

Management of Post-Bariatric Gynecomastia in Zagazig University Hospitals

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ABSTRACT

Background: Plastic surgery role in correction of post-bariatric gynecomastia is clinically called reduction mammoplasty by reducing breast size, flattening and enhancing the chest contours.

Objective: This study aimed to assess the aesthetic outcome of management of post-bariatric gynecomastia in Zagazig University Hospitals.

Patients and methods: Randomized-controlled clinical trial study was carried out in Plastic & Reconstructive Surgery Department, Zagazig University Hospitals during the period from February 2018 to February 2020. It included 30 patients with post-bariatric gynecomastia. Patients included in the study was divided into two groups: Group A that included 15 patients who underwent postero-inferior pedicle surgical technique, and group B, which included 15 patients who underwent circum-areolar reduction surgical technique (Doughnut Technique).

Results: In group (A), there was no residual skin redundancy in all cases of that group. Nipple necrosis was found in two (2) cases, and the rest was intact. Four (4) cases were presented by a defective scar and eleven (11) cases had no defective scar. Hematoma was found in only one (1) case. In group (B) that was corrected with circum-areolar reduction surgical technique, there were five (5) cases with nipple in-sensitivity, and ten (10) cases with intact nipple sensation. Four (4) cases with no nipple projection, and eleven (11) cases with normal nipple projection. Residual skin redundancy was complicated in eleven (11) cases, and four (4) cases with no skin redundancy.

Conclusion: The postero-inferior pedicle technique gave better results than the circum-areolar reduction surgical technique especially in grade IV post-bariatric gynecomastia.

Keywords: Plastic surgery, Post-bariatric, Gynecomastia.

INTRODUCTION

Gynecomastia is a unilateral or bilateral mammary gland enlargement in men that is benign and reversible. It is often confused with pseudogynecomastia, which refers to subareolar fat accumulation without gland involvement⁽¹⁾.

Fat tissue plays a key role in the development of obesity and metabolic complications, functioning both as energy store and major endocrine organ. The adipocyte is the principle cell type in adipose tissue, but the tissue is also comprised of adipocyte precursor cells, stromal-vascular cells, immune cells, and nerve cells⁽²⁾.

In mammals, two types of fat tissues are available: White fat tissue, which mainly serves as energy storing tissue, and brown fat tissue, which is mainly a thermogenic tissue. White adipocytes are characterized by a large lipid droplet that occupies the major part of the cytoplasmic space, while brown adipocytes contain numerous and relatively smaller lipid droplets and a large number of mitochondria⁽³⁾.

The function of the white adipocyte is to store excess energy and to provide other tissues with energy during periods of negative energy balance, by discharging unsaturated fats and glycerol from lipolysis of triglycerides stored in the adipocyte droplet. The storage function of fat tissue appears to be an important factor in obesity-related metabolic disorders. When the storing capacity of the fat tissue is exceeded or when the fat tissue is not functioning properly, fatty acids increase in the circulation and triglycerides accumulate in different organs, for example, liver, muscle, heart,

and the beta cells of the pancreas⁽⁴⁾. This ectopic fat deposition may seriously affect the functions of these organs and contribute to the pathogenesis of obesity-related conditions for example, insulin resistance diabetes, steatohepatitis and cardiovascular disease⁽⁵⁾. In addition to its storage function, fat tissue also has endocrine, paracrine and autocrine activities. Adipocytes secrete different peptides that control a wide range of functions including whole-body energy balance, inflammation, insulin sensitivity, blood pressure regulation, angiogenesis and cell development⁽⁶⁾. A lean adult has about 35 billion adipocytes and each adipocyte contains about 0.4 to 0.6 ug of triglyceride; an extremely obese adult can have 4 times as many adipocytes (125 billion), each containing twice as much lipid (0.8 to 1.2 u g of triglyceride)⁽⁷⁾.

With increasing obesity between population augment the problem of gynecomastia between males reflecting the psychological aspect and embarrassment. So, solving this problem by modern trends of bariatric surgery for weight reduction augment gynecomastia problem and increase the demand for correctional surgery⁽⁸⁻⁹⁾.

The aim of the treatment was to restore a masculine chest by resecting breast tissue and excess skin, reducing and adequately replacing the nipple-areola complex and removing the sub-mammary fold with minimal scar-ring to the chest⁽¹⁰⁾. The aim of the current study was to assess the aesthetic outcome of management of post-bariatric gynecomastia in Zagazig University Hospitals.

