Circumareolar concentric excision for Simon's grades 2B and 3 gynecomastia

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Purpose
The aim of this study was to evaluate the surgical outcome of circumareolar concentric skin excision for (grades 2b and 3) gynecomastia and its impact on the quality of life of these patients before and after surgery.
Patients and methods
Thirty male patients with bilateral gynecomastia (grades 2b and 3) were included in this study during the period from January 2012 to December 2014 at Benha University Hospital; all patients were operated upon by performing circumareolar doughnut skin excision for their Simon's (grades 2b and 3) gynecomastia.
Results
There was an acceptable improvement in the shape and contour of the breast with significant patient's satisfaction. No major offending operative or postoperative complications have been reported.
Conclusion
Although there are some possible complications associated with surgery, our case series demonstrates that with shrewd planning and careful patient selection, outcomes of operative correction can be favorable and yield high levels of satisfaction for both the patient and the surgeon.

Introduction

Gynecomastia is a benign enlargement of the male breast. It is a common condition, with an incidence in young patients as high as 38% [1].

Gynecomastia presents physiologically in two-thirds of normal male at puberty and may persist into adolescence. This transient breast enlargement usually subsides spontaneously, but it may persist during adolescence or adulthood due to a real hypertrophy of breast tissue, fat excess, or a combination of both [2].

Gynecomastia is divided according to Webester into true gynecomastia, which is due to proliferation of ducts and periductal tissues, and pseudogynecomastia, which is due to deposition of adipose tissue and combined cases [3].

Morphologically and according to the degree of skin redundancy, Simon et al. [4] classified gynecomastia into three grades:

(1) Grade I: small visible breast enlargement and no skin redundancy.
(2) Grade IIA: moderate breast enlargement without skin redundancy.
(3) Grade IIB: moderate breast enlargement with skin redundancy.
(4) Grade III: severe breast enlargement with marked skin redundancy (pendulous female breast).

On the basis of the different structural components of the breast (skin, the nipple–areola complex, inframammary fold, and glandular tissue) and the relations between these various components and in particular between the inframammary fold and the nipple–areola complex, Adriana and Francesco proposed a new four-grade gynecomastia classification of increasing severity from I to IV as follows. Grade I: increase in male breast diameter and protrusion but still limited to the areolar region. Grade II: hypertrophy of all structural components of the breast beyond the areola region but still the nipple–areola complex is above the inframammary fold. Grade III: hypertrophy of all structural components of the breast with the nipple–areola complex at the same height as or about 1 cm below the inframammary fold. Grade IV: hypertrophy of all structural components of the breast with the nipple–areola complex more than 1 cm below the inframammary fold [5].

True gynecomastia is due to some form of endocrine imbalance [6]. This may be attributable to increased estrogen, decreased androgen, receptor defects, or an altered sensitivity of the breast to estrogen [7].

The endocrine imbalance may occur first as a physiological condition, which may become evident during various periods of a man's life: neonatal, pubertal, or involutional. It is unlikely that neonatal gynecomastia would be treated surgically. If pubertal gynecomastia is transient, there are no surgical implications. The permanent form is well known. Involutional imbalance is a medical problem, and surgery is rarely indicated. The second endocrine imbalance is endogenous; this condition may result from congenital or acquired hormonal abnormalities such as Klinefelter's syndrome, male hypogonadism, testicular neoplasm, mumps, testicular atrophy, adrenal cortex neoplasm, adrenal cortex hyperplasia, thyrotoxicosis, and pituitary tumor. Finally, the third endocrine imbalance is exogenous; this situation may result from the administration of hormones, drugs whose molecular structure is similar to that of estrogen, or drugs that antagonize androgen [6].

The most common symptom of the patient with gynecomastia is being self-conscious about the appearance of the enlarged breasts, and, occasionally, tenderness or even pain [7].

Most patients request treatment for psychological reasons. The goal in treating these patients is resection of the abnormal tissue that restores the normal male breast contour and minimizes scarring or residual deformity of the breast and the nipple–areola complex [8].

