Benha Journal of Applied Sciences (BJAS) **print: ISSN 2356–9751**
Vol. (7) Issue (3) (2022), (123-127) **online: ISSN 2356–976x**
http://bjas.journals.ekb.eg

Comparative study between subcutaneous drainage system versus tissue re-approximation alone in obese females undergoing caesarean section

E.M.Nowar, A.Y.Rezk, A.A.Negm and A.S.Saad
Obstetrics and gynecology, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt
E-Mail: monnabeky1993@gmail.com

Abstract

Obesity is a nightmare for any surgeon who wants to avoid many difficulties and numerous dangers in his profession, especially for obstetricians, who face a wide range of unfavourable pregnancy outcomes in obese moms.. Subcutaneous tissue re-approximation alone or in conjunction with subcutaneous drain placement was the focus of this research in obese women scheduled for an elective caesarean birth to see which was more effective. Methods: Women with a BMI of more than 25 who had an elective caesarean delivery were randomised to either'subcutaneous tissue re-approximation alone' (200 women) or a combination of subcutaneous draining and re-approximation (200 women) (200 women). Each of the following conditions had to be met in order to be included in the study: BMI > 25, haemoglobin 10 gm/dl, Pfannenstiel incision, elective caesarean birth. Investigations carried out at the laboratory (CBC, LFT, KFT and bleeding profile). 200 patients in group I and 200 patients in group II were involved in this trial; both groups had subcutaneous tissue re-approximation and a subcutaneous drain as their treatment. In terms of age, body mass index (BMI), blood pressure, heart disease, subcutaneous tissue thickness, pre- and postoperative haemoglobin and infection, no variations were found between the two groups. However, in group II, the rate of hematoma and length of hospital stay were both considerably greater. Dehiscence and seroma were also more common in group I than group II. Conclusion: This research shows that obese women having caesarean section do not benefit from the preventive use of a subcutaneous drain in addition to a normal subcutaneous tissue re-approximation procedure.

Keywords: subcutaneous drainage system, tissue re-approximation, caesarean section, obesity**.**

1. Introduction

Pregnant women who are obese are more likely to have caesarean sections and surgery site infections. Despite precautions, surgical site infection develops in around 10% of obese caesarean section patients (e.g. antibiotics). Obesity-related inflammation and the resulting vascular dysfunction that occurs from it both contribute to the local hypoxic response. Surgical site infection is more likely to occur in patients with hypoxia, which inhibits the oxidative death of bacteria (2).

Obesity is a serious health issue that affects a wide range of organ functions and operations, including wound healing, including infection, seromas, dehiscence, and hematoma, especially after a caesarean section (1).

Reduce postoperative problems by reducing operating time, using antibiotics throughout the procedure, irrigating the surgical site and making sure there is no dead space, among other things (1).

Wound complications may have catastrophic consequences, necessitating many reoperations and a high mortality rate rather than being a minor problem that merely need antibiotics and local wound therapy (3).

Closure of the subcutaneous tissue could potentially lower the risk of problems, not only by reducing stress on tissues, but also by limiting probable dead space for seroma and blood sucking and reducing the incidence of post-operative wound complications (1).

Despite the fact that caesarean sections are the most frequent obstetrical surgical surgery, there are no set standards for the optimal skin closure procedures and materials. Only a few comparison research on various skin closure procedures have been undertaken, and the findings have been inconsistent (5).

An elective caesarean birth in an obese woman was the subject of this research, which aimed to find out whether or not subcutaneous tissue re-approximation, in conjunction with the placement of a subcutaneous drain, improved outcomes.

2. Patients and methods

This prospective randomized clinical trial study was done in Obstetrics and Gynaecology Department at Benha University Hospitals on four hundred obese women undergoing elective CS delivery; divided into two groups; 200 cases in group 1 (tissue reapproximation alone) and 200 cases in group 2 (tissue reapproximation with subcutaneous drain insertion).

All obese women undergoing caesarean delivery operation, with the following criteria were included:

- Pfannenstiel incision.
- Body mass index (BMI)> 25.
- Hemoglobin level 10 gm/dl or more.
- Elective caesarean delivery.
- Normal laboratory investigations (CBC, LFT, KFT and bleeding profile).

Exclusion criteria:

- Emergency laparotomy.
- Associated morbidities as HTN and DM .
- Patient with autoimmune disorders e.g. Systemic lupus erythematosis and rheumatoid arthritis.
- Associated mistake e.g. anesthesia allergy, shock or surgical injury.

