

# Brachioplasty with excision of a strip of deep fascia for management of severe post-mastectomy lymphedema

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## Summary

### Brachioplasty with excision of a strip of deep fascia for management of severe post-mastectomy lymphedema

**OBJECTIVE:** Post-mastectomy lymphedema have been treated over years by different techniques. So the objective of this study is to evaluate brachioplasty with excision of a strip of deep fascia and maintenance physiotherapy on the limb size and cosmesis in cases of severe post mastectomy lymphedema.

**METHODS:** Eleven patients with unilateral severe post mastectomy lymphedema were done from April 2009 to June 2012 at Mansoura University Principal Hospital. All patients were managed using a brachioplasty incision and excision of a strip of deep fascia. 2 weeks later, combined decompression therapy was started in the form of compression stocking and pneumatic compression session [2 hours / week for 4 weeks] was done.

**RESULTS:** Satisfactory outcome in all patients with subjective relief of their complaints [heaviness and limited shoulder motion] was reported. Some complications were occurred such as marginal necrosis of surgical wound and cellulitis.

**CONCLUSION:** Our technique offers single, simple and reliable method that achieves substantial cosmetic and functional improvement in post-mastectomy lymphedema patients.

**Key words:** Lymphedema, post-mastectomy lymphedema.

## INTRODUCTION

Lymphedema is the accumulation of protein rich interstitial fluid as a result of impaired lymphatic function<sup>1</sup>. Post mastectomy lymphedema may result from surgical trauma to the lymphatic system<sup>2</sup>. Further Damage to the lymphatic system may result from radiation<sup>3</sup>, chemotherapy, infection or inflammation<sup>4</sup>.

The incidence of post mastectomy lymphedema varies greatly, and ranges from 15 to 54%<sup>5</sup>. Post mastectomy lymphedema is a lifelong problem and can lead to pain, heaviness, weakness and psychological distress<sup>6</sup>. Recurrent soft tissue infection and rarely lymphangiosarcoma may complicate the condition<sup>7</sup>.

Treatment of lymphedema consists of both non operative and operative management. The non operative management is multidisciplinary termed combined decompression therapy (CDT) which contains massage, bandaging and exercises<sup>8</sup>. Most patients with early stages of lymphedema can be treated successfully with CDT<sup>9, 10</sup>.

Surgical approach should be considered entertained when appropriate CDT fail to adequately reduce lymphedema<sup>11</sup>. The operative management includes either excisional<sup>12</sup> or reconstructive surgery such as lympho-venous anastomosis<sup>13</sup> and lymph vessel transplantation<sup>14</sup> or liposuction<sup>15</sup>.

U.S, low level laser<sup>16</sup> and aqua lymphatic therapy<sup>17</sup>, also represent a useful modalities of good response in mild and moderate lymphedema. To date, however, none of these modalities used in our hospital.

The aim of this study is to evaluate our surgical treatment and maintenance physiotherapy on the limb size and cosmetic appearance in cases of severe post mastectomy lymphedema.

## PATIENTS & METHODS

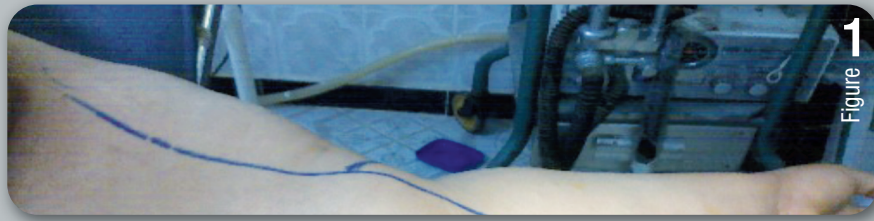
Eleven patients with unilateral severe post mastectomy lymphedema were included in this study. All patients in this study were refractory to CDT for 3 months and managed using a brachioplasty incision and excision a part of deep fascia at *Mansoura University Principal Hospital* from April 2009 to June 2012. This technique was done in order to apply the most cosmetic satisfaction of patients and decrease incidence of recurrence by enhancing lymphatic drainage through muscles. Criteria of exclusion included patients with acute infection, recurrent malignancy, acute or residual venous thrombosis, forearm and hand lymphedema or those with bilateral presentation.

All patients were assessed preoperatively by thorough history that include; age, sex, type of breast surgery, radiotherapy, chemotherapy, timing of lymphedema, lymphedema duration and the impact of lymphedema on patient's quality of life. The routine preoperative clinical assessment, lab investigations and duplex examination (Figure 1) were done to all patients. Preoperative photos and informed consent were obtained from all patients.

## SURGICAL TECHNIQUE

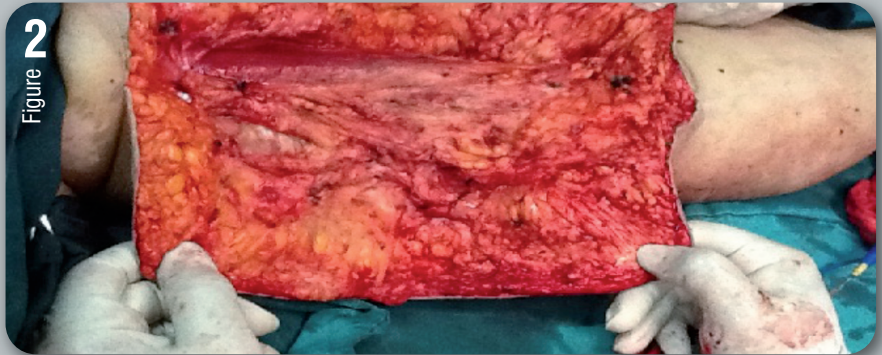
The patient was placed in supine position with the arm abducted after the induction of general endotracheal anesthesia. The upper limb was shaved circumferentially, draped free in the field and placed on a double arm board. The brachioplasty incision was done (Figure 2).

