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Liposuction: Drains, Are They Adequate?

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Background: Seroma following liposuction (especially mega-sessions; more than 5 L) is a common complication that causes much distress to the surgeon and the patient. This will eventually affect the overall satisfaction and patient's experience regarding liposuction. If not detected promptly, seromas can impair the results.

Methods: This is a prospective analysis performed by the authors in a private practice. All our patients had mega-liposuction sessions (more than 5 L, range 8–12 L) using Power-assisted Liposuction with Lipomatic by Euromai and VASER. Tumescent infiltration was used. Fifty male patients participated after providing their informed consent. Their mean age was 35 years (range, 21–50) and mean body mass index was 29 (range, 28–33). Patients were divided into 2 groups. Group A consisted of 25 patients with no adjunctive draining procedures done, and group B consisted of 25 patients with drainage procedures done. Patients were followed up every other day for 3 weeks for detection of seroma.

Results: Seventeen patients had post-operative seroma: 13 in group A and 4 in group B. The volume of seromas was further subdivided into mild (<50 cc), moderate (50–100 cc), and severe (>100 cc).

Conclusions: High definition liposuction is a demanding procedure by both the surgeon and the patient to achieve the best results and contour. Drainage procedures and drains placement are truly effective methods for minimizing seroma formation, enhancing the recovery, and eventually improving the results. *(Plast Reconstr Surg Glob Open 2020;8:e2677; doi: 10.1097/GOX.0000000000002677; Published online 20 March 2020.)*

INTRODUCTION

Liposuction is one of the most common procedures performed worldwide. Seroma following liposuction (especially mega-sessions; more than 5 L) is a common complication that causes much distress to the surgeon and the patient. This will eventually affect the overall satisfaction and patient's experience regarding liposuction. If not detected promptly, seromas can impair the results.[1,2]

MATERIALS AND METHODS

High-definition liposuction on 50 male patients was done. Patient ages ranged from 24 to 50 with a mean age of 36 years. Body mass index (BMI) ranged from 28 to 33. Patients with BMI above 35 were referred for bariatric surgery or encouraged to lose more weight. The mean follow-up was 3 weeks (range, 2–4 weeks).

Exclusion criteria included patients with hemoglobin level less than 12 g/mL and medical/family history of coagulopathy. Patients with history of previous liposuction were also excluded (including redo and revision cases). The patients were divided into 2 groups: group A consisted of 25 patients who had no adjunctive draining procedures, and group B consisted of 25 patients with draining procedures added.

Patients were followed up every other day for 3 weeks for detection of seroma. Seroma was defined as any persistent collection (on 2 or more occasions) following the first week of liposuction.

All patients were operated on by the same group of surgeons using the same technique of sequential liposuction. On the day of surgery, preoperative photos were taken before and after planning with markers in different positions. Marking the patients was done as shown (Fig. 1).

The patient was transferred to the operating room where scrubbing was done while the patient was standing, then the patient was draped and laid flat on the operating table. Urine catheterization then followed to monitor fluid balance.

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Ethical approval for this project was obtained.

Patients provided informed consent.

