

Comparative Study between Outcomes of Abdominoplasty with or without Use of Diuretics in Postoperative Treatment

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ABSTRACT

Background: Seroma formation is a common complication after abdominoplasty and is associated with delayed wound healing, infection, skin flap necrosis, patient discomfort and repeated visits to the outpatient clinic to deal with seroma and its sequelae. Closing the dead space after abdominoplasty seems to be key in reducing seroma and its complications.

Objective: The aim of this study was to compare outcome amount of serous fluid in the drain and incidence of seroma post abdominoplasty with and without use of spironolactone in medical treatment in postoperative period.

Patients and Methods: This study was conducted on 40 patients who underwent classical abdominoplasty without use of mesh, all laboratory and radiological investigations were done. Patients were divided into two groups group A involved 20 patients who didn't take spironolactone and group B included 20 patients that had taken spironolactone for 15 days postoperative.

Results: In group A, there were 3 males and 17 females and mean age was 34 ± 8.6 years. Group B consisted of 5 males and 15 females, their mean age was 40 ± 10.8 . BMI was 13 patients >25 in group A and in group B was 6 cases >25 . There is small paraumbilical hernia in 4 patients in group A and in 3 patients in group B. Group B who took spironolactone showed significant improvement in outcome including volume of fluid in the drain, time of removal of drain and no occurrence of flap edema.

Conclusion: There was statistically significant decrease in the incidence of seroma formation after abdominoplasty with the use of spironolactone postoperative.

Keywords: abdominoplasty, seroma, diuretics, spironolactone.

INTRODUCTION

Abdominoplasty is a comprehensive surgery, often followed by a large number of local and general complications. The formation of serums or accumulation of non-infected fluids under the skin is one of the most common complications after tummy tuck. The most important factors that prepare patients for seroma formation are body mass index, amount of undermining flap, and combination of liposuction or other procedures⁽¹⁾.

Incident estimates vary from 1% to 57%, with an acceptable standard of 10%⁽²⁾. It is usually a self-limiting phenomenon, but it can sometimes cause major problems. The accumulation of excessive serous fluid increases the pressure, which can be transmitted to the flap, causing gapping in the wound and necrosis of the flap. May also become contaminated and predispose to infection. Minor secondary effects such as chronic fluid accumulation with false wall formation and systemic inflammatory response syndrome⁽³⁾. As reported. Although they are benign in nature, the seroma always cause discomfort and anxiety in the patient, resulting in frequent office visits, treatment procedures and increased postoperative costs.

The supposed mechanisms of seroma formation are disorders of vascular channels and lymphatic vessels, creation of dead space, and shear forces between flap and muscles of ant abdominal wall, and release of inflammatory mediators⁽⁴⁾. As in

many other areas of medicine, this uncertain pathology led to a lack of consensus or a common approach for preventing and treating these complications.

Various preventive measures have been described, such as reducing the amount of flap undermining, reducing the use of electrolysis and liposuction, and using tissue adhesives and abdominal binders. Use of diuretics was also described to decrease incidence of seroma formation especially spironolactone in the morning⁽⁵⁾.

OBJECTIVE OF THE STUDY

This study was conducted to evaluate the value of use of diuretics (spironolactone) in treatment of post abdominoplasty surgery and its effect on seroma formation and to compare that with patients didn't use the diuretics postoperatively.

PATIENTS AND METHODS

This study was conducted on 40 patients who underwent abdominoplasty in Al-Azhar University Hospitals. They were divided into two groups: Group A 20 patients who did not take diuretics postoperative

Group B 20 patients who took diuretics postoperative

Inclusion criteria:

Patients with pendulous abdomen.

Patients with small paraumbilical hernia and pendulous abdomen.

Exclusion criteria:

Patient with recurrent pendulous abdomen.
 Patients with large incisional hernia.
 Patients refuse to participate in this study.

Ethical statements

All patient agreed to share in the study and written informed consent was taken. In addition, the study was approved from Al-Azhar Ethical Committee.

Preoperative data evaluation

Age and sex distribution

The age of the patients and baseline demographic data to be evaluated were analyzed in both groups.