For each participant, a signed consent for approval was obtained after an explanation of the study and the type of surgery. To rule out any related conditions, all patients underwent a full clinical examination and laboratory investigations, including a CBC, random blood sugar, PT, PTT, INR, SGOT, SGPT, serum

creatinine, and urine analysis, all according to a defined research procedure.

Surgical technique:

We kept track of every single participant who was operated under general or spinal anaesthesia, as well as the prophylactic antibiotics that were administered. The skin was incised with a pfannestiel abdominal incision in all operations recruited for this study, while the subcutaneous tissue and rectus sheath were incised with a diathermy pen electrode set to cutting. The parietal peritoneum was pierced. In both groups, coagulation diathermy was used to perform hemostasis, and the big subcutaneous vein was sutured and ligated.

In 1st group (closure in layers), subcutaneous tissue was sutured by interrupted suture with absorbable buried vicryl (2-0) round needle **(1).**

In 2nd group, before suture, the drain was placed exiting the wound via a separate stab site lateral to the skin incision and the subcutaneous space was thoroughly irrigated, then the suture was closed; the drain is secured with a single prolene suture (2\0) straight cutting needle **(1).**

The type of the drain used in this study was sterile Nelton tube sized 6.7 mm in diameter (yellow color, size 20FG, made in Egypt) connected with sterile collection bag.

This study was divided into two groups according to:

- 200 patients who have subcutaneous tissue re-approximation alone.
- 200 patients who have subcutaneous tissue re-approximation in combination with subcutaneous drain.

All patients were followed :

- To check proper wound covering and content of collecting bag connected to the drain during 1st and 2nd day of operation .
- To remove wound covering, assess wound healing or presence of any complications and remove the drain one week after operation .
- To asses recovery of complicated cases one month after operation .

The two groups were compared regarding these items:

- Wound infection, wound dehiscence, seroma, hematoma and abscess.
- Post-operative hospital stays (days).
- Pre-and post-operative haemoglobin level (gm/dl).

Statistical analysis

Data management and statistical analysis were done using SPSS version 25. (IBM, Armonk, New York, United States). Quantitative data were assessed for normality using Kolmogorov–Smirnov test and direct data visualization methods. According to normality, numerical data were summarized as means and standard deviations or medians and ranges. Categorical data were summarized as numbers and percentages. Quantitative data were compared between study groups using independent t-test or Mann-Whitney U test for normally and non-normally distributed numerical variables, respectively. Categorical data were compared using the Chi-square test. All statistical tests were two-sided. P values less than 0.05 were considered significant.

3. Results

This study was conducted at Obstetrics and Gynecology department at Benha University Hospital on obese women undergoing elective cesarean section delivery.No significant difference was noted between both groups regarding age (P-value = 0.06), BMI (P-value = 0.649), diabetes, hypertension, heart disease, and subcutaneous tissue thickness (P-value = 0.207) ***(Table 1).***

Table (1) General characteristics in both groups.

		Group I (n = 200)	**Group II (n = 200)**	**P-value**
Age (years)	Mean ±SD	25 ±4	25 ±3	0.06
Body mass index	Mean ±SD	35.5 ±2.7	35.7 ±2.6	0.649
Diabetes mellitus	n (%)	0 (0.0)	0 (0.0)	-
Hypertension	n (%)	0 (0.0)	0 (0.0)	-
Heart disease	n (%)	0 (0.0)	0 (0.0)	-
Subcutaneous tissue thickness	Mean ±SD	7.1 ±1.9	6.9 ±1.9	0.207

Independent t-test was used for numerical data. Chi-square test was used for categorical data

No significant difference was observed between

Table (2) Pre & post-operative hemoglobin in both groups.

Hemoglobin		**Group I (n = 200)**	**Group II (n = 200)**	**P-value**
Pre-operative (g/dl)	Mean ±SD	10.8 ±0.6	10.9 ±0.6	0.662
Post-operative (g/dl)	Mean ±SD	10.1 ±0.6	10.1 ±0.6	0.302

both groups regarding pre and post-operative hemoglobin (P-values = 0.662 and 0.302, respectively) ***(Table 2).***

Independent t-test as used

Hematoma was significantly higher in group II (8.5%) than group I (3.5%) (P-value = 0.035) ***(figure1).***

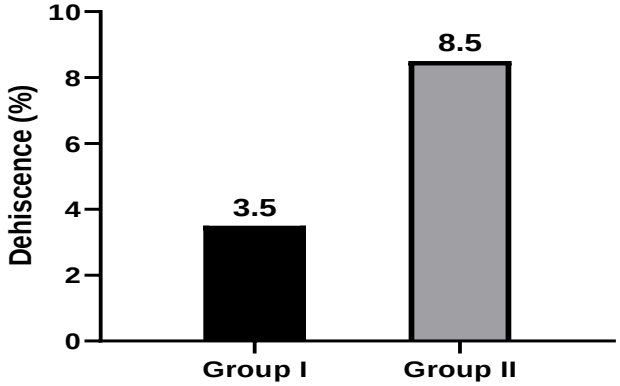

Fig. (1) Post-operative hematoma in both groups.

