Liposuction assisted Brachioplasty,

evaluation of its efficacy and safety

Braquioplastia asistida por liposucción, evaluación de su eficacia y seguridad

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Abstract

Arm deformity after massive body weight loss is a major concern for many people. Brachioplasty procedures to deal with such deformity are various but not without complications. In this study, a comparison between the liposuction assisted brachioplasty and the standard procedure regarding the complications and patients' satisfaction. All consecutive brachioplasty procedures that were done from Jan of 2017 until Sep of 2019 were reviewed prospective. Two plastic surgery teams in two private hospitals did these operations. Data was collected regarding the complications, duration of surgery and patients' satisfaction. The total number of cases was 37. Group (1), including 15 patients (40.5%), were operated as liposuction assisted brachioplasty, and group (2), including 22 cases (59.5%), were operated as standard method without liposuction. All the cases were female group (1) average of age 37.19 ± 4 years old and group (2) average of age 38.94 ± 4.9 years old. For the first group, the average body mass index at time of surgery was 25.94 ± 2.4 kg/m2, and the mean average body mass index was 26.99 ± 3 kg for the second group. Aesthetic and functional satisfaction were excellent in 25.5% and 62% of the patients respectively in the first group. On the other hand, in the second group, aesthetic and functional satisfaction were excellent in 9% and 18 % of the patients respectively. liposuction assisted brachioplasty has a lower complications rate than the standard procedure and has better aesthetic and functional satisfaction. No major difference regarding the duration of surgery of both procedures.

Key words: Liposuction, Assisted Brachioplasty, Efficacy and Safety.

Resumen

La deformidad del brazo después de una pérdida masiva de peso corporal es una preocupación importante para muchas personas. Los procedimientos de braquioplastia para tratar tal deformidad son diversos, pero no exentos de complicaciones. En este estudio, una comparación entre la braquioplastia asistida por liposucción y el procedimiento estándar con respecto a las complicaciones y la satisfacción de los pacientes. Todos los procedimientos consecutivos de braquioplastia que se realizaron desde enero de 2017 hasta septiembre de 2019 se revisaron prospectivamente. Dos equipos de cirugía plástica en dos hospitales privados realizaron estas operaciones. Datos recogidos sobre las complicaciones, duración de la cirugía y satisfacción de los pacientes. Estudio prospectivo comparativo de 37 casos. Grupo (1) 15 pacientes (40,5%) fueron operados como braquioplastia asistida por liposucción y el grupo (2) 22 casos (59,5%) fueron operados como método estándar sin liposucción. Todos los casos fueron grupo femenino (1) promedio de edad 37.19 ± 4 años y grupo (2) promedio de edad 38.94±4.9 años. Para el primer grupo, el índice de masa corporal promedio en el momento de la cirugía fue de 25,94±2,4 kg/m2 y el índice de masa corporal medio fue de 26,99±3 kg. Para el segundo grupo. La satisfacción estética y funcional fue excelente en el 25,5% y el 62% de los pacientes respectivamente en el primer grupo. Por otro lado, en el segundo grupo, la satisfacción estética y funcional fue excelente en el 9% y el 18,1% de los pacientes respectivamente. La braquioplastia asistida por liposucción tiene una tasa de complicaciones más baja que el procedimiento estándar y tiene una mejor satisfacción estética y funcional. No hubo grandes diferencias en cuanto a la duración de la cirugía de ambos procedimientos.

Palabras clave: Liposucción, Braquioplastia Asistida, Eficacia y Seguridad.

Introduction

There is increase in the demand for brachioplasty surgery, especially after increasing in the number of population that have massive weight loss either through bariatric surgery or through dietary habits[1]. Skin laxity and persistent fat that resulted after massive weight loss have a dramatic effect on the contour of the arm. The resulted deformities would be a primary concern for most of the patients. Continues friction of the arm skin against the chest would cause a functional problem[2]. Thorek was the first surgeon who described his brachioplasty procedure in 1930[3]. Since then, many other procedures have been developed to remove skin redundancy and associated sagging tissues from the upper arm. Those procedures have a high functional benefit, but the benefits may be associated with a relatively high complication rate[4]. Liposuction assisted brachioplasty might have lower complication rate with better functional and aesthetic outcomes. This study aim to compare this procedure with the standard brachiplasty procedure according to their aesthetic and non-aesthetic complications.

Method

The operations were conducted by two teams of plastic surgeons from Jan 2017 till Sep. 2019. The first team did liposuction-assisted brachioplasty, while the other did the brchioplasty without liposuction of the excised area. The complications were classified as an aesthetics complications and non-aesthetics complications for both groups. The aesthetic complications include scar shape and thickness, wound dehiscence, asymmetry, and residual redundancy. The non-aesthetic complications include seroma/ lymphedema, hematoma, wound infection, paresthesia, and thromboembolic problems. Patient satisfaction was conducted using a questionnaire asking about the acceptance for the scar and for the functional results. The questionnaire was answered six month after the surgery. In this questionnaire, the patient rate the operation whether: excellent, very good, good, poor, or bad.