Clinical history

Clinical picture was evaluated as the size of pendulous abdomen and diastasis of both recti muscles at time of surgery. Comorbidities that may affect the outcome of the procedure in the form of diabetes mellitus, hypertension, HCV +ve marker cases, cardiac troubles, renal impairment, and chest complications were recorded.

Laboratory reports

White cell count, hemoglobin level, albumin level, total and direct bilirubin level, gamma glutamyl transferase, alkaline phosphatase, aspartate amino transferase (AST), and International Normalised Ratio (INR) were recorded.

Radiological reports

Abdominal ultrasound was done to all cases to evaluate all intra-abdominal organs.

Standard abdominoplasty was performed in all 40 patients under general anesthesia. The abdominal flap was elevated using electrocautery. All patients underwent rectus sheath plication using prolene size 1. Another tensioning was applied in an effort to emphasize the waist.

All patients had closed vacuum drains placed. Prophylactic antibiotics were given perioperatively. Patients were asked to wear a supportive corset or other garment postoperatively until they felt it was no longer useful.

Group B received a regular diuretics in the form of spironolacton 100 once daily in the morning for two weeks.

Early outcome measures were: the volume of serous fluid in the drain, time of removal of drains and incidence of seroma in follow up period. Other outcome measures were haematoma formation (detected early postoperatively clinically and on ultrasound scan), return to theatre within the first week, necrosis (any documented area of skin necrosis),

wound dehiscence, infection (superficial wound infection, suture abscesses and deep abscesses) and late revision of scar and dog-ears.

Statistical analysis

Recorded data were analyzed using the statistical package for social science, version 20.0 9 (SPSS Inc. Chicago, Illinois, USA). Quantitative data were expressed as mean \pm standard deviation (SD). Qualitative data were expressed as frequency and percentage.

RESULTS

Patients in this study were 40 patients divided into two groups, in group A there were 3 males and 17 females and mean age was 34 ± 8.6 years. In group B, there were 5 males and 15 females and mean age was 40 ± 10.8 . BMI was 7 patients < 25 and 13 patients > 25 in group A and in group B, there was 14 cases < 25 and 6 cases > 25 .

Comorbidities in both groups were in the form of smoking, hypertension and diabetes mellitus. Local examination showed small paraumbilical hernia in 4 patients in group A and 3 patients in group B (table 1).

Table (1): Demographic data of patients

		Group A (No.= 20)	Group B (No.= 20)
Age		34 \pm 8.6	40 \pm 10.8
Sex	Male	3	5
	Female	17	15
BMI	<25	6	5
	>25	14	15
Co-morbidities	DM	3	5
	Smoker	5	5
PUH		4	3

Early outcomes: there was no cases of postoperative bleeding, or ischemic flaps.

There was one case of gapped wound in group A just in small area and healed by secondary intension. In group A, six cases had mild edema in lower half of flap and moderate in Mons pubis and one case with moderate edema in lower half of abdomen below the umbilicus and moderate in Mons pubis. Besides, there was an amount of serous fluid in the drain about 100 ± 40 cc per day that decreased gradually.

Its mean duration was 6 ± 2 days until there was minimal amount of serous about 30 cc or less. In group B, there was no flap edema but there was mild edema in Mons pubis and amount of serous fluid in the drain about 70 ± 30 per day and its mean duration was 8 ± 2.0 days and the drain was removed after about eight to ten days (table 2).

Table (2): comparison between two groups regarding early outcomes.

	Group A (No.= 20)	Group B (No.= 20)	Test value	p-value
Flap edema	7 (35.0%)	0 (0.0%)	8.485	0.004 (HS)
Volume of fluid in drain	100 ± 40	70 ± 30	-2.683	0.011 (S)
Time of removal of drain	mean (8 ± 2.0)	mean (6 ± 2)	-3.162	0.003 (HS)
Ischemia of flap	0 (0.0%)	0 (0.0%)	0.000	1.000 (NS)
Gapped wound	1 (5.0%)	0 (0.0%)	1.026	0.311 (NS)

The Previous table showed that there was statistically significant difference found between the two groups regarding flap edema, volume of drain per day and time of removal of drain.

While there was no statistically significant difference found between two groups regarding ischemia of flap or gapping in the wound.