Infection showed no significant difference between both groups (P-value = 0.062) ***(Table 3).***

Table (3) Post-operative infection in both groups.

		Group I (n = 200)	Group II (n = 200)	P-value
Infection	n (%)	50 (25.0)	67 (33.5)	0.062

Chi-square test was used

Dehiscence was significantly higher in group I (7.5%) than group II (0.0%) (P-value < 0.001) ***(figure 2).***

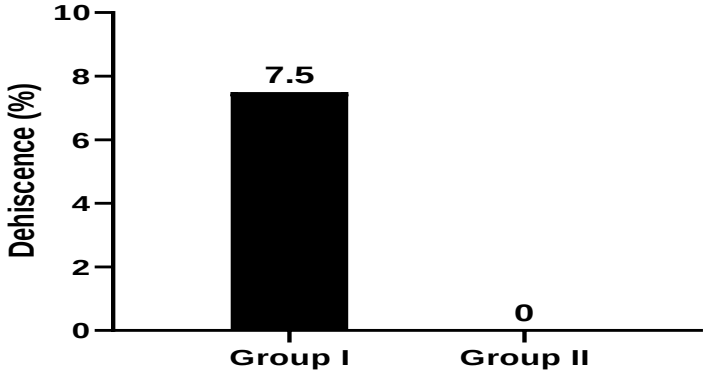

Fig. (2) Post-operative dehiscence in both groups.

Seroma was significantly higher in group I (8.5%) than group II (3.0%). P-value = 0.018 ***(figure 3).***

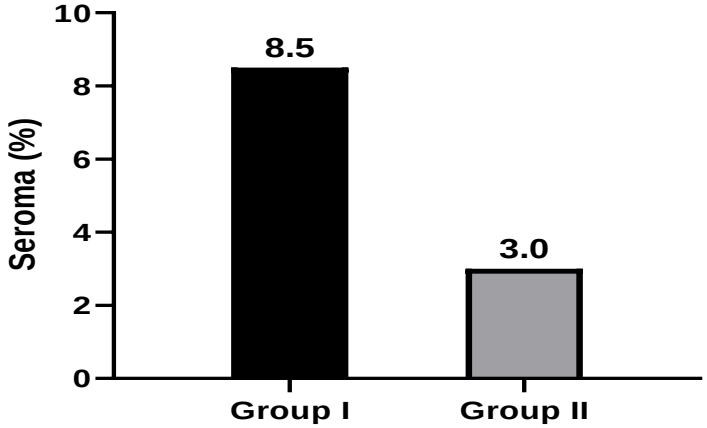

Fig. (3) Post-operative seroma in both groups.

The range of hospital stay was significantly wider in group II (1-6) than group I (1-3) (P-value = 0.038) ***(figure 4).***

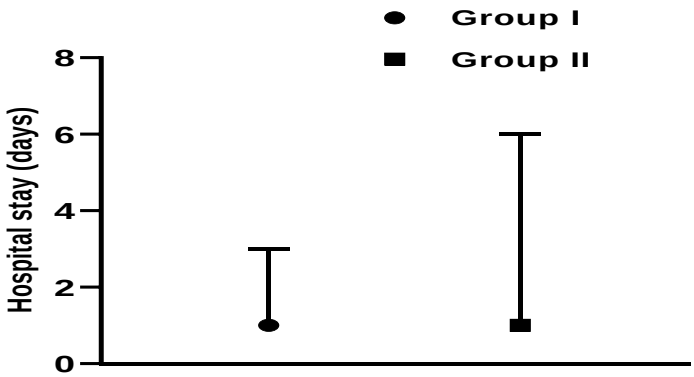

Fig. (4) Post-operative length of hospital stay in both groups.