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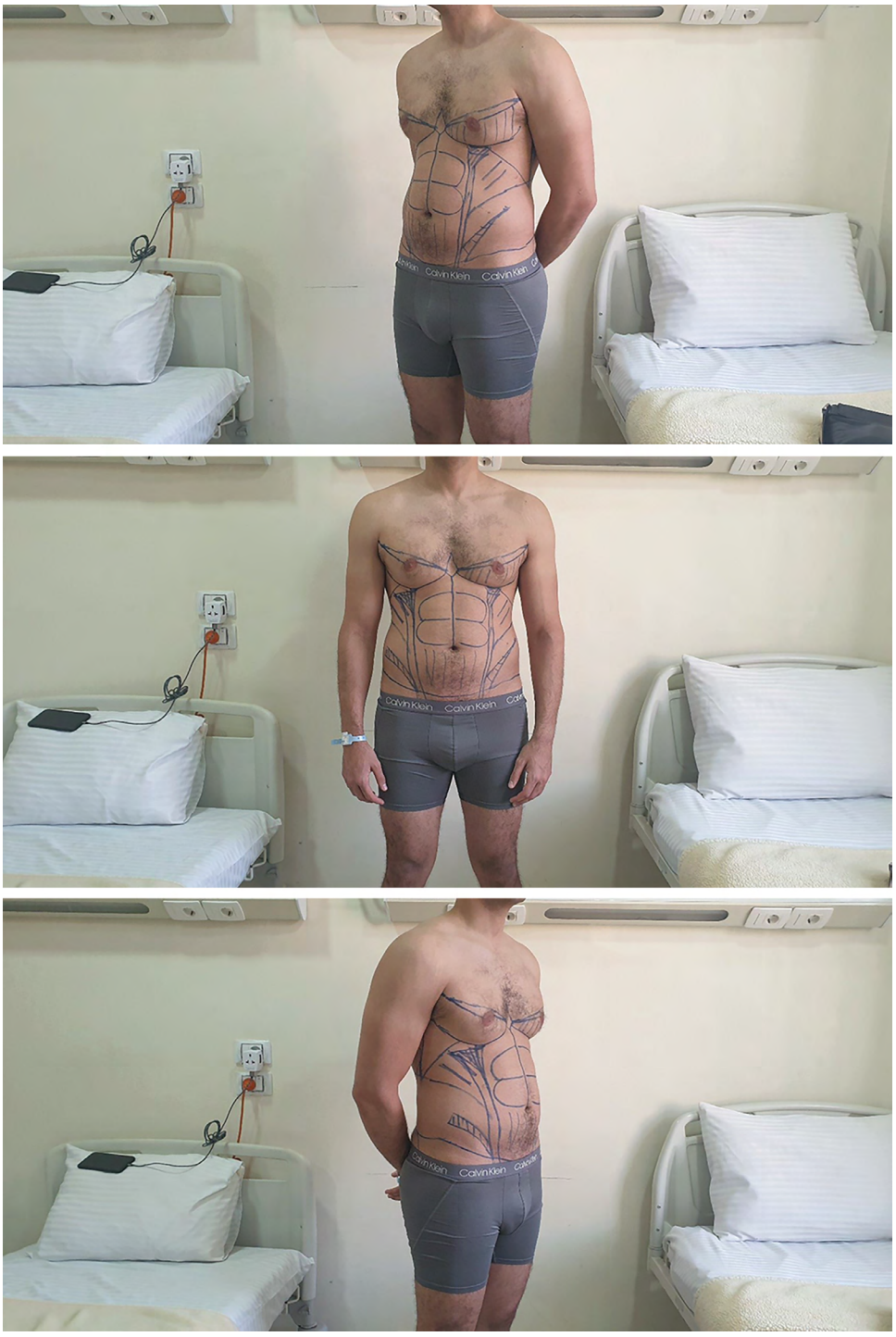

Fig. 1. Preoperative photographing of a 27-year-old male patient with a BMI of 28. Areas to be treated are waist, lower back, upper back, chest, and abdomen.

Anesthesia

- All of our procedures were done under local anesthesia plus intravenous sedation. The anesthesiologist starts the light sedation by using Precedex and Deprivan.
- Induction by using 2 mg Midazolam + 50 mg fentanyl.
- Maintaining by dexmedetomidine (*Precedex*) 1 mic/kg bolus over 15 min then IV infusion 0.2–1 microgram (mic)/kg/h.

The tumescence solution used was in the form 20 cc of 2% xylocaine and 1 mg of 1 mL epinephrine for each 1 L of normal saline.

When VASER is used, 70%, pulsed mode was used and applied immediately following infiltration. Special ports are used to guard against skin burns from the cannula. The cannula is applied in a different fanning manner while taking care not to become too superficial as not

to endanger the skin vascularity. The end point for the VASER is when the surgeon feels that all the septa were broken, there is no resistance, and flow of infiltrate from the port site is yellow. We call this the *fat soup*.

Liposuction was done using Power-assisted techniques using the Lipomatic by Euromai.

We started by the lateral position for liposuction of the waist, iliac, lateral chest, and back regions. This was followed by the other lateral side (where the same areas were treated).

