Effect of Prophylactic Negative Pressure Wound Therapy versus Standard Wound Dressing on Surgical-Site Infection Cesarean section in Obese Women: a randomized controlled trial

Abdelraouf Abdelnasser Abdelraouf[1], Hossam Gouda[1] , Moustafa Hassan[1] ,Mohamed Taman[1].

[1]Department of Obstetrics and Gynecology, Faculty of Medicine, Mansoura University, Egypt

Corresponding author:
Abdelraouf Abdelnasser Abdelraouf
mobile:01012841087
Email: mrherion1@gmail.com

Abstract

Background: Obesity is described as excessive fat accumulation presenting a risk to health. Caesarean delivery (CD) is the surgical approach by which a baby is delivered through an abdominal incision in the mother. Surgical site infections (SSIs) are a significant postoperative adverse event. Negative pressure wound therapy (NPWT) is a modality frequently utilized to help major wounds close rapidly.

Aim: To assess the efficacy of prophylactic NPWT, initiated immediately after CD in lowering the risk of SSIs compared to traditional wound dressing in obese females on the occurrence of SSI.

Methods: This is a non-blinded Randomized Clinical Trial (RCT) conducted on 130 obese pregnant females underwent cesarean section randomly divided into two groups: Group A included 65 cases who had NPWT and Group B included 65 cases who had traditional wound dressing on SSI. The primary outcome was the SSI rate after two weeks of delivery.

Results: There was insignificant difference between group A and B regarding temperature, wound hotness, redness, painful sore, pus discharge and bad smell in week 1 ($p>0.05$), while there was a significant difference was detected in week 2 between studied groups regarding temperature, hotness, redness, painful sores, bad smell and pus discharge. There was a statistically significant decrease in painful sore and wound redness incidence for group A. There was difference between studied groups concerning SSI rate after 2 weeks with higher rate among group B compared to group A.

Conclusion: Our study concluded that the use of NPWT decreases the rate of SSI two weeks after delivery in obese women delivered by CS compared with traditional wound therapy.

Keywords: NPWT, SSI, Obese Women, Cesarean Delivery.

INTRODUCTION

Obesity is a medical state characterized by excessive body fat that causes adverse consequences for health. In general subjects are classified as obese if their body mass index (BMI), (weight in kilograms divided by the height in meters square) is more than 30. [1]. Obesity has been demonstrated to be associated with several aspects of pregnancy; for instance, it raises the possibility of CD. Additionally, it could precipitate the occurrence of postsurgical SSIs [2].

Caesarean delivery (CD) is the surgical approach by which a baby is delivered through an abdominal incision in mother, frequently conducted as vaginal delivery (VD) may put fetus or her mother at risk. Causes of CD comprise labour obstructions, twin pregnancy, maternal hypertension, breech presentation, and placental abnormalities. A CD could be conducted according to the maternal pelvis structure or past history of a CD [3].

Essentially, SSIs are a significant postoperative complication. These infections happen within 30 days of surgery for the deep layers, and 30 to 90 days for the superficial layers, when microorganisms penetrate the tissues. Two more categories of SSIs are organ/space and incision. There are two types of incisional SSIs: superficial and deep. SSIs even though they are only allowed at surgical sites. The epidermis and superficial fascia are affected by superficial SSIs, whereas the fascia and muscle layers are infected by deep SSIs. Within 30- or 90-days following surgery, any tissue below the fascial layer that was engaged in the approach gets infected by organ/space SSIs. The incidence of SSI varies between 0.5 and 15% globally. Additionally, it has been reported that individuals with high body mass indexes (BMIs), documented histories of drinking, chronic heart conditions, and diabetes are key risk factors for developing SSI [4].

There are two primary kinds of wound healing: primary healing and secondary healing. The majority of primary closure of surgical wounds results in less tissue loss and a satisfactory approximation of the wound borders. This permits for primary healing where there is rapid epithelialization of the wound and fine scar formation. On the contrary, in the secondary healing of wounds, the wound is left open, which could be secondary to the existence of SSIs or an inability to cause satisfactory approximation of the edges. In this context, the wound heals normally by granulation, ultimate contraction, and slow epithelialization, leaving large scars [5].

