

These patients were divided into three groups of 50 patients each:

Group A – Use of subcutaneous closed drain

Group B – Subcutaneous closure with synthetic suture

Group C – No closure group

These cases were randomly distributed so as to keep number of patients comparable in three groups as related to indication, type of incision, socio-economic status, type of skin suture, medical complications and pre-operative & intra-operative high risk factors.

Before surgery, abdominal and pelvic hair were removed by disposable razor. All patients received full abdominal skin preparation with iodine soap, ether and spirit.

After fascia closure with nonabsorbable suture material (ethilon), the subcutaneous tissue thickness was measured with sterile metallic ruler in middle of the incision from skin surface to the fascia. The depth of subcutaneous fat was measured at the cephalic end of the wound in case of Pfannenstiel incision. The wound was irrigated with sterile saline.

In group A, closed drainage system with negative pressure (Romovac drain) was placed in subcutaneous tissue from one end to another (Fig. 1). The drain was brought out at a separate point one inch away from lower or lateral end of the incision (Fig 2). At this point the drain was fixed to the skin by a nonabsorbable suture material and negative pressure created.

In group B, subcutaneous tissue was sutured with continuous running suture using 2-0 polyglycolic acid.

In group C, subcutaneous tissue was not closed

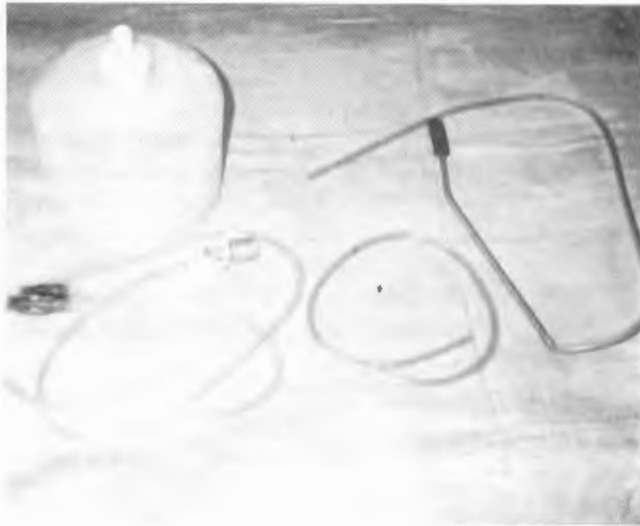


Fig. 1



Fig. 2

at all.

The skin was sutured by either vertical mattress sutures with black silk or by subcuticular running stitch by 3-0 polyglecaprone (monocryl). All patients were given post-operative antibiotic therapy.

The incision was dressed with sterile bandage. In study group the suction bag was emptied every day and repeat suction was created. Drain was removed after 72 hours or when there was less than 25cc per day drainage from the tube. The dressing was changed on the fifth post-operative day.

In patients with subcuticular running stitch, the knot was cut on the 5th to 7th day depending upon the healing. In patients with vertical mattress stitch the sutures were removed on the 7th post-operative day without any complications.

All operations were done or assisted by the chief author himself. The data and the results in all the three groups were compared.

Observations and Results

Majority of our patients were between 40-50 years of age. Table I summarises demographic data for the three groups. Average depth of subcutaneous fat was 5.4 cms while mean weight was 84.2 kg. In these patients, we had one patient weighing 96 kg with subcutaneous fat of 7.5 cms. Diabetes and previous scar are known risk factors for infection and wound complication. We had a total of ten patients of diabetes mellitus taking insulin therapy in this study. Majority of these patients were from lower middle class.

The indications for abdominal hysterectomy are listed in Table II. Midline vertical incision was used in 62 patients while Pfannensteil incision was taken in the remaining 88. In 94 patients skin was sutured with subcuticular sutures, using 3-0 polyglecaprone (monocryl) (Table III)

Table IV compares the post-operative complications and results in these 3 groups.

Post-operative fever viz temperature more than 38° C after for atleast 24 hrs developed in 12.6%.

Table I: Demographic Data

	Group A	Group B	Group C
Age (yrs)	44.6 ± 5.5	45.1 ± 4.2	46.5 ± 2.6
Weight (kg)	86 ± 9.2	83.4 ± 8.6	82.4 ± 10.2
Fat thickness (cms)	5.4 ± 2.1	5.6 ± 1.6	5.4 ± 1.0
Length of surgery (mins)	56 ± 20	50 ± 16	60 ± 15
Previous scar	9	8	10
Diabetes	4	4	2

Table II: Indications for surgery

	Group A	Group B	Group C
DUB	17	15	15
Fibroid	21	22	24
Adenomyosis	3	4	5
Benign ovarian tumor	5	6	4
Endometriosis	2	1	-
Adenexal mass	2	1	-
Others	-	1	2

Table III: Surgical Details

	Group A	Group B	Group C	Total
Incision				
Pfannensteil	30	27	31	88
Vertical	20	18	24	62
Skin closure				
Vertical mattress	20	19	17	56
Subcuticular	32	32	30	94

Table IV: Results and Complications

	Group A	Group B	Group C
Fever	4	9	8
Hematoma	1	-	3
Seroma	-	3	5
Infection	1	3	4
Wound disruption			
Superficial	1	4	6
Deep	1	5	9
Dehiscence	-	-	1
Hospital stay (days)	6	9	12

An infection of wound, as diagnosed by purulent discharge with classical signs of erythema, induration and tenderness was found in 6 and 8 patients in groups B & C respectively as compared to only 2 in group A.