Then, the patient was placed in supine position for liposuction of the abdomen, chest, and thigh (if planned). Finally, the patient was turned into prone position for completion of liposuction of the gluteal region, upper posterior thighs, and gluteal fat grafting, if needed.

The end point for aspiration was either 0.5 cm smooth skin pinch without any irregularities or bloody aspirate.

A silicone drain was placed in the inguinal region, one on each side and in the iliac region as well (Fig. 2). The drains were placed from the same sites used for liposuction. The remaining incisions sites were left open at the end of the procedure. This was crucial to help drainage and reduce seroma formation. Daily dressing with antibiotic cream containing fusidic acid was done around the drains. Sterile dressings were then placed over the drains to absorb the fluids and minimize soaking. Drains were removed after 1 week.

All patients were padded with cotton dressings and placed in a pressure garment on the operating table immediately after finishing the procedure.

One of the frequent challenges when performing liposuction is hypothermia, especially with large volumes of fluids being infiltrated.[3] This can be avoided/managed by the following simple steps:

1) Warm betadine solutions during draping and sterilization
2) Warm draping sheets/frequent removal of wet sheets
3) Warmer, plus AC is turned off
4) Warm infiltration/maintenance solutions
5) Rapid pressure garment application with a conscious patient

Patients were kept in the hospital overnight with close monitoring of the vital signs, urine output, signs of hypothermia, and xylocaine toxicity.

Postoperative Care

Post-operative care and management is crucial for the success of the procedure and maximizing our results.

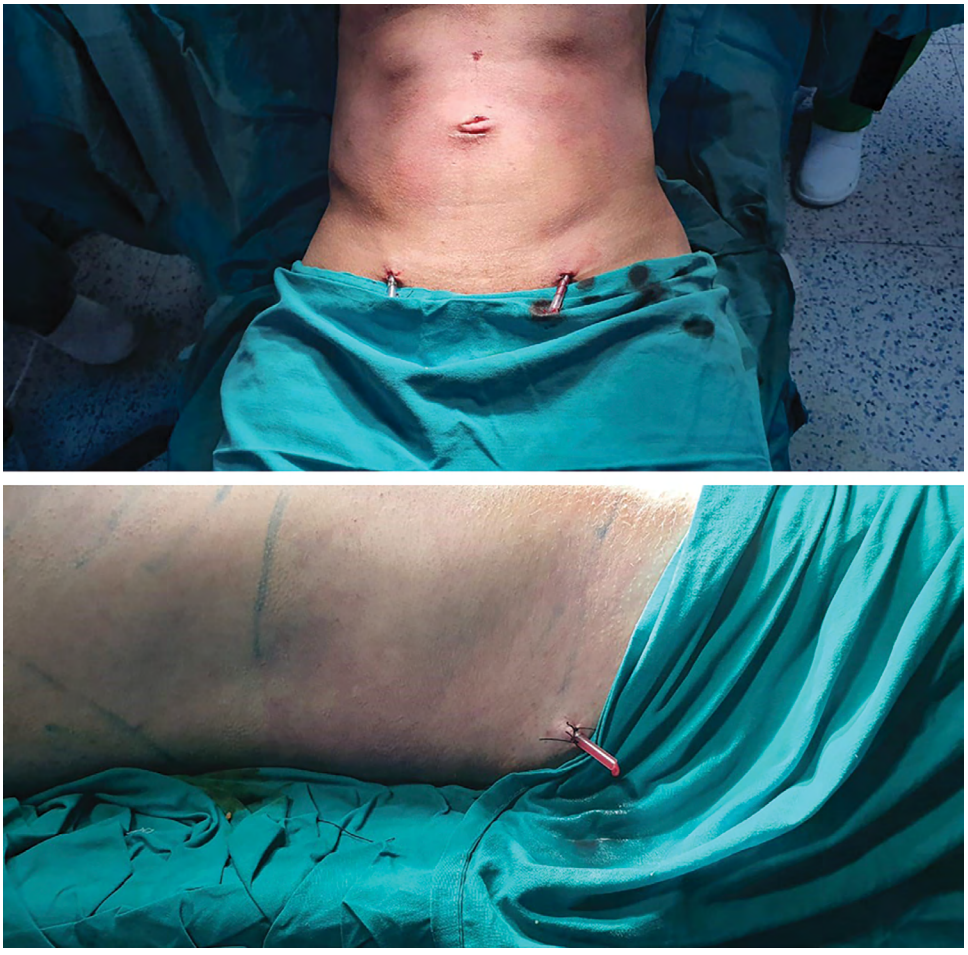

Fig. 2. Silicone drains placed in the inguinal and iliac regions on both sides, making a total of 4 drains. These are the same openings used for liposuction.