Procedure

Marking was done in all cases of both groups in medial aspect of the arm. With arm abduction and the forearm supinated, the upper marking was straight and placed at the intermuscular groove after palpation, starting from the axilla to the medial epicondyle, and trying to limit the area of excision in the arm. This line would be the final scar placement. Another horizontal line was drawn 1 cm above the intermuscular line which indicate the upper incision (fig.1). The lower incision was placed posteriorly after elevation of the arm and palpation of the amount the skin proposed to be resected using index and thumb palpation. The final marking would be an ellipse. Other areas that need liposuction in the arm, other than the marked above area, was marked then.

Fig 1: Marking

The operation was done under general anesthesia in supine position with both arms abducted. Prophylactic antibiotics was given. The area was infiltrated with epinephrine diluted in normal saline (1:1000000). The amount of infiltrated fluid is given until the area become tense.

For the liposuction-assisted group, liposuction was done aggressively using power assisted liposuction for the fat above the aponurosis until the skin become has no fat (fig.2). The area become depressed. Then, folding the area-using index finger inside the depression and using surgical staples to bring the folded edges together with mild tension, starting gradually from the elbow till reaching the axilla.

Fig 2: Left liposuction until no fat. Right, skin fat clipper indicate zero fat after liposuction

Fig 3: Left placement of the staples and assessment of the tension. Right: removal of the staples and drawing the final mark for excision.

Assessment of the tension is done after that and removing the staples of non-tense area and replace with new one till it become linear and with mild tension. The staples should be placed just at the upper incision line. Using skin marker with ink solution, marking is placed over the staples to mark the final incision line. Cross hatching might be used to help appropriate closure. Removal of the staples then done (fig.3). Excision of the skin of the marked area was done by avulsion or by help of electrocutterization just below the dermis, leaving the lattice of lymphatics and small vessels intact. Closure was done in two layers. Dermis was closed by continues intradermal suture using Vicry 2/0 starting from the elbow. Skin was closed using running subcuticular Proline 3/0 suture. No drain was used in this group (fig.4).

Fig 4: intraoperative view after resection

For the standard group, incision was started in the upper line and dissection was done using electrocutterization just above the muscle fascia in the loose areolar plane. Traction of the skin flap and assessment of the amount of the skin to be resected was done. After excision, hemostasis was done and closure was done with help of the cross hatching markings. The dermis was closed using interrupted inverted suture using vicryl 2/0 and skin was closed by subcuticular running suture-using proline 3/0. Drain was inserted. For both groups, dressing was applied and crepe bandage with cotton inside was used. Dressing was changed five days after the surgery and antibiotic was continue for five days only. Removal of the suture was done two weeks later. Pressure garmet was used after five days for four weeks.

Results

Comparative prospective study of 37 cases were operated from Jan 2017 until Sep 2019. Group (1) 15 patients (40.5%) were operated as liposuction assisted brachioplasty and group (2) 22 cases (59.5%) were operated as standard method without liposuction. All the cases were female In-group (1), average of age was 37.19±4 years old and group (2), the average of age was 38.94±4.9 years old. For the first group, the average body mass index at time of surgery was 25.94±2.4 kg/m2, and the mean body mass index was 26.99±3 kg for the second group. The mean operative time for first group was 103 minutes, and 110 minute for the second group. The duration for the surgery is for the brachioplasty procedure and does not include the abdominoplasty procedure for the cases, which has concomitant surgeries. For both groups, the hospital stay was only one day.

From current study 1 patients (7%) have asymmetrical appearance in-group 1 comparing to 5 patients (23%) have asymmetrical appearance in group (2). About the redundancy the patients in-group (1), 2 (13%) of them have redundancy while 5 patients (23%) in-group (2) have redundancy. In current study, 1 patients (7%) have scar hypertrophy while 5 patients (23%) have scar hypertrophy in-group (1) and (2) respectively.

About wide scar after operation, the results reveal 2 patients (13%) with wide scar in-group (1), nine patients (41%) of them with wide scar after operation in-group (2) two of them were revised under general anasthesia. In current study, also the results show in-group (1) one patients (7%) have wound dehiscence while in-group (2) four patients (18%) have wound dehiscence.

