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Original Research Article

Effect of negative suction drain on abdominal wounds after obstetric and gynecological surgery

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ABSTRACT

Background: Wound complications are common after gynecological surgery. The purpose of the study was to find out whether use of negative suction reduces wound complications in gynecological surgery
Methods: Patients undergoing obstetric and gynecological surgeries were taken into the study. The study group had negative suction drain in the subcutaneous plane. The control group had conventional layered closure of abdominal wound. Wound complications were noted in each group and compared.
Results: We found significant reduction in surgical site infections in the negative suction group. In patients who are obese and BMI>25 there were less delayed wound healing, surgical site infections and gaping in negative suction group.
Conclusions: The use of negative suction drain significantly reduced surgical site infections. In patients with BMI>25 there was significant reduction in the incidence of delayed wound healing, gaping and surgical site infections

Keywords: Gynecological surgery, Negative suction drain, Surgical site infection, Wound healing

INTRODUCTION

Wound complications are a significant cause of morbidity in gynecological and obstetric surgery. Surgical site infections and wound breakdown can cause significant increases in hospital stay.[1,2] Women who are obese, malnourished or have undergone bowel surgeries are at the highest risk of wound complications. Prophylactic negative suction has been used to reduce postoperative wound complications.[3-5] Many studies have found beneficial effects of negative suction on wound healing and complications associated with wounds.[6-8] Study was done to find out whether a prophylactic suction drain can decrease the wound complications associated with gynaecologic and obstetric surgeries.

Objectives

The purpose of the study is to find out the effect of a negative suction drain on wound healing, surgical site infections and wound breakdown after obstetric and gynecological surgery.

METHODS

This was a prospective observational study conducted at Kasturba Medical College Mani-pal, a unit of Manipal Academy of Higher Education(MAHE). The institutional ethical committee clearance committee cleared the study under IEC2-449/2023. The study was registered under CTRI under number CTRI/2023/11/060086. All patients undergoing major obstetrics Gynecological surgery entered the study.

The study was conducted from December 2023 to January 2025.

Patients who were immunosuppressive therapy were excluded from the study. Skin preparation was done in all patients with alcohol and povidone iodine. The rectus sheath was closed with continuous polydioxanone 0

suture. The study group had a negative suction drain. Romovac drain was kept in the subcutaneous tissue plane above the rectus sheath. The drain was kept for a minimum of 5 days. Negative suction was continuously provided . The control group had their wound sutured in a conventional way. Subcutaneous tissue was closed with 2-0 Vicryl. Skin closure was done either by mattress, subcuticular or by surgical staplers.

Complications like gaping, wound discharge, secondary suturing and delayed wound healing were noted. Surgical site infection was defined as infection of the skin and subcutaneous tissue of the incision with at least 1 of the following.

Purulent drainage, positive wound culture or incision that physician deliberately opens with pain, tenderness, swelling, erythema. Delayed healing was defined as a wound which did not heal after 7 days of hospital stay and needed more than 7 days to recover. All the patients were followed up and were observed for wound discharge, surgical site infection and wound dehiscence.

Data were entered in MS-Excel and analyzed in SPSS V25. Categorical data was represented in frequencies and percentages. Continuous data was expressed as mean and standard deviation for normal. Chi square test was used as test of significance for categorical data.

Independent sample t test was used as test of significance for continuous data. P value <0.05 was considered statistically significant.

RESULTS

A total of 163 subjects entered the study, of which 79 were cases and 84 were controls. The patients in the cases group had negative suction applied to the subcutaneous tissue plane. The demographic variables of the groups are depicted in Table 1. The nature of the surgeries patients underwent is depicted in Table 2. Most patients underwent an abdominal hysterectomy followed by a cesarean section. The methods of skin closure were described in Table 3.

We did not find any statistically significant difference between the groups except for surgical site infection, which was less in negative suction groups (Table 4). There was no significant difference in complications in patients with Diabetes in our study Table 5.

Table 1: Demographic variables.

Variable	Cases (n=79)	Controls (n=84)
Age (in years)		
20-40	47 (59%)	41 (49%)
>40	32 (41%)	43 (51%)
BMI		
<26.9	30 (38%)	31 (37%)
>27	49 (62%)	53 (63%)
Presence of Diabetes	17 (22%)	18 (21%)
Previous surgeries	45 (57%)	41 (49%)

Table 2: Nature of surgery.