Table (3): Relation of amount of serous fluid above 80 cc in drain into relation to clinical parameter:

	Group A	Group B	Test value	p-value
Obese patients	13 (65.0%)	6 (30.0%)	4.912	0.026 (S)
Diabetic patients	3(15.0%)	2 (10.0%)	0.229	0.632 (NS)
Presence of PUH	0(0.0%)	0(0.0%)	0.000	1.000 (NS)
Smoking	1 (5.0%)	1 (5.0%)	0.000	1.000 (NS)

The Previous table showed that there was statistically significant difference found between two groups regarding obesity and serous fluid, which came in the drain. While there was no statistically significant difference found between the two groups regarding smoking, diabetes or presence of small paraumbilical hernia (figure 3).

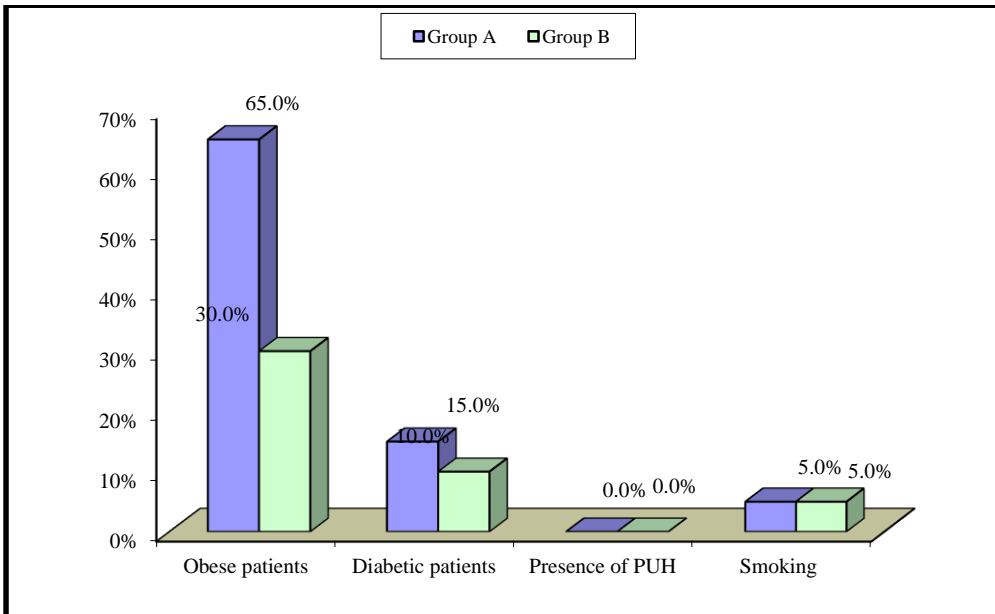


Fig. 1: Relation of amount of serous fluid above 80 cc in drain into relation to clinical parameter

DISCUSSION

In general, the incidence of postoperative serum formation varied from 2 to 30% ⁽⁶⁾, although in postoperative ultrasound cases, it could be as high as 70% ⁽⁷⁾.

Although serum formation is a common complication in abdominal and hernia repair, little is known about the cause. However seroma formation may lead to serious complications requiring repeated puncture over weeks or even months, and can possibly lead to severe wound infection with the need for surgical intervention ⁽⁸⁾.

Preoperative assessment of individual risk might help to identify subgroups that may need different or additional therapies, e.g. using glue to close the wound area or a change to laparoscopic access. Unfortunately, to date we are unable to predict the formation of a seroma in a patient. Clinical parameters appear to be only somewhat reliable ⁽⁹⁾.

Certain factors have been discussed controversially as predictors of seroma formation, e.g. advanced age, hypertension, high BMI, the total drainage output within the first 3 days postoperatively, and drainage for more than 8 days were all assumed to be related to seroma formation ⁽¹⁰⁾ and this was accepted in this study as it showed more fluid drainage in the drain in group A who did not take diuretics but in group B, there was decrease in volume and less in days needed to drainage.