Negative pressure wound therapy (NPWT) is a modality frequently utilized to help major wounds close rapidly. It enhanced local blood flow and the speed of granulation tissue formation. It also speeds up wound closure rates in comparison to traditional wound care dressings. Research has demonstrated that NPWT has been associated with an improvement in wound appearance in animal models, in spite of increasing bio burden [6].

It has been demonstrated that efficient wound management needs a detailed evaluation of the patient and the wound to detect the optimum therapeutic strategy for accomplishing wound care aims. Multiple wound and patient predisposing factors are identified to possibly complicate wound healing and increase healthcare charges. Cases with severe tissue damage, critical infections, or high levels of exudate have been associated with delayed wound healing. Debridement, prophylactic antibiotics and utilization of antiseptic agents, use of drains, and regular wound cleaning are basic lines in terms of caring for cases of at-risk wounds. Of note, wound irrigation has been considered the most reliable and successful step of wound cleansing compared to the remaining methods [7].

Wound irrigation is the continuous passage of a fluid through an open wound to encourage wound hydration, eliminate deep debris, and facilitate visual assessment, and it is essential to the healing process. The purpose of the irrigation solution is to help create

the ideal environment for wound healing by eliminating cellular debris, and wound exudate, as well as metabolic wastes. [8]. So, we aimed to assess the efficiency of prophylactic NPWT, initiated immediately following CD in lowering the risk of SSIs compared to traditional wound dressing in obese females on the occurrence of SSI.

PATIENTS AND METHODS

This open labeled randomized clinical trial was held at OBESTERIC AND GYNCOLOGY DEPARTMENT, MANSOURA UNIVERSITY HOSPITALS from November 2021 to November 2022. After obtaining the approval from institutional review board (IRB) with code number: MS.22.01.1857, Faculty of medicine, Mansoura University. This study included pregnant female at childbearing period (18 years to 40years) had planned or unplanned cesarean delivery with body mass index >30 kg/m2, with no coagulation disorders (Hemophilia, ITP, clotting factor deficiencies, hypercoagulable states and deep venous thrombosis). But we excluded pregnant females diagnosed to have bleeding disorder (von Willbrand disease, hemophilia, clotting factor disorders), therapeutic anticoagulation (low molecular weight heparin, aspirin), uncontrolled Diabetes Mellitus, hypertension and pregnant females with allergy to silicone or adhesive tape.

Entire cases were divided into two groups, group A included 65 cases who were treated by negative pressure wound therapy and group B included 65 cases who were treated by standard wound dressing on surgical site infection.

Methods

All cases were subjected to history taking including personal history, menstrual history, obstetric history present history, past history and family history. The full physical examination included measuring the BMI. The investigations included CBC, Kidney functions test, INR, liver functions test and random blood glucose.

Technique of NPWT:

Add a Drain Catheter: The drainage catheter features several openings on one end enabling fluid to pass through and a pointed tip (trocar) to penetrate the skin. Knowing anatomy is crucial when inserting the drain to prevent damaging key tissues like arteries or nerves. Place the drain beneath the skin with the trocar pierced, and apply counter pressure above the skin's surface. To prevent unintentional harm, pull the trocar through the skin and tuck the trocar's pointed end with the safety rubber. Trim the perforated catheter to the required length after pulling the catheter until all holes are just within

Using sutures to secure the drain catheter , A skin suture is obtained close to the drain site, and a loose square knot is made on it. (i.e., hanging knot). After that, wrap a double knot around the drain catheter and repeat multiple times, throwing the knot the catheter's rear and front .

Keeping Drain Secure During Microvascular Techniques, vascular repair site should not be crossed by the drain catheter. The drain catheter, which was placed inside a flap, was stabilized with one or two more stitches before fixing the drain as previously mentioned. The extra suture, which was introduced through the skin via the nearest catheter hole and then reinserted through the skin, forms a loose knot on the skin side.. The drain won't be moved by using this way of security. To provide for additional care, it is necessary to demonstrate to the nursing personnel where the anchoring suture was placed

Making the Circuit Complete , A clamped plastic tube with a drain is connected to the cut catheter trocar. A bottle of negative pressure in the high-pressure drain, a bulb in the low-pressure drain, and the given reservoir drain are all linked to the opposite end of the plastic tubing. When the clamp-on plastic tubing is loosened skin wound has been dressed and closed.