Determination of the site and size of the nipple–areola complex in men according to Beckenstein and colleagues was ∼20 cm from the sternal notch and 18 cm from the midclavicular line. The ideal nipple-to-nipple distance is 21 cm. The average areolar diameter is 2.8 cm [9].

In 1990, Spear et al. [10] described three rules to mark the patient having concentric mastopexy that seemed to produce more predictable esthetic results (Fig. 1). The three rules are as follows:

(1) The outer circle diameter must be drawn not to exceed the original areola diameter by more than the difference between the original areola diameter and the inner concentric circle (normal) diameter.
(2) The diameter of the outer circle should never be more than twice the diameter of the inner circle.
(3) The final areola size should be an average of the inner and the outer concentric circle.

Patients and methods

Thirty male patients with bilateral gynecomastia (grades 2b and 3) were included in this study during the period from January 2012 to December 2014 at

Figure 1
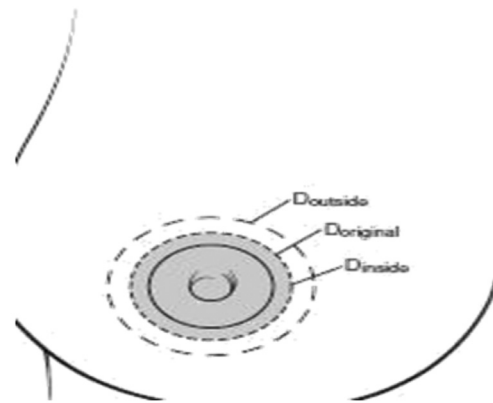
Rule 1 D. outside ≤ D.(original - D.inside)
Rule 2 D. outside ≤ D. (2 × D.inside)
Rule 3 D. final = D. (original - D.inside)

Spear rules. Illustrative markings of the three concentric circles for the spear rules in mastopexy design. D, the diameter of labeled circles. Rule 1: $D_{outside} \leq (D_{original} - D_{inside})$; rule 2: $D_{outside} \leq (D2 \times D_{inside})$; rule 3: $D_{final} = (D_{original} - D_{inside})$.

Benha University Hospital, after approval of the study by the local ethical committee and obtaining written fully informed consent from the patients. The age of the patients ranged between 20 and 44 years with a mean age of 26 years. All patients underwent a routine preoperative evaluation in the form of proper medical history, careful general and local examination, and routine laboratory investigations, especially endocrinal assessment. Cases of secondary gynecomastia due to hormonal imbalance, drugs, or liver diseases and those suffering from morbid obesity were excluded from the study. Only idiopathic cases with average BMI were included in this study. Breast mammography was performed to exclude the presence of breast calcifications.

On the basis of the size of the breast and the degree of skin redundancy in Simon's classification, only the moderate to severe degrees (grades 2b and 3) were included in this study, either true gynecomastia cases (firm, localized, and discoid mass), pseudogynecomastia cases (soft and diffused mass), or mixed cases confirmed by means of mammography.

Surgical technique

Markings were drawn with the patient in upright position and included the midline of the chest, inframammary fold, breast meridian (from the midclavicular point to the nipple normally=18 cm), and then with the patient lying down the concentric circles were drawn in the form of three circles centered at the nipple (Fig. 2).

Figure 2
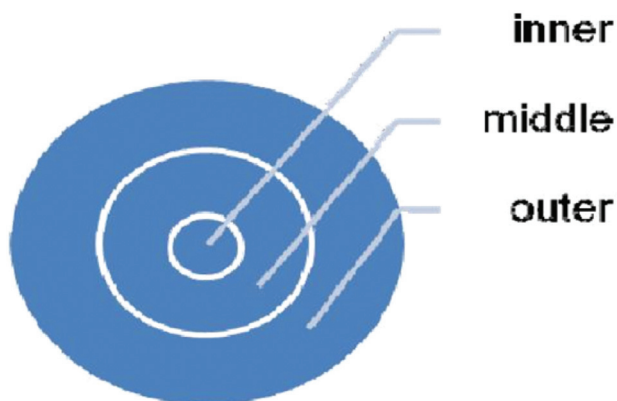
The three concentric circles.