4. Discussion

Morbidity increases and hospital stay lengths rise due to post-C-section wound problems. Even if appropriate surgical technique is strictly followed, these issues might arise. It is crucial to limit the use of cauterization and adhere to aseptic technique and proper skin preparation in order to avoid wound complications; nevertheless, these precautions are not sufficient on their own. Wound disruption may be further reduced in women with at least 2.5cm of subcutaneous fat by using subcutaneous suture (6).

Group II had an 8.5% hematoma rate compared to 3.5% in group I (P-value = 0.035). Hematoma was identified in 3.5 percent of patients by Ibrahim et al.(1). Subcutaneous drain patients experienced six fewer cases of necrotizing fasciitis than those without a subcutaneous drain (8 patients).

Both groups were infected at the same rate (P-value = 0.062). Another study indicated that patients without subcutaneous drains had a lower incidence of "abscess development" (12 patients) compared to those with subcutaneous drains (14), although the difference was statistically insignificant..

While Chelmow et al. (2007) verified the advantages of subcutaneous suture closure in women with 2 cm or more of subcutaneous tissue thickness, they also showed that when compared to women with unclosed wounds, subcutaneous suture closure significantly reduced wound disruption and seroma. To further reduce any dead space, subcutaneous drainage may be able to help remove any remaining fluid or blood from the incision that might serve as an ideal environment for the development of germs. Subcutaneous tissue closure was observed to reduce hematomas, seromas, wound infections, and wound disruptions by 1.6 percent, 8.5 percent, and 7.1% respectively in the absence of subcutaneous tissue closure.

(P-value 0.001), the rate of dehiscence in group I was substantially greater than in group II (7.5 percent). Despite this, Ibrahim et al.(1) observed that the wound dehiscence rate was the same in both groups of patients, with no statistically significant difference.

P-value = 0.018 indicates that group I had a substantially greater seroma rate than group II (3.0 percent). It was also shown that subcutaneous tissue approximation or a subcutaneous drain was more effective in obese individuals with BMI more than 30 kegs/m2 and subcutaneous fat thickness greater than 2.5 cm to minimise wound complications such as seroma, hematoma, or infection. In both groups, factors of postoperative wound complications are compared, and seroma has a significantly larger presence in group A [subcutaneous stitches]. Seroma was discovered in 9.5 percent of patients by Ibrahim et al.(1)

Obese individuals, in general, have a higher risk of complications and a longer postoperative stay than non-obese patients (11). Group II (1-6) had a considerably greater range of hospital stays than Group I (1-3) (P-value = 0.038). Ibrahim et al.(1) also showed that patients with subcutaneous drains spent more time in the hospital after surgery than those without subcutaneous drains (p- value 0.040). An increase in nosocomial infections, including site infection, expensive inpatient stays, and delayed treatment, was identified by Mulu et al. (9).

Gates and Anderson(10) conducted a meta-analysis of studies in the Cochrane Library to determine the impact of caesarean wound drainage. A total of 5,248 women were involved in the 10 studies that made up the bulk of the review. The meta-analysis found no indication that women who had wound drains had a higher risk of infection, other wound issues, or discomfort than those who did not. A subcutaneous drain may increase the risk of wound infection compared to a subsheat drain in one study. The findings of the three studies comparing subcutaneous drainage with subcutaneous suture were indistinguishable.

There was a study done on wound healing in obese people, by the researchers Kosins and colleagues(11). In breast biopsies and axillary node dissections, prophylactic subcutaneous drainage was statistically significant only for preventing hematoma development and avoiding seroma formation. However Drainage was not shown to be beneficial in any other operation, including caesarean section in obese individuals. Indicating that caesarean sections may be performed safely without the need for prophylactic surgical drainage. Ob-gyns may thus feel confident in not doing post-Cesarean drainage. Additionally, surgeons are not compelled to install surgical drains in obese patients beforehand. There are several variables that go into the decision to insert a surgical drain after an operation.

According to Aziz Khalifa et al. (12), regular subcutaneous drain placement after caesarean delivery in obese diabetic women was effective. This research comprised obese and diabetic pregnant women who were admitted to the hospital for caesarean sections. One group was made up of women who had a subcutaneous drain still in place after the skin was closed, while the other was made up of those with no subcutaneous drain at all. For superficial SSI, wound disintegration, and post-operative fever, there was no significant difference between the two groups tested. When it came to wound seroma and post-operative discomfort, there was a substantial difference between group I (the drain group) and group II (the no drain group). Reduced rates of wound seroma and post-operative discomfort are linked to routine subcutaneous drainage after caesarean section in obese diabetic women.