Observe the drainage After surgery, blood is

instantly collected by the reservoir. The collections gradually lose their crimson color as time goes on. With occasional blood clots, the fluid subsequently turns yellow. In the event that the reservoir fluid abruptly transforms into milky white or blood with clots, the surgeon must be notified.

Taking advantage of the drain tube: Milking keeps the tube from clogging. Hand hygiene should be done with water and soap before milking. Holding the tube initially with the non-dominant hand at the skin insertion point. Next, carefully squeeze the tube between your index and middle fingers while travelling around the source with your dominant hand. For easy gliding over the tube, use alcohol rub or hand sanitizer. With a finger in the tube, let the fluid flow into the reservoir. While milking, as much fluid as you can out of the tube is preferable than nothing. For each drain, two times every day, the tube must be milked. If milking the tube fails to bring the flow back, inform the surgeon as you likely signifies that the tube is obstructed internally. Never cut, kink, or detach the drain tubing.

Taking the Collection Out of the Low-Pressure Bulb: At least three times each day, or if it is more than 50% filled, the bulb is drained. It is necessary to thoroughly wash the hands with soap and water. and the drain care must be sterile. Remove the stopper at the top of the bulb's emptying port. Over measuring cup, invert source gently squeeze the bulb fluid into a measuring cup. In a measuring cup, insert the day, time, and volume from the chart. Discard the liquid in the measuring cup in a sink or toilet. Precaution: Never remove the drain tubing from the bulb.

Making a low-pressure bulb pressurized negatively: First, use an alcohol swab to clean the port aperture. The bulb should next be carefully squeezed by hand to flatten it as much as possible. Plug the stopper as far as you can into an emptying port with a flattened bulb. Check to see if the bulb is flat before releasing it. As the fluid fills the bulb, it slowly enlarges. The bulb's constant suction forces accumulated fluid out of the body. To improve drainage, attach a plastic tag to the bulb so that it is below where the drain is inserted .

High-Pressure Reservoir Changing: cleaning using hand sanitizer or soap and water before starting to change the bottle. Make that the compressed nozzle and clamp are present on the new high-pressure bottle. Lock the bottle's two clamps. that will be taken out. To separate from the bottle's tube, remove the area surrounding the connection and an alcohol swab and unscrew it. Apply a fresh alcohol swab to the tube connector to clean it. Without touching the connector, attach the replacement bottle. Finally, let go of the new bottle's two clamps. The drain is kept ideally at the same hour every day, on a flat surface for measurement. Observe the fluid reading at eye level while drawing a line on a white label to indicate the measurement date. Record the quantity of drainage on the provided chart .

Treatment of the Site of Drain Insertion: A tiny degree of swelling and discomfort at the drain insertion site persisted for a few days. is typical. In most circumstances, 48 hours after surgery, the patient can take a shower. Allow the shower's soapy water to drip down the drain. Following skin cleansing region, pat it dry and give it some time to dry. If you are unable to take a shower, at least once every day, clean with soap and water, clean the drain location. Cleaning the drain insertion site should come after performing hand hygiene with soap and water. .

Daily dressing changes are made at the insertion site. Typically, the dressing is taken off before to taking a shower, and thereafter, infection symptoms are examined. A fresh dressing is then put on. The standard way of the drain site covered with tape and a folded piece of gauze. It down over the drain site, another folded piece of gauze is put and taped down.

Look for symptoms of infection such as pain, swelling that worsens, pus discharge, offen-

sive discharge, or systemic signs like fever at the place where the drain was inserted. Inform the surgeon if any of the symptoms are present.

Drain removal: It is standard procedure to check removing the drain when it falls below 30 ml/day and checking the drainage every 24 hours. for two days in a row (16). Perform a last milking process to look for any leftover collections before cutting the suture. Holding the catheter is a suture in place is cut, and the tube is then clamped. Any clots that are still clinging to the catheter's perforated end are carefully removed when it is progressively taken out.