A wound draining sero-sanguinous fluid and not meeting criteria for infection was classified as having seroma. It was found in a total of 9 cases, from all groups. All patients with infection were treated with higher antibiotics with/without drainage of pus by opening the wound.

The disruption of wound was observed in 26 cases. The superficial disruption of wound meaning less than one cms in depth, was mainly treated conservatively, while more than one cms deep disruption was categorized as 'deep' type and required secondary suturing. Superficial breakdown of wound was seen in 1, 4 & 6 cases in group A, B, C respectively. Deep disruption of wound requiring repeat suturing was seen in 9 cases in no closure group, 5 in closure with synthetic suture and only 1 case in drainage group. In these cases also, the gape was limited to upper 5 cm part of wound probably because drain came out partially.

In 5 patients in nonclosure group (C) and 3 in closure group (B), we encountered complete gape of wound comprising full length and full depth upto rectus sheath. One of the patients of group C had repeat breakdown requiring tertiary suturing. We had one case of burst abdomen (dehiscence) in non-closure group.

Average hospital stay was much less in the study group. Incidence of overall complications was much less in study (A) group, even in patients with diabetes or previous scar.

Discussion

Abdominal hysterectomy is one of the commonest operation performed in gynecology for a variety of indications. Wound disruption after this surgery is a major cause of morbidity and increased length of hospital stay. These complications can occur despite strict adherence to good surgical technique. Although careful handling of tissue to minimize trauma, minimal use of cautery, strict observance of aseptic technique, adequate skin preparation and the use of prophylactic antibiotics are important in preventing wound complications, presence of certain high risk factors can increase risk of infection or wound disruption in such patients.

Obesity is one of the important risk factor for

developing wound complications. The thickness of the subcutaneous fat layer undoubtedly has a direct bearing on wound infection and failure of healing (Pitkin 1976). The chance of complications is particularly more if patient also has additional risk factors like diabetes, previous scar or perioperative infection.

When an abdominal incision is closed by approximating only the fascia (rectus sheath) and skin, a potential space is left behind in subcutaneous tissue, particularly as in obese patients. This dead space can serve as a reservoir for collection of serous fluid or blood increasing the possibility of seroma or hematoma. These pockets of fluid or blood can easily get infected during or after surgery.

The closure of subcutaneous tissue can, to a certain extent, decrease the incidence of wound disruption. Del Valle et al (1992) published randomized study comparing closure of subcutaneous tissue with non-closure during a caesarean section in obese patients and demonstrated a reduction of postoperative wound disruption from dead space obliteration in closure group.

Although subcutaneous closure prevents seroma formation and reduces tension on skin incision, these sutures can cause necrosis and invite infection. Elek and Conen (1957) reported that presence of suture material can decrease the innoculum of bacteria needed to cause infection by factor 10,000. The type of suture material and technique is important in this respect. Synthetic suture causes less inflammation than gut suture (Haxton et al, 1974). The horizontal running suture helps to distribute the tension evenly throughout the length and lessen the possibility of tissue necrosis. In this study, though, the incidence of wound breakdown in closure group was lower than that in non-closure group, the difference was not significant.

Subcutaneous suction drain also helps in preventing serous fluid or blood collection, keeping cavity-space collapsed and approximated, facilitating early and better healing. It is important to achieve proper hemostasis before using drain. Also proper placement of drain all along the incision and its fixing to skin is important.

The drain should be kept in place at least for 72 hours or till it is draining less than 25cc fluid per day. Improper placement, partial pull-out or premature removal can lead to failure and wound complications. Negative pressure in drainage system helps in literally sucking out the serous fluid or blood collected, irrespective of position of patient, thus keeping cavity collapsed. Thus suction drainage system is likely to drain

much better than simple tube (i.e. part of Ryle's tube) or corrugated drain.

It is feared that infection rate may actually increase by facilitating bacterial migration into the wound, but majority of the studies have shown that use of prophylactic antibiotics in such patients helps in preventing infection. In study by Gallup et al (1996), incidence of wound breakdown in obese patients was only 2% when drain was used along with prophylactic antibiotics as compared to 10% when antibiotics were not used. But when drain was not used, incidence of breakdown was 14% and 9% in no-antibiotic and prophylactic antibiotic group respectively. This showed that subcutaneous drainage used along with prophylactic antibiotics significantly reduces the incidence of wound breakdown. In our study also, wound disruption rates were very low in study group (2%). As our study had only 150 patients the statistically significant difference could not be calculated. The power analysis revealed a minimum of 600 patients would be

needed to show a significant difference in our series, but initial experience does suggest recommendation of subcutaneous drain in obese patients undergoing abdominal hysterectomy.

Acknowledgement

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