In current study, the results reveal that no any patients have Seroma/lymphedema, infection, hematoma and paresthesia in-group (1), while 5 (23%), 3 (14%), 1 (5%) and 4 (18%) patients have Seroma/lymphedema, infection, hematoma and paresthesia respectively in-group (2). The age group of patient's classify as the following: below 35 years old are 33% and above 35 years are 67% in-group (1). Age group below 35 years old 33% and above 35 years 77% in-group (2). While patients BMI classification in current study: 60% of patients are overweight in-group (1) and 50% of them are overweight in-group (2) while obese patients are 6% in-group (1) and 18 % in-group (2). All variables are no significant difference between two groups.

Table 1: variables distribution.

Variables	Group 1		Group 2		P-value
A symmetry	Frequency	Percentage	Frequency	Percentage	
Not occur	14	93	17	77.3	0.37
Occur	1	7	5	22.7	
Redundancy					
Not occur	13	87	17	77.3	0.68
Occur	2	13	5	22.7	
Scar hypertrophy					
Not occur	14	93	17	77.3	0.37
Occur	1	7	5	22.7	
Wide scar					
Not occur	13	87	13	59.1	0.14
Occur	2	13	9	40.9	
Wound dehiscence					
Not occur	14	93	18	81.8	0.36
Occur	1	7	4	18.2	
Seroma/lymphedema					
Not occur	15	100.0	17	77.3	0.07
Occur	0	0	5	22.7	
Infection					
Not occur	15	100.0	19	86.4	0.26
Occur	0	0	3	13.6	
Hematoma					
Not occur	15	100.0	21	95.5	1.000
Occur	0	0	1	4.5	
Paresthesia					
Not occur	15	100.0	18	81.8	0.13
Occur	0	0	4	18.2	
Age					
35 years and below	5	33	5	22.7	0.71
Above 35 years	10	67	17	77.3	
Nnormal	5	33	7	31.8	
Overweight	9	60	11	50.0	0.6
Obese	1	7	4	18.2	

P-value < 0.05 (significant).

For the patient satisfaction, all patients answered the questionnaire after six month after the operation. In the first group, patient satisfaction for the aesthetic results was excellent by 4 (25.5%), very good by 9 (62.5%) and good 2 (12%). While the functional satisfaction to the procedure was answered as excellent by 11 (62%), very good by 4 (38%), no good and poor results was answered. The patient with the poor answer to the aesthetic result was the patient who gave history of steroid abuse (table 3). In the second group, patients satisfaction for the aesthetic results, two cases were excellent (9%), four cases were very good (18.1%), eight cases were good (36.3%), five cases were poor (22.7%) and three were bad (13.6%). While the functional satisfaction were excellent in four cases (18%), very good in 9 (41%), good in 6 cases (27%), poor in two cases (9%) and bad in one case (5%). No thromboembolic complication was noticed. As in table (2).

Table 2: patient's satisfaction according to group.

Patient Satisfaction	Group 1		Group 2	
A-Aesthetic Results	No.	%	No.	%
Excellent	4	25.5	2	9
Very Good	9	62.5	4	18.1
Good	2	12	8	36.3
accept	0	0	5	22.7
poor	0	0	3	13.6
B-functional Results	No.	%	No.	%
Excellent	11	62	4	18
Very Good	4	38	9	41
Good	0	0	6	27
accept	0	0	2	9
poor	0	0	1	5

According to table 3: significant difference in aesthetic satisfaction between group 1 and group 2; group 1 more satisfied aesthetic than group 2. Also significant difference in functional satisfaction between group 1 and group 2; group 1 more satisfied functionally than group 2

Table 3: comparison between aesthetic satisfaction and functional satisfaction

	Group	N	Mean
Aesthetic satisfaction	1	16	4.13
	2	22	2.86
Functional satisfaction	1	16	4.73
	2	22	3.59

T student test = 0.0001 (≤ 0.05 significant).

Fig 5: preoperative and six month postoperative photograph for patient with liposuction assisted brachioplasty.

Fig 6. preoperative and 12 month's postoperative photograph for patient with liposuction assisted brachioplasty.

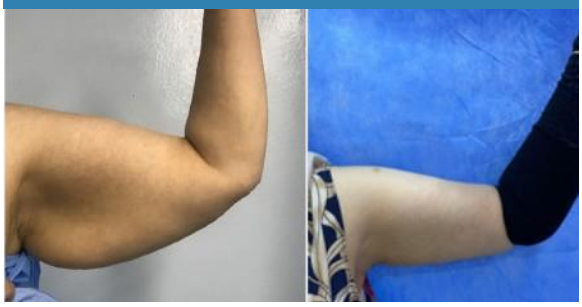

Fig7. Preoperative and nine months postoperative photograph for patient with liposuction assisted brachioplasty.

Fig 8. Preoperative and postoperative photograph of patient with standard brachioplasty. Note, residual skin redundancy that required revision.