Dressing Following Removing drain: piece of the gauze placed over the skin gaping wound where ,There was a drain, and taped in place. After 24 hours, the dressing can be taken off, and the patient is free to request a shower. The additional dressing is typically not recommended; instead, a week's worth of twice-daily applications of an antibiotic ointment may be provided .

Redivac

Interventions

We used absorbable suture (vicryl) for suturing the uterus and anterior abdominal wall and non-absorbable (prolyn) material for suturing skin in all cases. Prophylactic negative pressure wound therapy was done for patients in Group A by Redivac (EGY VAC) and standard wound dressing was done for patients in Group B.

Management

All cases had Prophylactic broad-spectrum antibiotic within 30 minutes to 60 minutes preoperative. Prophylactic NPWT was placed for patients in group A before skin closure and was removed on postoperative after 7 to10 days. Standard wound dressing was placed for patients in group B after skin closure and was removed within 24 – 48 hours.

Follow up and Outcomes

Fever, chills, hot to touch, redness, pain or sore to touch, pus or discharge, bad smell coming from the wound were examined for surgical site infection. The primary outcome was the surgical site infection rate after 2 weeks of delivery. Surgical site infection was defined as presence of 3 or more of the following signs, fever, chills, hot touch, redness, pain or sore to touch, pus or discharge, bad smell coming from the wound, seroma, and hematoma. The secondary outcomes included endometritis rate, sepsis rate, urinary tract infection, mastitis rate, adverse events: skin blistering, erythema, wound bleeding

Sample size

Sample size calculation was based on incidence of wound complications between prophylactic negative pressure wound therapy vs standard wound dressing on surgical-site infection in obese women after cesarean delivery retrieved from previous research. Using G power program version3.1.9.4 to calculate sample size based on expected difference of 17%, using 2-tailed test, α error =0.05 and power = 80.0%, the total calculated sample size will be 65 in each group.

Statistical analysis

Data were analyzed using SPSS (statistical package for social sciences) version 22. Qualitative data will be presented as number and percent, Quantitative data will be tested for normality by Kolmogorov-Smirnov test then described as mean and standard deviation for normally distributed data and median and range for non-normally distributed. The appropriate statistical test was applied according to data type with the following suggested tests, Chi-square for categorical variable, Student t test and Mann Whitney U test for continuous variables.

Ethical Consideration

The research approval of the study was obtained from IRB of Faculty of Medicine at Mansoura University before starting the study. The researcher clarified the objective and aim of the study to the subjects included in the study. We maintained anonymity and confidentiality of the subject's data. Subjects were informed that they allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time without giving any reasons. Ethics, values, culture and beliefs of subjects were respected. A written consent was taken from every case included in this study.

RESULTS

The present study was open labeled RCT that was conducted on 130 age matched groups (65 allocated randomly to group A for NPWT) and (65 allocated randomly to group B for traditional wound dressing on SSI) (Fig. 1). Table (1) demonstrates no significant difference between studied groups concerning age, body, ass index, obesity grade, residence, occupation, incidence of bad habits, obstetric history including gravidity, parity, full term normal delivery, cesarean, preterm labor, history of abortion, complications or medical, surgical history.

Table (2) illustrates no significant difference between studied groups as regards hemoglobin level and hematocrit level pre-intervention and post-intervention. But in hemoglobin level, for group A, there was a statistically significant decrease from 11.10±1.34 gm/dl pre-intervention to 10.56±1.25 post-intervention ($p<0.001$). For group B there was a statistically significant increase from 11.03±1.09 gm/dl pre-intervention to 11.30±1.01 post-intervention ($p<0.001$), and in hematocrit level for group A, there was a statistically significant decrease from 33.30±4.02 pre-intervention to 31.65±3.76 post-intervention ($p<0.001$), for group B, there was a statistically significant decrease from 33.11±3.28 pre-intervention to 30.91±3.01 post-intervention ($p<0.001$).