The patients were discharged on the second day with adequate pain medications, iron supplementation and laxatives. Antibiotics were prescribed if fat injection was done and continued for 1 week.

Patients were instructed to wear a pressure garment immediately after the operation and to be kept on for 6 weeks. The patient was instructed to wear the pressure garments most of the day in the first 3 weeks. In the next 3 weeks, patients could take off the pressure garments during sleep.

Showers were done with our team supervision on postoperative day 1. Care should be taken upon removing the pressure garments, as many of the patients may experience vaso-vagal attacks and are at risks of head injuries. None of our patients were left unattended during the showers.

The massage sessions were started within 5 days following liposuction. The aim of these sessions was to enhance skin adherence, reduce edema, prevent seroma formation, and remove any skin irregularities. Massage sessions were carried out using a massage/baby oil. These sessions were done every other day in the first week, twice per week in the second week, and then once per week.

The return to normal activity was allowed after 1 week. Patients can exercise 6 weeks after the procedure.

Statistical Analysis

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data were summarized using frequency (count) and relative frequency (percentage) for categorical data. For comparing categorical data, $\chi 2$ test was performed. Exact test was used instead when the expected frequency is less than 5.[4] *P*-values less than 0.05 were considered as statistically significant.

RESULTS

Fifty male patients participated in this study after providing informed consent. Their mean age was 36 years (range, 21–50) and mean BMI was 29 (range, 28–33).

Seventeen had post-operative seroma: 13 in group A and 4 in group B. The volume of seromas was variable from mild (<50 cc), moderate (50–100 cc), and severe (>100 cc).

Seromas were felt as a fluctuating mass that is not painful in a previous site of liposuction. Under proper sterilization, drainage was done using 20 cc (18 G) syringes followed by application of a compressive dressing (Fig. 3).

Most common sites for seroma were: lower abdomen, 11 patients (65%); back, 4 patients (25%); and lower chest, 2 patients (10%). The results are summarized in the following tables (Tables 1–3).

DISCUSSION

Liposuction is a moderately stressful procedure in the spectrum of surgery. Patients who are morbidly obese can undergo bariatric surgery, and patients who are mildly overweight (BMI < 28) may follow special diet and exercise regimens to gain the ideal body and contour. It is those patients who lie in the gray zone who are mildly obese (BMI, 28–35) and who cannot tolerate or dislike the idea of bariatric surgeries, or for whom bariatric surgery is not indicated. Those patients represent the real challenge for the plastic surgeon to achieve a good contour and satisfactory results. For those patients, the surgeon is usually greedy to get more fat out of the patient but within limits so as not to endanger the patient's safety.

Seroma formation is a common complication seen following liposuction, especially following mega sessions (more than 5 L). Other causes include aggressive suction, large bore cannulas, and the use of lipo-assisted techniques, eg, Ultrasound.[5,6] Seroma causes much distress to the patients as well as their treating physicians. Frequent office visits are required for drainage, which requires repeated pricking for needle aspiration. This procedure carries a risk for causing the seroma to be infected by normal commensals injected during the aspiration process. Furthermore, some seromas might get infected from other septic foci in the body.

The seroma acts as a barrier that may limit the skin adherence following liposuction. This is particularly important with the introduction of new techniques of high-definition liposuction, where proper anatomical skin adherence to the underlying musculature is essential to sculpture the body (Fig. 4). Furthermore, infected seroma may initiate fibrosis that will eventually lead to contour irregularities and skin tethering.