PATIENTS AND METHODS

This Randomized-controlled clinical trial included 30 patients with post-bariatric gynecomastia.

This study was performed during the period from February 2018 to February 2020 in the Plastic & Reconstructive Surgery Department, Zagazig University Hospitals. Patients were divided, according to computerized programme. Group A (15) patients who underwent postero-inferior pedicle surgical technique, their ages ranged from 18 to 60 years with a mean of 33.13 ± 5.62 years, and group B (15) patients who underwent circum-areolar reduction surgical technique, their ages ranged from 18 to 60 years with a mean of 33.33 ± 7.4 years.

Inclusion criteria: Age between 18 and 60 years old. Gynecomastia post-bariatric surgery. gynecomastia grade III & IV.

Exclusion criteria: Any patient with uncontrolled diabetes, hepatic, renal and cardiac problems. Any patient refusing participation in this study or difficult to follow up after surgery.

Pre-operative:

Patients were subjected to history taking, physical examination, investigations [Complete Blood Count (CBC)], liver function tests (LFT), kidney function test (KFT), Coagulation profile and breast ultrasound. Patients should stop smoking at least two weeks before the operation. Patients were operated with one of two surgical techniques either by postero-inferior pedicle or circumareolar reduction surgical technique.

(A) Postero-inferior pedicle surgical technique :

Drawing was performed preoperatively on standing patients. The drawings delineated the palpable gland limits, with the inferior resection line being placed in the inframammary fold, and the amount of tissue to be resected determined by a pinch test (generally just above the areola). Surgery was performed under general anesthesia. The patient was placed in the supine position with the arms abducted at 90 degrees.

An adrenaline serum infiltration (1 L of Ringer's lactate solution, 1cc of adrenalin 1:1000; mean = 0.5–1 L/patient) was administered. The first surgical step consisted of liposuction of the entire thoracic area, except for the area of the pedicle, using a 4-mm cannula. At the superior quadrants, only deep fat was aspirated to achieve liposuction undermining.

A separation layer was then created on these superior quadrants, allowing the superior fascio-cutaneous thoracic flap to be moved to the inframammary fold. We then proceeded to perform de-epithelialization of the flap between the areola and inframammary fold. We checked the resection lines of the infero-internal and infero-external quadrants by pinching the skin, then incised along the tracks. Using

electrocautery, we removed these quadrants close to the dermis. At the upper extremity of the areolar flap, we realized a bevel section to reduce the stair effect.

This was then sutured to the pectoral perimysium by absorbable stitches, with the aim of gradually reducing the flap thickness. We then fixed the superior thoracic flap to the inframammary fold. We checked via palpation that the new location of the nipple–areola complex corresponded to the predetermined drawing on the superior thoracic flap.

We then proceeded to perform the skin incision, remove a skin and fat cylinder on the superior thoracic flap, and, finally, transpose the nipple–areola complex using a technique similar to that employed to transpose an umbilicus in abdominoplasty. The nipple–areola complex was then secured by 8 subcutaneous reversing stitches with 3-0 absorbable monofilament. A compression bandage was applied and kept in place day and night for between 48 and 72 h. It was then replaced by compressive chest clothing over a total period of 2 months. Practicing a sport also requested after 2 months.

B) Circum-areolar reduction surgical technique

Skin marking is done with the patient awake and sitting in an upright position. We normally outline a 30-mm-diameter nipple-areola complex around the existing nipple. A second complete circumareolar circle representing the epidermal ring to be de-epithelialized is drawn 15 to 20 mm from the outlined nipple-areola complex. Finally, the breast gland is outlined. Then surgery was performed under general anesthesia. The patient was placed in the supine position with the arms abducted at 90 degree. The complete circumareolar ring is de-epithelialized. An incision is then made from 3 o'clock to 9 o'clock along the inferior border of the deepithelialized ring. Subcutaneous glandular excision is completed through that incision. And a closed suction drain is then placed. A 3–0 polypropylene intradermal circumareolar pursestring stitches is used for skin closure. Few interrupted 5–0 absorbable sutures are also used to adjust skin edges at the pursestring closure.

Post-operative Follow up:

An elastic compressive chest garment is applied intraoperatively and is worn for 2 months. The patient may go home the next day with the drains in place and then attend the clinic daily until the drains are removed.

Ethical consent:

Approval for performing the study was obtained from Plastic & Reconstructive Surgery Department, Zagazig University Hospitals after taking Institutional Review Board (IRB) approval. Every patient signed an informed written consent for acceptance of participation in the study. Study has been carried out on experiments involving human subjects in compliance with the Code of Ethics of the World Medical Association (Declaration Helsinki).