(1) Original areolar circle in the middle.
(2) Normal-sized areolar circle (about 2.8 cm in diameter) internally.
(3) Circle of the epithelialization outside and its radius were determined by subtraction normal meridian (18 cm) from the actual meridian.

Under general endotracheal anesthesia with the patient in the supine position, the surgical field was prepped and draped, and then infiltration of the subcutaneous tissue with tumescent solution composed of 250–350 ml mixture of normal saline 1000 ml, lidocaine 2% 25 ml, and 1 ml adrenaline 1 : 1000 was carried out. De-epithelialization of the skin area between the inner and the outer circle was meticulously performed so as to not to jeopardize the vascularity of the nipple–areola complex. The dimension of this skin area was carefully tailored to fit the degree of skin redundancy and the size of the breast for each patient. A semicircular incision was made at the lower edge of the large circle through which the gynecomastia structure with a decent amount of breast tissue was dissected from the nipple and areola, leaving 10–15 mm thickness of tissue on the undersurface of the nipple and areola and to the pectoral fascia deeply without insulting it, and then proper hemostasis was carried out and negative suction drain was inserted. The wound was closed with the aid of a purse string proline 4/0 suture through the large circle to become at the size of the small circle. Subsequently, deep dermal interrupted vicryl 4/0 sutures were applied, followed by subcuticular skin closure using vicryl 5/0 sutures. The excised tissue was sent for histopathological examination.

An elastic compression garment was applied for 48 h before exposure of the wound. The patient was discharged the same day from hospital. Broad spectrum antibiotic was prescribed in the form of intravenous second generation cephalosporin every 12 hours for 48 hours, and then maintained on the oral form for 1 week. Sutures were removed after 7–10 days, and the drain was removed once stopped drainage or when the drainage was less than 20 ml per day. The garment was applied for 3 months. Postoperative follow-up visits were scheduled at 2 weeks, 1, 3, and 6 months to allow for close follow-up and photographing.

No validated outcome assessment questionnaire exists specifically for gynecomastia correction. We, therefore, created a three-item questionnaire, which was sent to all patients who underwent surgery to ascertain their satisfaction with the procedure. A similar proforma was used by Ridha *et al.* [11]. The proforma comprised questions that allowed patients to rank their satisfaction levels with their surgery in relation to three factors. The first question was related to patients' comfort with their breast/chest in different settings (intimate, social, and professional). The second question was related to the degree of comfort with their breast/chest appearance. The third question was related to patients ranking as regards the satisfaction level for themselves and their partner/family (1=very dissatisfied; 2=dissatisfied; 3=neither; 4=satisfied; and 5=very satisfied) preoperatively and postoperatively.

To achieve some level of objective assessment, a topographic scale was used to evaluate preoperative and postoperative results. Each patient underwent a photographic assessment before and after surgery at each visit. The photos taken before and after surgery were assessed by three surgeons who were not involved with the patients; surgeon-assessed result was evaluated in a visual analog scale (scale 0–10 wherein 0 is worst outcome and 10 is the best). The visual analog scale considered symmetry, scarring, and natural appearance. Data provided by surgeons were grouped [12].

Results

Thirty patients with grades 2b and 3 gynecomastia were included in the study, 18 (60%) cases of true gynecomastia and 12 (40%) cases of pseudogynecomastia. The age of the patients ranged between 20 and 44 years, with a mean age of 26 years. There were two obese patients, eight overweight patients, five cases of type 2 diabetes mellitus, and one case of hypertension. The remaining 17 cases were free of comorbidity. All patients with bilateral idiopathic gynecomastia were enrolled (Tables 1 and 2).

All patients received general endotracheal anesthesia and local tumescent solution and were operated up on

Table 1 Type of gynecomastia

Total	True gynecomastia	Pseudogynecomastia
30	18 (60%)	12 (40%)

Table 2 Comorbidity with the cases

	n (%)
Obese	2 (6.7)
Overweight	8 (26.7)
Diabetes	2 (6.7)
Hypertension	1 (3.3)
Free	17 (56.6)

by performing circumareolar concentric excision (in the shape of a doughnut), after which the patients were advised to wear elastic garment and were followed up at 2 weeks, 1, 3, and 6 months.