In this study, neither nicotine abuse nor gender influenced the formation of a seroma directly. In accordance to **Tomita et al.** ⁽¹¹⁾, patients with elevated BMI had a higher risk for seroma formation in comparison with patients with a normal BMI. One possible explanation is that in patients with obesity the wound cavity is disproportionately enlarged, promoting seroma formation and this agrees with the study to show significance more amount of serous fluid with both groups in obese patients and significant increase in group A also than in group B.

In this study, there was significance of fluid seroma in obese patients and amount of drain in postoperative period and no effect of smoking, age and small paraumbilical hernia on it. Although others found that the presence of a drainage itself did not influence the outcome of seroma formation ⁽¹⁰⁾. This agrees with others who found that there was no significant association between age, BMI or duration of drainage and postoperative seroma formation ⁽¹²⁾.

Less use of cautery or a central full-thickness suture to reduce dead space were promoted as possible maneuvers to avoid seroma formation, these modified surgical techniques were accepted as effective preventive measure ⁽⁸⁾.

There was a relation between fluid in the drain and extracellular fluid. To find the effect of diuretics on this fluid, some studies showed that during the first postoperative days, the drained fluid is contaminated with blood from the surgical wound. Therefore, hemoglobin and RBCs are present in the liquid but disappear thereafter. In addition, low levels of fibrinogen and platelets coming from the blood during the early stages might lead to the formation of some clots useful in the homeostatic phase of wound healing, but this tends to cease later because these elements are consumed ⁽¹³⁾.

There was a widespread belief that seroma fluid may be caused by lymphatic obstruction and that it is composed of lymph. Lymph is essentially an alkaline ultra-filtrate of the blood plasma formed by continual seepage of fluid constituents of the blood across the capillary walls into the surrounding interstitial spaces ⁽¹⁴⁾. The chemical structure of lymph varies significantly at different locations in the lymphatic system. Early seroma fluid differs in many ways from peripheral lymph. First, the pH is more acidic; the content of protein, LDH, and cholesterol are significantly higher; and the fibrinogen is lower than found in lymph ⁽¹⁵⁾. The early seroma fluid has elements not present in lymph such as RBCs, hemoglobin, and platelets. Finally, the white blood cells count for early seroma fluid is higher, with high proportions of neutrophils. On the other hand, although late seroma fluid still has high protein, LDH, and cholesterol levels. It does not have platelets, hemoglobin, and RBCs as found in lymph. Late seroma fluid also demonstrates different leukocyte counts and distribution as well as a lower fibrinogen level, with a triglyceride level very similar to lymph, although we must consider that the latter is strongly influenced by the lipid intake ⁽¹⁵⁾.

From this analysis, it seems that early seroma fluid closely resembles an inflammatory exudate as an immediate consequence of surgery and differs significantly from lymph. With time, this fluid turns into a less inflammatory and more lymph-like fluid as the wound healing process evolves. These findings are very similar to those described for the composition of seroma fluid after breast cancer surgery so diuretic have role in this fluid formation at its different stages ⁽¹⁶⁾.

Spironolactone, an aldosterone antagonist, has been extensively used as a minor diuretic in achieving volume homeostasis and is used primarily to treat heart failure and edematous conditions such as nephrotic syndrome or ascites in people with liver disease ⁽¹⁷⁾. So, we use spironolactone in this study to show its effect on postoperative serous fluid and also there was no or mild side effect. This study showed

significant difference between group A and B with better result in the group B who took spironolactone.

The implications of these results are very important. If the liquid accumulating at the beginning is an inflammatory exudate, measures such as gentle tissue handling, limited undermining, and dead space closure may significantly affect fluid collection postoperatively while we search for a better anti-inflammatory agent. In recent years, procedures such as the selective undermining described by **Saldanha et al.** ⁽¹⁸⁾ and the quilting sutures described by **Baroudi and Ferreira** ⁽¹⁹⁾ have become good options for reducing the incidence of seroma after body-contouring surgery. On the other hand, if the accumulating liquid is less inflammatory and more lymph-like, compression garments, use of diuretics and lymphatic drainage techniques may be the best preventive measures.

CONCLUSION

There was statistically significant decrease in the incidence of seroma formation after abdominoplasty with the use of spironolactone in postoperative treatment. There was reduction in all postoperative complications and early return to usual life as early removal of drain and better cosmetic appearance of wound as decrease of wound complications.

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