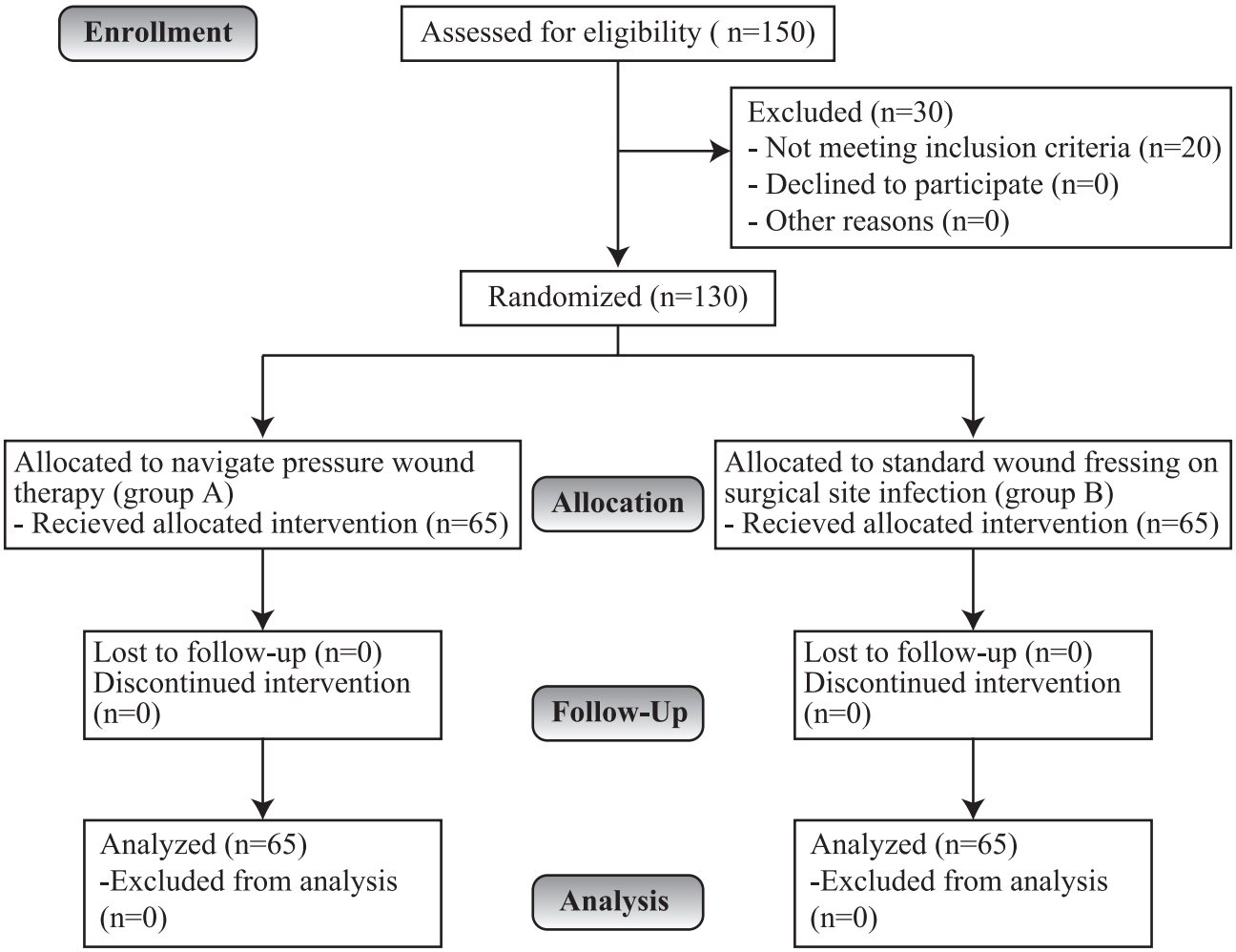

Figure (1): Consort flow chart showing study design
Group a: were treated by negative pressure wound therapy
Group b : treated by standard wound dressing on surgical site infection.