The collected data included the duration of surgery, amount of blood loss, need for blood transfusion, postoperative hospital stay, frequency of complications, and the impact on the patient's quality of life preoperatively and 6 months postoperatively.

Early complications that occurred within the first 2 weeks were hematoma, seroma, skin gangrene, bruises, and infection, and late complications that occurred after 3 months were hypoesthesia, ugly scar, nipple inversion, residual lump, and skin redundancy.

All surgeries were accomplished smoothly without intraoperative complications with a mean operative time of 90±31 min. All patients had an uneventful postoperative course. Complications were classified into two types: early, when occurring within the first 15 days, and late if happening after this period. Early complications were observed in two patients (6.6%), who developed seroma collections after removal of the drains and were treated by means of aspiration.

One patient (3.3%) developed hematoma and was treated medically. Six patients (20%) developed bruises in the surgical field early postoperatively and was managed without trouble. Two patients (6.6%) developed infections in the suture line with partial dehiscence, one patient was managed conservatively and the other required secondary sutures. No cases of skin, nipple, or areola sloughing or gangrene were observed.

As regards late postoperative complications (3 months postoperatively), one (3.3%) patient developed unilateral hyposthenia in the region of the nipple and areola and two (6.6%) patients developed ugly keloid scars and were treated with serial corticosteroid injections. There

Table 3 Operative data

Data	Finding
Operative time (min)	90±20
Weight of excised tissue (g/side)	250±30
Hospital stay	All one day

Table 4 Early complications

	n (%)
Hematoma	1 (3.3)
Seroma	2 (6.6)
Skin necrosis	–
Bruises	6 (20)
Infection	2 (6.6)

Table 5 Day of drain removal

Cases	Day of drain removal	Total amount (ml/day)
13	5th	30–80
9	6th	35–85
8	7th	40–110

Table 6 Total amount of seroma on each side before drain removal

Number of cases	Right side (ml)	Left side (ml/day)
13	30	50
9	35	60
8	40	70

Table 7 Seroma after drain removal

	n (%)
Number of cases	2 (6.6)

Table 8 Late complications

	n (%)
Hyposthenia	1 (3.3)
Ugly scar	2 (6.6)
Nipple inversion	–
Residual lump	–
Skin redundancy	–

were no cases of nipple inversion or residual lumps (Tables 3–8).

As regards patient satisfaction preoperatively and postoperatively, all 30 patients were very dissatisfied preoperatively with their images; postoperatively, 20 (66.6%) cases were very satisfied with their images, five (16.7%) cases were satisfied, and five (16.7%) cases were equivocal in their satisfaction with their images.

There were high satisfaction rates among surgeons. In total, 21 patients (70%) had their outcome classified as 'excellent' at their second follow-up appointment, five patients (16.7%) had their outcome classified as 'good',
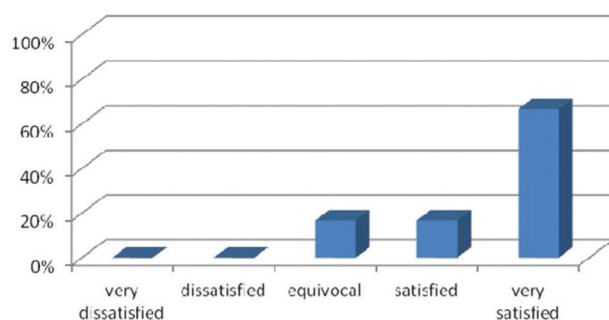
Table 9 Levels of patients' satisfaction

Postoperative satisfaction	Number of patients [n (%)]	P value
Very dissatisfied	0 (0)	
Dissatisfied	0 (0)	
Equivocal	5 (16.7)	0.05
Satisfied	5 (16.7)	0.05
Very satisfied	20 (66.6)	0.03

Table 10 Topographic scale

Scales	n (%)	P value
Excellent	21 (70)	0.01
Good	5 (16.7)	0.05
Satisfactory	4 (13.3)	0.05
Poor	–	

Table 11 Visual analog scale

Data	Score	Finding [n (%)]
Scaring	8	9 (30)
	9	21 (70)
Symmetry	7	5 (16.7)
	9	25 (83.3)
Natural appearance	8	10 (33.4)
	9	20 (66.6)

Figure 3

Levels of patient's satisfaction.

and four (13.3%) patients were classified as 'satisfactory' (Tables 9–11 and Figs 3 and 4).