Following caesarean delivery, Fahmi et al. (13), investigated whether regular use of subcutaneous drains might minimise wound complications (CS). Subcutaneous draining for thin women who have CS can only minimise seroma, postoperative discomfort, and the requirement for redressing if done routinely, researchers observed. However, other wound problems, such as infection and postoperative fever, were unaffected.

It was discovered by Najam et al.(8) that the use of a subcutaneous drain lowers postoperative discomfort and wound seroma development in obese females after caesarean section abdominal incisions whose subcutaneous layer thickness is 2.5cms or more. Other complications, such as post-operative fever, superficial wound disintegration, and surgical site infection (SSI), were unaffected. Almost the same amount of women were affected by each of these illnesses.

5. Conclusion

According to the results of this research, reducing wound complications in obese women having caesarean sections by employing a subcutaneous drain in conjunction with the standard subcutaneous tissue re-approximation is unsuccessful. After a surgical operation, the surgeon's choice on whether or not to insert a subcutaneous tissue drain is influenced by a number of variables. Subcutaneous drain prophylaxis in caesarean section needs a bigger, conclusive study to determine its therapeutic value.

Sources of funding

There was no specific grant from a government, commercial, or non-profit funding organisation for this research.

Conflicts of interest

There are no conflicts of interest.

References

[1] SA.Ibrahim, MM.Abdalla, RM.Elshafei , Evaluation of subcutaneous drainage system versus tissue re-approximation alone using Pfannenstiel incision in obese females undergoing caesarean section, 2021.

[2] N.Hyldig, CA.Vinter, M.Kruse, O.Mogensen, C.Bille, JA.Sorensen, et al. Prophylactic incisional negative pressure wound therapy reduces the risk of surgical site infection after caesarean section in obese women: a pragmatic randomised clinical trial. BJOG An Int J Obstet Gynaecol.vol.126(5),pp.628–35,2019.

[3] N.Anfinan, KH.Sait, Appropriate Management of Subcutaneous Tissue of Midline Abdominal Incisions. Cureus.vol.12(1) ,2020.

[4] DLW.Dasanayake, AK.Jodhi, K.Roomadu, GKR.Saumya, Skin closure with Pfannenstiel incision in lower segment caesarean section; comparison of wound outcome with interrupted vs. subcuticular techniques. Gall Med J.vol.25(1),2020.

[5] PK.Saha, R.Bagga, B.Joshi, M.Rohilla, S.Gainder, P.Sikka, Wound complication among different skin closure techniques in the emergency cesarean section: a randomized control trial. Obstet Gynecol Sci.vol.63(1),pp.27–34,2020.

[6] T.Kawakita, HJ.Landy, Surgical site infections after cesarean delivery: epidemiology, prevention and treatment. Matern Heal Neonatol Perinatol.vol.3(1),pp.1–9,2017.

[7] D.Chelmow, EJ.Rodriguez, MM.Sabatini, Suture closure of subcutaneous fat and wound disruption after cesarean delivery: a meta-analysis. Obstet Gynecol.vol.103(5),pp.974–80,2004.

[8] R.Najam, D.Suman, S.Pandey, Subcutaneous Drain Versus Subcutaneous Suture Reapproximation: A Randomised comparative Study In Obese Patients Undergoing Cesarean Section. Asian J Med Res [Internet] .vol.7(2),pp.OG01–4,2018.

[9] W.Mulu, G.Kibru, G.Beyene, H.Damtie, Associated risk factors for postoperative nosocomial infections among patients admitted at Felege Hiwot Referral Hospital, Bahir Dar, Northwest Ethiopia. Clin Med Res.vol.2(6),pp.140–7,2013.

[10] S.Gates, ER.Anderson, Wound drainage for caesarean section. Cochrane Database Syst Rev.vol. (12),2013.

[11] AM.Kosins, T.Scholz, M.Cetinkaya, GRD.Evans, Evidence-based value of subcutaneous surgical wound drainage: the largest systematic review and meta-analysis. Plast Reconstr Surg.vol.132(2),pp.443–50,2013.

[12] AAA.Khalifa, KM.Abdelraza k, IA.Abdelazim, Routine subcutaneous drain versus no drain in cesarean section for diabetic obese women: a randomized controlled trial. Int J Curr Microbiol App Sci.vol.4(8),pp.479–85,2015.

[13] MM.Fahmi, HA.Hamza, IAS.El-Nasr, Khalaf MTAA-R. Routine subcutaneous drains versus no drains in repeated elective and emergent cesarean sections. Menoufia Med J.vol.31(1),pp.46,2018.