Several methods have been tried to reduce seroma formation. Perhaps the most famous is the quilting sutures. This will not only reduce the seroma formation following abdominoplasty but will ultimately reduce the wound tension with all its known complications.[7]

With liposuction, there is no access to such sutures, with minimal stab incisions commonly used. Another author reported the use of special chemical agents for treatment of persistent seroma.[8]

Very few articles in the literature are considering seroma management following liposuction as a sole procedure.

In our practice, several modalities are tried to reduce the seroma formation. These include, but are not limited to:

1. Evacuation of all the infiltrate through the incisions sites at the end of the procedure;
2. Liposuction cannula sites are left open to heal by secondary intention and help the drainage process;
3. Tight dressing applied all over the treated areas;
4. Pressure garment applied immediately at the end of the procedure and worn for 6 weeks;
5. Patients are instructed to be ambulant as soon as possible, to help the gravitational drainage process;
6. Massage therapy started on postoperative day 5 and continued for 4 weeks.

Seromas mostly occurred in the lower areas of liposuction (lower abdomen and lower back). This is due its dependent position, effect of gravity, and these are the targeted sites for fluid evacuation during the postoperative massages.

We found placing drains (silicone drains at the inguinal and iliac regions; same incisions used for abdominal

Fig. 3. (Above) Seroma collection on the right side of the back. (Below) After aspiration of nearly 30 cc. No drains were used in this patient (group A).

Table 1. Seroma Rates

Seroma Rates	Group A (25)	Group B	Total	*P*
Number	13	4	17	0.007
Percentage	52%	16%	34%	

Group A (not drained): 52% had seromas. Group B (drained): only 16% had seromas.

Table 2. Seroma Volumes

Seroma Volumes	Group A	Group B	Total	*P*
Mild (<50 cc)	3	3	6	1
Moderate (50–100 cc)	5	1	6	0.189
Severe (>100 cc)	5	0	5	0.051
Total	13	4	17	0.007

Group A (not drained): 3 patients had mild seromas, 5 had moderate seromas, and 5 patients had severe seromas. Group B (drained): 3 patients had minor seromas, 1 patient had moderate seromas, and none had severe seroma.

liposuction), in addition to the above adjunctive procedures, has reduced the incidence of seromas dramatically in our patients (52% in group A vs only 16% in group B, $P < 0.007$).

The use of the same incisions (used in liposuction) minimizes further scarring and helps with drainage process. In

Table 3. Seroma Onset

Seroma Onset	Group A	Group B	Total	*P*
Day 3	2	0	2	0.490
Day 5	4	2	6	0.667
Day 7	4	2	6	0.667
Day 9	1	0	1	1
Day 11	1	0	1	1
Day 13	1	0	1	1
Total	13	4	17	0.007

In both Group A (not drained) and Group B (drained), most of the seromas occurred in the first week.

Fig. 4. Postoperative results for the same patient as in Figure 1, day 5, high-definition liposculpture. Note the drains in the inguinal region.

addition, silicone drains are proved to be more convenient to the patient than the suction drains with the many tubes and the reservoir. Patients are more ambulant when using small drains. Additionally, most seroma occurring in the "drained group" are mild, with less than 50 cc collected.

Another feature in the drained group is the better resolution of the fluids. The drain acts as guide for the fluids toward the outside. Eventually, the drains help with earlier recoveries, where no seroma was collected after the first week in the drained group compared with the undrained group.

Patients are sometimes concerned about the blood-tinged fluids coming out from their bodies and entangling their pressure garment. Instructions and careful reassurance are mandatory to avoid anxious patients. This

can be managed by early showers (postoperative day 1) to give a sense cleanliness and refreshment to the patient.

The drains might be irritating for some patients, especially because of the pain caused by the stitch. Again, careful guidance to the patients about how to handle their drains, dressing application, and the careful fixation of the drains (intraoperative) is mandatory.

Although ultrasound-guided aspiration of the seroma has been reported by some authors,[9] we did not use it on any of our patients.

CONCLUSIONS

Liposuction, especially high-definition liposuction, should be done with good adjunctive draining procedures as mentioned. This will not only reduce the rate of seroma formation, but will eventually intensify the patient's satisfaction and goodness of the end results.

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