Analysis revealed a general trend showing increased satisfaction rates as time from surgery increased.

Discussion

Numerous esthetic surgical techniques have been described for correction of gynecomastia, but it is a challenge to fulfill the main objectives of the surgical treatment of gynecomastia, which are restoration of the male chest shape with good contour, elimination of the inframammary fold, correction of the position of the nipple–areola complex, removal of redundant skin, and symmetrization between the two sides and the nipple–areola complex [5].

Mild grades of gynecomastia (Simon's 1 and 2) of pseudogynecomastia type are amenable to liposuction, but in severe grades (Simon's 3) open surgery should be performed alone or in combination with liposuction [13].

Surgery is the mainstay of treatment for gynecomastia. Although a wide range of surgical techniques have been described, such as infra-areola excision of breast tissue, concentric mastopexy, formal breast reduction as in female breast reduction with superiorly or inferiorly based pedicled flaps, or breast amputation with free nipple–areola graft, surgeons often find it difficult to choose the technique that will achieve the best results for a given patient [14].

The surgical management of high-grade gynecomastia (Simon's grade III) has remained problematic because both liposuction and conventional subcutaneous mastectomy (without skin excision) have frequently resulted in significant residual skin redundancy, requiring a second operation for skin resection [15].

In an attempt to minimize scarring, Balch [16] introduced the transaxillary approach for glandular excision. The technique is effective in the removal of glandular tissue, but it cannot be used in Simon's grades II and III with much fat and skin excess. However, in the present study, the circumareolar technique helped us to hide the scar around the areola and also helped to widen the range of access to excise all gynecomastia tissues without the aid of liposuction and to excise the redundant skin all around the areola.
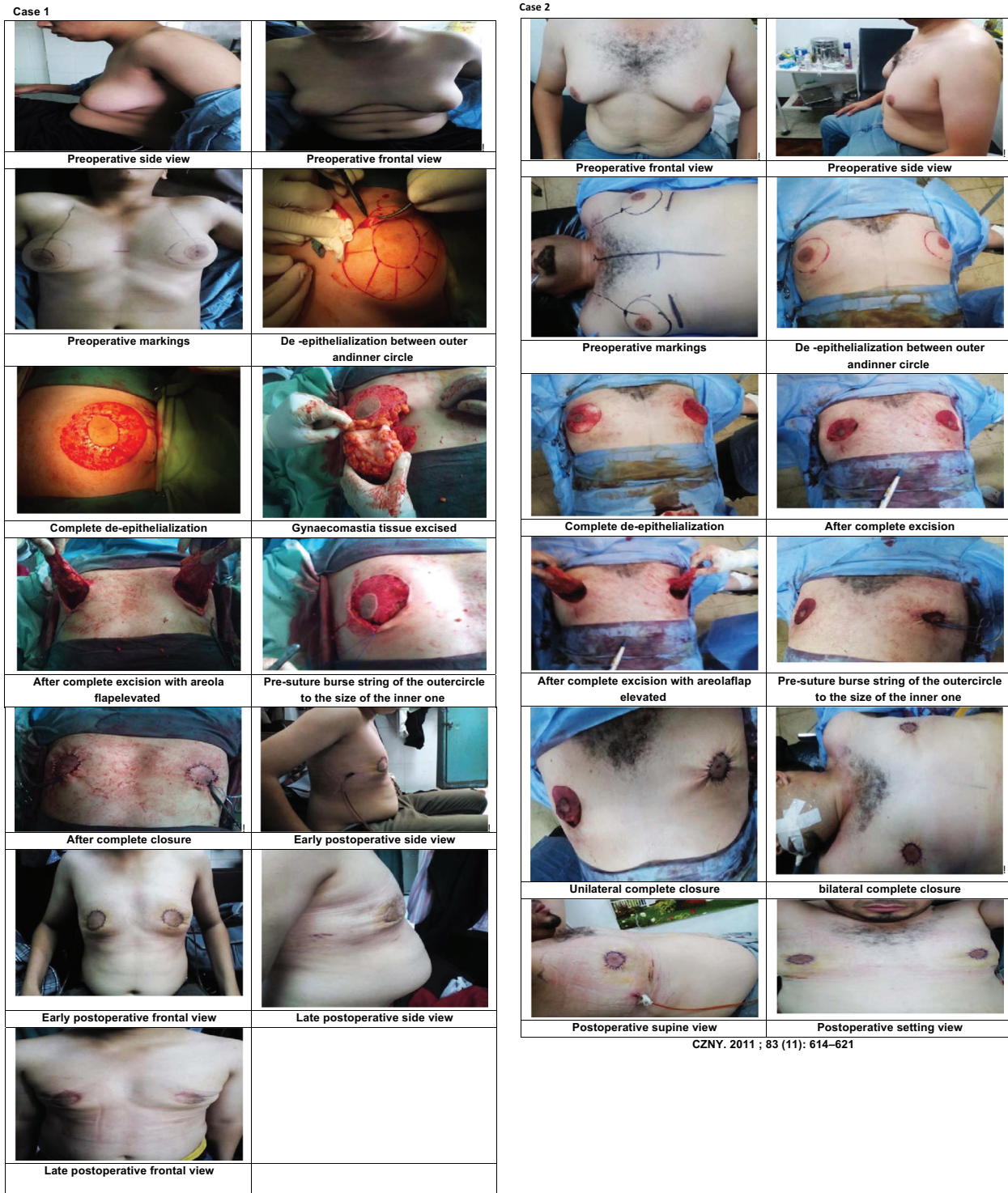
As regards complications, only two patients developed seroma after drain removal and were treated by means of aspiration.