Nature of surgery	Cases (n=79)	Controls (n=84)
Abdominal hysterectomy	24 (30%)	41 (49%)
Laparotomy (myomectomy/ salpingectomy)	5 (6%)	7 (8%)
Cesarean section	36 (46%)	29 (35%)
Staging laparotomy	9 (11%)	7 (8%)
Laparoscopy converted to laparotomy	2 (3%)	0 (0%)
Interval debulking surgery	2 (3%)	0 (0%)
Cesarean hysterectomy	1 (1%)	0 (0%)

Table 3: Skin closure technique.

Type of closure	Cases (n=79)	Controls (n=84)
Mattress	61 (77%)	21 (25%)
Staplers	5 (6%)	5 (6%)
Subcuticular	13 (17%)	58 (69%)

Table 4: Comparison of outcome between two groups.

Complication	Cases (n=79)	Controls (n=84)	P value
Gaping	5 (6%)	7 (8%)	0.624
Discharge	10 (13%)	20 (24%)	0.066
Delayed healing	8 (10%)	17 (20%)	0.73
Surgical site infection	5 (6%)	16 (19%)	0.015
Secondary suturing	2 (3%)	2 (2%)	0.015

Table 5: Complications in subjects with Diabetes.

Outcomes	People with Diabetes in cases (n=17)	People with Diabetes in control (n=18)	P value
Delayed healing	2 (12%)	5 (28%)	0.237
Secondary suturing	0 (0%)	1 (6%)	0.324
Discharge	3 (18%)	7 (39%)	0.164
Surgical site infection	2 (12%)	1 (7%)	0.237
Gaping	1 (6%)	3 (17%)	0.316

Table 6: Comparison of outcome in patients with BMI>25.

Outcomes	Cases (n=70)	Controls (n=63)	P value
Delayed healing	7 (10%)	15 (24%)	0.032
Surgical site infection	5 (7%)	14 (22%)	0.013
Secondary suturing	2 (3%)	1 (2%)	0.622
Discharge	9 (13%)	17 (27%)	0.04
Gaping	5 (7%)	6 (10%)	0.619

In obese patients, we found that negative suction drains can reduce the incidence of delayed wound healing, surgical site infections and discharge from the wound (Table 6).

DISCUSSION

The current study found no difference in complications like wound gaping, discharge, delayed healing and secondary suturing between the two groups. However, the incidence of surgical site infection was lower in the negative suction groups. Hence, the use of a negative section may reduce the incidence of surgical site infection. The use of negative suction did not offer any advantage to patients with diabetes. In women with obesity (BMI>25), there were fewer delayed healing, surgical site infections and discharge in the negative suction group.

In a study by O'Leary et al negative suction drastically reduced the incidence of wound complications from 32% to 8%. The study was done on patients undergoing colorectal and gynecologic surgeries.[6] Curran et al, in a study, found a significant decrease in wound complications when negative suction was used in patients undergoing colorectal surgery.[7]

Sahebally et al did a meta-analysis of the use of negative suction drains. They found that the use of negative suction drains significantly reduced wound complications in patients undergoing abdominal surgery.[9] Negative suction drains can be applied with minimal training and are easily used in the operating room. They can be used in patients at high risk of wound complications like patients with diabetes, obesity or in patients with a high risk of anaesthesia. Surgical site infections cause an immense economic burden on health care.[10] Lewis et al, in a study, found significant cost reduction with the use of negative suction drains and it reduced the cost of care significantly. In their study, the surgical site infection rate was substantially less with the use of negative suction drains.[11] Chopra et al, found a decrease in surgical site infection from 29% to 9% with negative suction drains.[12] Gynaecological surgeries are at high risk of developing wound complications. The use of a negative suction drain is an easy to use cost-effective method to reduce wound complications. It can be easily used with minimal training.

In our study, we found that the use of suction drains can reduce the incidence of surgical site infections. Though no statistically significant difference was found between wound gaping, discharge , delayed healing and secondary suturing, but we found surgical site infections are significantly low with negative suction drains. In subgroup analysis, we found that negative suction can decrease the incidence of delayed healing, surgical site infections and wound discharge in obese patients with more than 25.

CONCLUSION

The study found that surgical site infections are significantly reduced when negative suction drains are used in gynecological and obstetric surgery. In obese patients with BMI more than 25, we found that it decreased the incidences of delayed healing, surgical site infections and wound gaping.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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