Discussion

Various techniques had been developed for correction of the laxity of the upper arm, despite that, many problems are exit after these procedures [5]. In this study, a comparison was done between the liposuction assisted brachioplasty procedure and the standard brachioplasty procedures. Weight reduction was achieved by bariatric surgery in 7 cases, and through dietary habits in 22 cases. Eight cases had no weight loss during the time of surgery and they refuse to reduce their weight before surgery. Concomitant abdominoplasty done in three cases, one in the first group and two in the second group.

The comparison was for both the aesthetic and non-aesthetic complications. In liposuction assisted group patients, the non-aesthetic complication was zero. Seroma was not noticed which is similar to Runz et al study who did liposuction assisted procedure[4]. No hematoma or paresthesia was noticed in our study, although Runz reported one case of hematoma and two cases of paresthesia out of 37 cases. Our study is comparable to the study of Pierfranco et al, who report zero non-aesthetic complications in 24 patients in his study[6].

The aesthetic complications for this group were in form of mild asymmetry in one case (7%), that does not required revision while Runz et al, who uses liposuction procedure, reported 8 cases (12%). Pierfranco et al reported asymmetry in four cases. Scar hypertrophy was mild and it was treated conservatively using silicon sheet and intralesional steroid, while Runz et al reported 48 cases of hypertrophic or wide scar. He mentioned that tension should be assessed before closure. In our procedure, the tension is frequently assessed before final removal of the staples. The mean of scar problem with Pierfranco et al cases was 4[6]. Widened scar with skin redundancy was noticed in two cases only in our study in patient who had long history of steroid abuse and presence of significant strai in her body, one of them was severe redundant that required revision under general anesthesia while the other was mild unilateral; that revised under local anesthesia in the clinic both. Wound dehiscence was noted in one case, which was small, and near the axilla. Runs reported nine cases out of 66 cases had developed wound dehiscence. No scar revision was done for any of our study cases, apart from the patient with skin redundancy who still waiting for an appointment for re-excision. While in Runz et al study, 22 cases of the 66, revisions done[4]. This might be caused by the tension applied to wound during the closure. For the cases of standard brachioplasty, the overall complications were in nine cases (40.9%), while in another study he notice 53.1% complication rate in Multipractice Cohort[1].

Seroma/lymphedema was noted in five patients (23%) in group while in the study done by Virdiana et al, who uses standard procedure, 7 out of 20 (35%) had seroma[7]. Jesenof et al reported 36 patients out of total 101 cases (36%) of seroma formation[8]. Overall seroma formation was recorded to be 6.94% in a literature review conducted by Andrea et al.[9]. Seroma/Lymphedema was unilateral in one case, which was severe and needed mild diuretics. The other lymphedema subsided after one month. Seroma. cases were treated by

frequent aspiration in two cases and the others were treated conservatively.

Wound dehiscence was reported in four cases (18.1%). Zomerli et al. reported 6 cases out of 96 cases (6.2%) of wound dehiscence[1]. Overall, wound dehiscence was reported to be 5.7% in the literature view by[9]. Wound infection was noticed in three cases (13.6%) in our study, while the overall reports in Andrea study was 3.1%. Hematoma formation was low and occurred in one case, which is comparable with overall report, which is 0.75%[9]. Paresthesia and nerve injury was notice in four cases (18.1%) which occurred in same patient with severe odema and the other occurred in-patient with hematoma. Knoetegen and Moran, in their study, reported two cases (5%) of nerve injury[10]. In cadaveric studies, the medial antebrachial cutaneous nerve was found to penetrate the deep fascia of the forearm at 14 cm proximal to the medial epicondyle[11-13]. Liposuction is considered as a safe procedure regarding the sensory nerves of the arm[4]. The better aesthetic results in the liposuction-assisted group might because of the careful placement of the skin staples and frequent assessment the tension of the arm. Together, the final line after excision could be placed with more accuracy with method. The lower incidence of seroma formation for the first group in our study is belong to the excision type of the tissue which is just below the dermis, so preserving the underlying lymphatics and small blood vessels. Liposuction may still potentially damage lymphatics; however, a study done by Haddad Filho et al, he found no significant damage to the lymphatics associated with liposuction[14]. In the standard group, there is end bloc resection of tissue with undermining which might be the cause of incidence of sarcoma and lymphedema. Difference in the duration of surgery for both groups was minimum as the liposuction done for very small area. Overall, functional satisfaction were rated as excellent in 80% in the liposuction-assisted group while it was 18.1% in the standard group. The aesthetic satisfaction were rated as excellent in 60% in the first group while it was 9% in the standard group and this belong to better look of the scar and shape ,together with absence of the non-aesthetic complications.

Conclusion

Brachioplasty procedures are associated with postoperative problems. Liposuction assisted brachioplasty has lesser complications rate, thanks to the preservation of the lymphatics, blood vessels and nerves. Together with the better aesthetic satisfaction, we recommend this type of brachioplasty over the standard one.

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