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA).

Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) was used to calculate difference between two or more groups of qualitative variables. Quantitative data

were expressed as mean \pm SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value $<$ 0.05 was considered significant.

RESULTS

Age was distributed as 33.33 ± 7.4 and 33.13 ± 5.62 respectively with no significant difference between groups (Table 1).

Table (1): Age distribution among studied group

	Circum areolar reduction technique Group	Post-inf pedicle technique Group	t	P
Age	33.33 \pm 7.4	33.13 \pm 5.62	0.083	0.934

Table (2) showed that there was no significant difference between groups regarding any of anthropometric measures.

Table (2): anthropometric measures distribution between studied groups

	Circum areolar reduction technique Group	Post-inf pedicle technique Group	t	P
Weight (Kg)	79.8\pm5.51	81.66\pm5.86	-0.898	0.377
Height (M)	1.68\pm0.03	1.69\pm0.05	-0.719	0.478
BMI	28.2\pm1.58	28.46\pm2.0	-0.384	0.704

Table (3) showed that there was no significant difference between groups regarding nipple sensation or projection.

Table (3): Nipple sensation and projection distribution between studied groups

			Surgery		Total	X²	P
			Circum areolar reduction technique Group	Post-inf pedicle technique Group			
Nipple sensation	No	N	5	2	7		
		%	33.3%	13.3%	23.3%		
	Yes	N	10	13	23	1.67	0.19
		%	66.7%	86.7%	76.7%		
Nipple projection	No	N	4	2	6		
		%	26.7%	13.3%	20.0%		
	Yes	N	11	13	24	0.83	0.36
		%	73.3%	86.7%	80.0%		
Total		N	15	15	30		
		%	100.0%	100.0%	100.0%		

Residual skin redundancy was significantly associated with circum-areolar reduction technique group but defective scar was associated with post-inf pedicle technique group but not significantly, and overall complication was significantly associated with circum-areolar reduction technique group as shown in table (4).

Table (4): Complication distribution between studied groups

			Surgery		Total	X ² / Fisher exact	P
			Circum-areolar reduction technique Group	Post-inf pedicle technique Group			
Residual skin redundancy	No	N	4	15	19		
		%	26.7%	100.0%	63.3%		
	Yes	N	11	0	11	14.36	0.00**
		%	73.3%	0.0%	36.7%		
Nipple necrosis	No	N	13	13	26		
		%	86.7%	86.7%	86.7%		
	Yes	N	2	2	4	0.00	1.0
		%	13.3%	13.3%	13.3%		
Defective scar	No	N	15	11	26		
		%	100.0%	73.3%	86.7%		
	Yes	N	0	4	4	3.11	0.085
		%	0.0%	26.7%	13.3%		
Hematoma	No	N	12	14	26		
		%	80.0%	93.3%	86.7%		
	Yes	N	3	1	4	1.15	0.28
		%	20.0%	6.7%	13.3%		
Overall complication	No	N	4	11	15		
		%	26.7%	73.3%	50.0%		
	Yes	N	11	4	15	6.53	0.011*
		%	73.3%	26.7%	50.0%		
Total	N	15	15	30			
	%	100.0%	100.0%	100.0%			

In grade III, there was 6 patients with excellent satisfaction and 1 patient with fair satisfaction after circum-areolar reduction surgery technique. While in grade IV, 7 patients with excellent satisfaction and 1 patient with fair satisfaction after post-inf pedicle surgery technique as shown in table (5).

Table (5): Post-operative patients' satisfaction distribution between studied groups

Patient's satisfaction		Surgery				Total
		Circum-areolar reduction technique Group		Post-inf pedicle technique Group		
		Grade III	Grade IV	Grade III	Grade IV	
Excellent	N	6	0	0	7	13
	%	20 %	0 %	0 %	23.33 %	43.33 %
Fair	N	1	1	1	1	4
	%	3.33 %	3.33 %	3.33 %	3.33 %	13.33 %
Poor	N	0	7	6	0	13
	%	0 %	23.33 %	20 %	0 %	43.33 %
Total	N	7	8	7	8	30
	%	23.33 %	26.67 %	23.33 %	26.67 %	100.0%

DISCUSSION

In our study, the mean age was 33.13 ± 5.62 ranging from 27-39 years old, which is comparable with **Thiénot et al.** (11) and **Tashkandi et al.** (12) as the mean age of the patients in their studies was 36 ± 9.3 ranging from 27-45 years old.