Table (1): Comparison of demographic characters, obstetric, medical and surgical history among studied groups

	Group A N=65	Group B N=65	Test of significance
Age / years Mean ±SD	27.28±6.01	27.06±5.93	t=0.206 p=0.837
BMI (kg/m^2) Mean±SD	38.53±5.68	38.42±5.72	t=0.103 p=0.918
Obesity Class I Class II Class III	 19(29.2) 21(32.3) 25(38.5)	 21(32.3) 21(32.3) 23(35.4)	X^2=0.183 P=0.912
Residence Urban Rural	 13(20.0) 52(80.0)	 15(23.1) 50(76.9)	X^2=0.182 P=0.670
Occupation Housewife	65(100)	65(100)	P=1.0

Gravidity Median (min-max)	3.0(1.0-6.0)	3.0(1.0-8.0)	Z=0.021 p=0.983
Parity Median (min-max)	2.0(0.0-5.0)	2.0(0.0-7.0)	Z=0.155 p=0.877
FTN No 1 2	 62(95.4) 1(1.5) 2(3.1)	 63(96.9) 1(1.5) 1(1.5)	 MC=0.341 P=0.843
CS No Yes	 19(29.2) 46(70.8)	 14(21.5) 51(78.5)	X^2=1.02 P=0.313
Caesarean number Median (min-max)	2(1-4)	2(1-5)	Z=0.705 P=0.481
Preterm labour	1(1.5)	2(3.1)	FET=0.341 P=1.0
Abortion	20(30.8)	24(36.9)	X^2=0.549 P=0.458
Abortion number Median (min-max)	1(1-3)	1(1-3)	Z=0.362 P=0.717
Last labour Free	64(98.5)	65(100.0)	P=1.0
Previous puperia	0	0	
Complications	0	0	
Medical history	0	0	
Surgical history	6(9.2)	9(13.8)	X^2=0.678 P=0.410

t: Student t test, Z; Mann Whitney U test, FET: Fisher exact test, X^2=Chi-Square test, FTN: full term normal delivery, CS: cesarean section
Group a: were treated by negative pressure wound therapy
Group b : treated by standard wound dressing on surgical site infection.

Table (2): Comparison of hemoglobin and hematocrite values between studied groups

		Group A N=65	Group B N=65	Test of significance
HB (gm/dl)	Pre	11.10±1.34	11.03±1.09	t=0.308 p=0.759
	Post	10.56±1.25	11.30±1.01	t=0.308 p=0.759
Paired t test		P<0.001*	P<0.001*	
HCT	Pre	33.30±4.02	33.11±3.28	t=1.28 p=0.201
	Post	31.65±3.76	30.91±3.01	t=1.24 p=0.217
Paired t test		P<0.001*	P<0.001*	

t: Student t test, *statistically significant
Group a: were treated by negative pressure wound therapy
Group b : treated by standard wound dressing on surgical site infection.

Table (3) shows clinical presentation of the studied groups. There was a significant difference in week 2 between studied groups (p=0.04), higher mean temperature after 2 weeks was detected in group B compared to group A, while there was no statistically significant difference was detected in temperature between group A& B in week1 (p=0.054.) As regard change within group; there was statistically significant decrease in temperature from 37.57±0.98 to 37.26±0.46 for group A (P=0.02) and from 37.91±1.02 to 37.43±0.51 for group B (P=0.001). There was no significant difference about Hot to touch between group A& B in week1 (p=0.856) and also no statistically significant difference was detected in week 2 between studied groups (p=1.0). At one week; 38.5% of group A and 36.9% of group B report that there is hot to touch that demonstrates statistically significant decrease after 2 weeks (all cases in group A & B don't have hot to touch lesions). There was a statistically significant difference detected in redness in week 2 between studied groups (p=0.015), while there was no statistically significant difference was detected in redness between group A&B in week1 (p=0.720). As regards change within group; there was statistically significant decrease in incidence from 38.5% to 3.1% for group A (P=0.001) and from 41.5% to 15.4% for group B (P=0.002).

Table (4) demonstrates a significant difference between the studied groups concerning SSI rate after 2 weeks with higher rate among group B than group A. for Group B ; there was a significant decrease in SSI rate from 49.2% at 1st week to 12.3% after 2 weeks. However, there was no statistically significant change in SSI rate among group 2 between 1 & 2 week follow up (p=0.724).