Two skin flaps with 5 mm thickness at least were created; all the subcutaneous tissue & deep fascia were excised (Figure 3) preserv-



**Figure 1**  
Left severe post mastectomy lymphedema with duplex mapping (Case 1).

**Figure 2**  
Brachioplasty incision with excision of subcutaneous tissue and deep fascia (Case 1).



**Figure 3**  
Excised skin, subcutaneous tissue and deep fascia (Case 1).



**Figure 4**  
Suction drain application and surgical wound closure with significant limb reduction (Case 1).



**Figure 5**  
Post-operative fitted compression sleeves (Case 7).



**Figure 6**  
Post-operative pneumatic compression session (Case 11).

ing the cephalic & basilic veins. Suction drains were placed and flaps were fashioned to be tight over the muscles by interrupted dermal and skin sutures (Figure 4) then the limb was compressed firmly by bandage.

Drains were removed when the effluent was less than 20 ml/24 h. The patient was allowed to ambulate immediately with the arm in a sling. Post-operative education about hygienic measures, skin care and prophylaxis of recurrence was started within the same admission. Two weeks later the CDT was started with compression stocking (Figure 5), and an appropriately measured and fitted compression sleeves is prescribed.

After stitch removal, pneumatic compression session for 2 h/week for 4 weeks was started (Figure 6), and home massage was continued.

## RESULTS

A total of 11 patients with severe unilateral post-mastectomy lymphedema underwent a brachioplasty with excision of a strip of deep fascia followed by maintenance conservative treatment. Nine of them were females and two were males.

Their age range was 40-74 years (mean  $55.73 \pm 10.51$ ) of old. Lymphedema diagnosed post mastectomy by a mean period of 5.45 years (range 3-16) and presented for a mean period of  $3.18 \pm 1.17$  years (range 2-5). The mean arm circumference difference was  $14.45 \pm 3.24$  cm (range 9-19) as measured 5cm from the olecranon. The main complaint of our patients was heaviness and limited shoulder motion (Table 1).

After the follow up period (mean  $14.55 \pm 7.54$  months, range 4-24), variable improvement was obtained in all of patients. The outcome was satisfactory in all patients with subjective relief of their complaints. The pressure sleeve is far better tolerated than preoperative.

One patient showed marginal skin necrosis of the surgical wound and this was treated conservatively by frequent dressing. One patient developed cellulitis six months post operative that responded to antibiotic and local treatment.

## DISCUSSION

Lymphedema is one of dreaded sequelae of breast cancer treatment. Its strategy of treatment is to control not to cure<sup>18</sup>. *Pezner, et al.*<sup>19</sup> described arm edema depending on the difference between arm circumference at various points from the elbow when the affected arm is compared with the unaffected arm.

*Cluzan*<sup>20</sup> defined severe lymphedema as more than 8 cm difference between both arms. We choose this method of assessment because it provides the most clinically simple, inexpensive, and reliable method for evaluating lymphedema.

We evaluated the patients clinically to rule out other reasons for edema such as venous disease and to detect any contraindication for treatment such as related malignancy, infection, or thrombosis. Duplex exam was done as a routine to exclude venous thrombosis and to map the superficial veins to avoid superficial venous injury during surgery.

Each patient served as his own control, in other words, the non affected arm was the control against which we compared changes in size and the limits of the upper limb movement. None of our patients' educated prior mastectomy about lymphedema and most of them developed cellulitis which have a role in severity<sup>4</sup>.

Treatment of lymphedema is tailored according to severity: in severe lymphedema, the pitting component can often be treated by non operative modalities successfully; however fibrosis will remain. Our study confirms this observation as all patients were refractory to non operative treatment for three months, but it facilitates flaps creation. Operative treatment is an uncommon entity and only indicated in a few cases as a last resort<sup>21</sup>.

This relative rarity, although not measured in our study, is reflected in the presence of only 11 patients over a period of 3 years in a tertiary referral Hospital.

We choose our technique as our results with Sistrunk surgery in severe lower limb lymphedema is encouraging. Also, the results of reconstructive surgery are fair<sup>13</sup>.

In our technique we performed excisional surgery through a brachioplasty incision and excision of a strip of deep fascia to achieve the best cosmeses. In the current study operative treatment gave the best results when combined with continued postoperative CDT this results were confirmed by *Matsubara* and *Brorson*<sup>13, 15</sup>.

Pneumatic compression also represented a useful adjunctive tool for lymphedema that gives good results and it represents a corner stone in CDT. This agrees with *Johansson*<sup>22</sup>. We educated our patients about lymphedema and taught them that the operation is a step in management and not all the course.

## CONCLUSION

We advocate brachioplasty with excision of a strip of deep fascia as a single-stage operative treatment for patients with severe post mastectomy arm lymphedema. We believe that this approach offers simple and reliable method and achieve substantial cosmetic and functional improvement in these patients.

Table1. Patient data

No	Age (year)	Sex	Lymphedema diagnosis (year)	Lymphedema duration (year)	Arm circumference difference (cm)	Follow-up period (month)	Complication
1	52	F	3	2	13	13	
2	66	M	7	4	14	9	
3	55	F	5	4	16	15	Marginal skin necrosis
4	40	F	3	3	14	24	
5	74	F	11	4	19	6	
6	51	F	2	3	15	19	
7	48	F	5	3	15	24	
8	62	F	16	5	18	14	
9	58	M	2	2	10	12	
10	46	F	3	2	17	20	Cellulitis
11	61	F	3	3	9	4	
Mean	$55.73 \pm 10.51$		5.45	$3.18 \pm 1.17$	$14.45 \pm 3.24$	$14.54 \pm 7.54$	

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