In our study, the mean weight was 81.66 ± 5.86 ranging from 75-88 kg(s), and the mean BMI was 28.46 ± 2.0 kg/m² ranging from 26.4-31.4 kg/m². While in the study of **Thiénot et al.** (11), the mean weight was 94 ± 21.7 ranging from 68-128 kg(s), and the mean BMI was 30.7 ± 5.4 kg/m² ranging from 24.6-37.6 kg/m². And in the study of **Tashkandi et al.** (12), the mean weight of the

patients in their study was 89.3 ± 6.69 ranging from 83-95 kg(s), and the mean BMI was 30.6 ± 2.89 kg/m² ranging from 27.71-33.49 kg/m². This difference between the weight and BMI groups may be returned to that the patients in our study underwent different bariatric operations so they lost massive weight which was about 26-40 kg(s). In this study, nipple sensitivity and nipple projection was intact in thirteen (13) patients and two (2) patients had nipple in-sensitivity and no nipple projection. This may be due to that the nerves to the area are traumatized and then experience a temporary neuropraxia, a transient loss of nerve conduction due to the nipple areola complex

repositioning. Typically this should be resolved within 1 year. And the loss of nipple projection may be due to flap necrosis/ischemia caused by poor blood circulation or may be due to active smoking. In the study by **Thiénot *et al.***⁽¹¹⁾ nipple sensitivity was intact in eight (8) patients and one (1) patient complained of dysesthesia. And all nine (9) patients had normal nipple projection. The cause of dysesthesia (abnormal sensation) was due to damage of peripheral nerves to area of nipple areolar complex.

In our study, fifteen (15) patients had no skin redundancy, two (2) patients presented with nipple necrosis, four (4) patients had a defective scar and one (1) patient had hematoma. The risk of hematoma may be due to that some patients did not follow some instructions as wearing compressive clothes day and night after the operation, the defective scar was due to fixation of the dissected superior thoracic flap to the infra-mammary fold but it was acceptable for the patients as there was no skin redundancy and the scar was treated by cosmetics creams later on and patients were satisfied. In the study by **Thiénot *et al.***⁽¹¹⁾ nine (9) patients had no skin redundancy, none of the patients presented with nipple necrosis or hematoma or seroma and nine (9) patients had a defective scar. This defective scar was accepted by the patients and they were satisfied. In our study, eleven (11) patients had mild to severe skin redundancy, two (2) patients had nipple necrosis, three (3) patients had hematoma, and no one had a defective scar. While in the study **Tashkandi *et al.***⁽¹²⁾ eighteen (18) patients had mild to severe skin redundancy, no one had a defective scar, nipple necrosis or hematoma. Mild skin redundancy occurred especially in grade III gynecomastia that was resolved by time by wearing compressive clothing day and night for 2 weeks, while the severe skin redundancy occurred in grade IV gynecomastia as there was no skin excision done in the circum-areolar reduction technique.

In the current study, all patients were completely satisfied with the results, which is comparable with the study by **Thiénot *et al.***⁽¹¹⁾ as all patients were also completely satisfied with the results.

In this study, seven (7) patients with grade III gynecomastia were completely satisfied, and eight (8) patients with grade IV gynecomastia were poorly satisfied as there was residual skin redundancy. While in the study by **Tashkandi *et al.***⁽¹²⁾ all the patients were with grade III gynecomastia, and they were completely satisfied although there was mild skin redundancy which was resolved by time by continuous wearing of compressive clothing for a time.

The circum-areolar reduction technique only in few cases of grade III post-bariatric gynecomastia gave better results than the postero-inferior pedicle technique as there was no defective scar only a limited circum-areolar scar and there was no skin redundancy which is comparable with the study by **Tashkandi *et al.***⁽¹²⁾. On the other hand, the postero-inferior pedicle technique in

grade III & IV post-bariatric gynecomastia gave better result than the circum-areolar reduction technique as there was no residual skin redundancy but there was a defective scar, which was acceptable for the patients, which is comparable with the study by **Thiénot *et al.***⁽¹¹⁾

CONCLUSION

Throughout our study, we found that the postero-inferior pedicle technique gave better result than the circum-areolar reduction surgical technique especially in grade IV post-bariatric gynecomastia. Because there was no residual skin redundancy, which was the main complain of the patients treated by the circum-areolar reduction surgical technique especially in grade IV. The defective scar in the infra-mammary fold that was associated with the postero-inferior pedicle technique was treated by cosmetic creams and several fractional laser sessions and patients accepted the end results.

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