Table (3): Comparison of clinical presentations rate sign between studied groups and during follow up.

		Group A N=65	Group B N=65	Test of significance ##
Temperature	Week 1	37.57±0.98	37.91±1.02	t=1.95, p=0.054
	Week 2	37.26±0.46	37.43±0.51	t=1.99, p=0.04*
#		P=0.02*	P=0.001*	
Hot to touch	Week 1	25(38.5)	24(36.9)	X^2=0.03, P=0.856
	Week 2	0	0	P=1.0
#		P<0.001*	P<0.001*	
Redness	Week 1	25(38.5)	27(41.5)	X^2=0.128, P=0.720
	Week 2	2(3.1)	10(15.4)	X^2=5.88, P=0.015*
Test of significance#		0.001*	0.002*	
Painful sore to touch	Week 1	23(35.4)	26(40.0)	X^2=0.295, P=0.587
	Week 2	10(15.4)	20(30.8)	X^2=4.33, P=0.037*
#		0.001*	0.289	
Pus	Week 1	11(16.9)	9(13.8)	X^2=0.236, P=0.627
	Week 2	6(9.2)	15(23.1)	X^2=4.60, P=0.03*
#		0.225	0.06	
Bad smell	Week 1	10(15.4)	8(12.3)	X^2=0.258, P=0.612
	Week 2	8(12.3)	18(27.7)	X^2=4.81, P=0.028*
Test of significance#		0.484	0.025*	

paired t test, MC Nemar test # Student t test, Chi-Square test *statistically significant
Group a: were treated by negative pressure wound therapy
Group b : treated by standard wound dressing on surgical site infection.

Table (4): Comparison of SSI rate between studied groups and during follow-up.

		Group A	Group	Test of significance
SSI rate >3 sign	Week 1	32(49.2)	26(40.0)	P=0.290
	Week 2	8(12.3)	24(36.9)	P=0.001*
P value #		<0.001*	0.724	

comparison between 1& 2 weeks
comparison between group a&b
Group a: were treated by negative pressure wound therapy
Group b : treated by standard wound dressing on surgical site infection..

DISCUSSION

This was open labeled RCT conducted on 130 obese pregnant females underwent cesarean section divided into 2 groups. Group A included 65 cases who had negative pressure wound therapy and group B included 65 cases who had traditional wound dressing on SSI. We aimed to assess the efficiency of prophylactic NPWT, initiated immediately after CD in lowering the incidence of SSIs compared with traditional wound dressing in obese females. The mean age of group A was 27.28 ± 6.01 years versus 27.06 ± 5.93 for group B (P=0.837). Mean body mass index is 38.53 ± 5.68 versus 38.42 ± 5.72 kg/m2 for group A & B, respectively (p=0.918). There was no significant difference between both groups concerning demographic data, gravidity, parity, previous abortion , caesarean section and other surgical history p value > 0.05. Which is consistent with Tuuli et al., [9] found that both groups were comparable regarding baseline data.

There was insignificant difference between the studied groups concerning hemoglobin and hematocrit level pre-intervention (p=0.75, p=0.201) and post-intervention (p=0.759, p=0.217). Hemoglobin level, for group A; statistically significant decrease in Hb level from 11.10±1.34 gm/dl pre-intervention to 10.56±1.25 post-intervention (p<0.001). For group B; statistically significant increase in Hb level from 11.03±1.09 gm/dl pre-intervention to 11.30±1.01 post-intervention (p<0.001). Also, as regard hematocrit level for group A; statistically significant decrease was found in hematocrit level from 33.30±4.02 pre-intervention to 31.65±3.76 post-intervention (p<0.001). In terms of group B, a significant reduction was found in hematocrit level from 33.11±3.28 pre-intervention to 30.91±3.01 post-intervention (p<0.001).