As regards late complications, only two patients developed keloid scar treated with corticosteroid injections, and one patient developed unilateral hypoesthesia in the region of the nipple and the areola.

Celebioglu et al. [7] found that the main disadvantage of the free areola nipple graft technique was long transverse scar and loss of sensation in nipple graft. Moreover, in pedicle nipple–areola flap in conventional breast reduction the main disadvantage was the inverted T scar.

The most common complication in the study by Fruhstorfer and Malata [14] was a residual lump in patients treated with conventional liposuction alone, which was often associated with a degree of discomfort.

Figure 4

Case 1

Preoperative side view | Preoperative frontal view

Preoperative markings | De -epithelialization between outer and inner circle

Complete de-epithelialization | Gynaecomastia tissue excised

After complete excision with areola flap elevated | Pre-suture burse string of the outercircle to the size of the inner one

After complete closure | Early postoperative side view

Early postoperative frontal view | Late postoperative side view

Late postoperative frontal view

Case 2

Preoperative frontal view | Preoperative side view

Preoperative markings | De -epithelialization between outer and inner circle

Complete de-epithelialization | After complete excision

After complete excision with areolaflap elevated | Pre-suture burse string of the outercircle to the size of the inner one

Unilateral complete closure | bilateral complete closure

Postoperative supine view | Postoperative setting view

CZNY. 2011 ; 83 (11): 614–621

Topographic scale.

In these cases, some patients were not satisfied with the result, but in our study we excised the redundant skin and the wide circle allowed us a wider plane for fat excision.

Outcome studies of gynecomastia correction have shown varying levels of satisfaction with the results of surgery with Fruhstorfer and Malata [14] showing high levels of satisfaction, whereas the results of Ridha et al. [11] showed much lower levels. Our series demonstrated generally high satisfaction rates among both patients and surgeons.

Twenty-one patients (70%) had their outcome classified as 'excellent' ($P=0.01$) at their second follow-up appointment by the operating surgeon, five patients (16.7%) had it

classified as 'good', and four (13.3%) as 'satisfactory' with no poor outcome among patients and surgeons.