Regarding post-operative complications, we found that no statistically significant differences were detected between group A& B in temperature, wound hotness, redness, painful sore, pus discharge and bad smell in week1 (p>0.05), while there was statistically significant difference was detected in week 2 between studied groups regarding temperature, hotness, redness, painful sores, bad smell and pus discharge, as group A had significant better outcome after 2 weeks post operative p value< 0.05. Which is agreed by Tuuli et al., [9] who found that frequency of composite of SSI and wound adverse events, didn't significantly vary between both groups (P>0.05). In the same line, individual components didn't reveal any significant difference. Adverse skin reactions were rare, and all happened in the prophylactic NPWT group. Pain score (zero - ten) was significantly decreased by using prophylactic NPWT (P=0.02).

This was in disagreement with Ruhstaller et al., [10] who demonstrated that the composite wound outcome was decreased in the NPWT group (4.9 vs. 6.9%), however such decrease didn't reach statistical significance (p>0.05). Pain scores, length of hospital admission, and records of wound concerns at the week 2 calls were comparable among females receiving traditional WC and NPWT.

However, Tuuli et al., [11] demonstrated that

the risk of adverse skin reactions was significantly increased in the NPWT group compared to the traditional dressing group (56 occasions versus five occasions (P<0.001)). The incidence of individual consequences such as blisters, haemorrhage, erythema, and different skin reactions was significantly increased in the NPWT group.

There was a significant decrease in painful sore and wound redness incidence for group A (P=0.001). Which is in the same line with Gillespie et al., [12] who recorded that all kinds of SSI favored closed incision NPWT therapy, there were nearly significant differences concerning wound pain , surgical wound dehiscence (SWD), seroma and SSIs (P= 0.06), and found that 75 (7.4%) women managed with closed incision NPWT and in 99 (9.7%) females with a traditional dressing (risk ratio (RR) 0.76, P=0.06). In addition, Tuuli et al., [11] demonstrated an insignificant difference concerning the risk of SSI following CD with prophylactic NPWT (3.6%) versus traditional wound dressing (3.4%).

Hyldig et al., [13] found that SSI happened in twenty (4.6%) cases managed with incisional NPWT and in 41 (9.2%) cases managed with a traditional dressing (P = 0.007). Such an effect was still significant after adjusting BMI and the possible predisposing factors. Incisional NPWT significantly decreased wound exudate, while no difference was demonstrated for SWD or life quality between both groups. Also Kawakita et al., [14] found that the rates of the primary outcome in the unmatched cohort were comparable between cases receiving NPWT and cases receiving traditional dressings (p=0.44). The rate of primary outcome was still comparable between females receiving NPWT and those receiving traditional dressings following matching (p=1.0).

Another study conducted by Yu et al., [3] recorded that the SSI risk was significantly decreased with the usage of prophylactic NPWT compared to traditional wound dressing. IN terms of secondary outcomes, composite wound complications were accompanied by a significant decrease in cases receiving prophylactic NPWT compared to traditional dressing.

Another study conducted by Guo et al., [15] reported that the utilization of NPWT diminished SSI (RR=0.76, P=0.004). There was insignificant difference in the incidence of wound complications (RR=0.9, P >0.05), seroma (RR=1.1, P=0.7), haematoma (RR=0.6, P=0.3) and hospital readmission (RR=1.4, P>0.05). In addition, NPWT significantly increased the development of skin blisters with a RR of 4.6 (P<0.5). Utilization of prophylactic NPWT after CD among overweight females is accompanied by a significant drop of SSI.

Also, Groenen et al., [16] investigated incisional NPWT for SSI prevention and demonstrated high evidence for the considerable advantage of NPWT over traditional dressings in terms of SSI prevention. Also, Tian et al., [17] found that NPWT caused a reduction in SSI rate compared to traditional dressing. The infection rate following a low transverse incision was lower compared to the NPWT group with the traditional dressing group. Both groups demonstrated an insignificant difference concerning blister development.

CONCLUSION

Our study concluded that the use of NPWT decreases the rate of SSI two weeks after delivery in obese women delivered by CS compared with traditional wound therapy.

Conflict of interest: The investigators declare no conflict of interest.

Sources of funding: The current study didn't receive any specialized grant from funding agencies.

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