Patients were generally 'satisfied' with their outcome as regards comfort and appearance. Patients who underwent excision were generally very satisfied, obtaining the highest overall scores for satisfaction, chest shape, and self-confidence levels. The periareolar scar was well-accepted and faded with time. This is in accordance with the study by Anna Kasiels and Bogusław Antoszews [17], which revealed that gynecomastia causes considerable emotional discomfort and limitation of everyday activity in young men. Thus, it constitutes a psychosocial problem and surgical treatment of gynecomastia significantly contributes to an increase in social activity and an improvement in social acceptance and emotional comfort, and hence it significantly improves satisfaction from personal life in the men who underwent this intervention.

Conclusion

The reason for adopting this procedure is that it is simple and straightforward procedure that results in flat chest compared with other breast reduction techniques that carry the risk for more complications such as cone-like breast contour, less skin excision with marked skin redundancy, longer time, and ugly scar. Although there are some possible complications associated with surgery, our case series demonstrates that, with careful planning and shrewd patient selection, outcomes of operative correction can be favorable and yield high levels of satisfaction from both patient and surgeon.

Conflicts of interest

No conflict of interest. All procedures done in the best interest of the patients and all patient were delight about their surgical outcome.

References

1 Nydick M, Bustos J, Dale JH, Rawson RW. Gynaecomastia in adolescent boys. JAMA 1961; 178:449–454.

2 Brenner P, Berger A, Schneider W, Axmann HD. Male reduction mammoplasty in serious gynaecomastias. Aesthetic Plast Surg 1992; 16:325–330.

3 Webster JP. Mastectomy for gynecomastia through a semicircular intra-areolar incision. Ann Surg 1946; 124:557–575

4 Simon BB, Hoffman S, Kahn S. Classification and surgical correction of gynecomastia. Plast Reconstr Surg 1973; 51:48–52.

5 Adriana C, Francesco M. Algorithm for clinical evaluation and surgical treatment of gynecomastia. J Plast Reconstr Aesthet Surg 2008; 61:41–49.

6 Letterman GL, Schurter M. Suggested nomenclature for aesthetic and reconstructive surgery of the breast. Part III: gynaecomastia. Aesthetic Plast Surg 1986; 10:55–57.

7 Celebioglu S, Ertas NM, Ozdil K, Oktem F. Gynecomastia treatment with subareolar glandular pedicle. Aesthetic Plast Surg 2004; 28:281–286.

8 Lewis CM. Treatment for gynaecomastia. Aesthetic Plast Surg 1985; 9:287–292.

9 Beckenstein MS, Windle BH, Stroup RT. Anatomical parameters for nipple position and areolar diameter in males. Ann Plast Surg 1996; 36:33–36.

10 Spear SL, Kassan M, Little JW. Guidelines in concentric mastopexy. Plast Reconstr Surg 1990; 85:961–966.

11 Ridha H, Colville RJI, Vesely MJJ. How happy are patients with their gynaecomastia reduction surgery? J Plast Reconstr Aesthet Surg 2009; 62:1473–1478.

12 Anderson RC, Cunningham B, Tafesse E, Lenderking WR. Validation of the breast evaluation questionnaire for use with breast surgery patients. Plast Reconstr Surg 2006; 118:597–602.

13 Kornstein AN, Cinelli PB. Inferior pedicle reduction technique for larger forms of gynecomastia. Aesthetic Plast Surg 1992; 16:331–336.

14 Fruhstorfer BH, Malata CM. A systematic approach to the surgical treatment of gynecomastia. Br J Plast Surg 2003; 56:237–246.

15 Tashkandi M, Al-Qattan MM, Hassanain JM, Hawary MB, Sultan M. Minimally invasive surgical therapy of gynecomastia: liposuction and exeresis technique. Ann Plast Surg 2004; 53:17–20.

16 Balch CR. A transaxillary incision for gynecomastia. Plast Reconstr Surg 1978; 61:13–16.

17 Anna Kasiels KA, Bogusław Antoszews KI. Effect of operative treatment on psychosocial problems of men with gynaecomastia. Pol Przegl Chir 2011; 83:614–621