Calculated Round Block Mastectomy for Grades IIB and III Gynaecomastia; Clinical Outcome and Patient Satisfaction: A Prospective Study

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Gynaecomastia is a common condition with prevalence in young adults as high as 38%. Enlarged breasts can cause anxiety, self-consciousness and embarrassment, functional problems and psychosocial discomfort and fear of malignancy. There are many surgical techniques for treating Gynaecomastia according to its grade. The aim of this study was to assess our novel calculation to adjust round block excision to minimize complication and difficulties of this procedure.

Patients and methods: This was a prospective study conducted on thirty-three patients (forty-two breasts) with grade IIB and III gynaecomastia "Simon grading" undergoing mastectomy via calculated round block excision.

Conclusion: Our novel calculated round block excision provides a safe and feasible technique for mastectomy in large gynaecomastia grades IIB and III.

Key words: Gynaecomastia, round block, Simon IIB-III.

Introduction

Gynaecomastia is derived from the Greek words gyne, meaning woman, and mastos, meaning breast. Gynecomasty is a synonym, and gynaecomazia is an obsolete term, while there have been many definitions of gynaecomastia, the one that is most applicable today is: A benign enlargement of the male breast (mamma masculina).[1]

It is a common condition, with a prevalence in young patients as high as 38%.[2] Gynaecomastia is of two types: 1-True gynaecomastia is due to proliferation of ducts and periductal tissues. 2-Pseudogynaecomastia is due to deposition of adipose tissue or to the presence of an excessive amount of skin.[3] True Gynaecomastia is usually caused by a hormonal imbalance as may be seen postnatally, during puberty, and in the elderly.

Most cases of Gynaecomastia are idiopathic, although, pathological etiologies need to be ruled out; these include congenital and endocrine disorders, tumors, and drugs. Gynaecomastia may be unilateral or bilateral, symmetrical or asymmetrical. Pain or tenderness may or may not be present. In contrast to the male breast cancer, which is usually present as a hard mass with or without skin changes and it is usually centrally located.[4]

The most common symptom of the patient with gynaecomastia is being self-conscious about the appearance of his enlarged breasts.[5] Enlarged breasts can cause anxiety, self-consciousness and embarrassment, functional problems and psychosocial discomfort and fear of malignancy. It is not surprising, therefore, that gynaecomastia is the most common cause for seeking medical advice for a breast condition in men, the two treatment options are medical therapy and surgical removal. Medical therapy is probably most effective during the active proliferative phase of the condition. If a trial of medical treatment is unsuccessful or the gynaecomastia has been present for several years, then surgical treatment is likely to be required. Surgery is indicated for patients with gynaecomastia that does not regress spontaneously or, with medical therapy, or causing considerable discomfort or psychological distress or is long-standing (beyond an 18-24-months period).[5]

The current surgical options for gynaecomastia are subcutaneous mastectomy, suction-assisted lipectomy, or a combination of these approaches that are performed with different technologic devices and surgical methods for different grades.[6]

Resection with skin reduction is generally added to the surgical procedure in Simon's grade III gynaecomastia[6] **(Table 1)**.

Table 1: Simon classification[7]

Simon classification	
Grade 1	Small enlargement, no skin excess
Grade IIA	Moderate enlargement, no skin excess
Grade IIB	Moderate enlargement with skin excess
Grade III	Marked enlargement with extra skin

In spite of the variety of methods and tools used in gynaecomastia surgery, in mild gynaecomastia the results are satisfactory while severe gynaecomastia presents a surgical challenge.[8] As some postoperative frustrating problems still cannot be completely eliminated, the most common of these are a saucer-like deformity (over resection under areola), bleeding, followed by seroma, infection, ischaemic necrosis of nipple-areola complex residual gynaecomastia (under resection), persistence of inframammary fold, contour irregularities, and asymmetries between breasts.[3]

Patients and methods

This was an observational review of patients who had undergone mastectomy for gynaecomastia via calculated round block technique by an experienced breast surgical team at the Ain shams university hospitals between May 2014 and June 2016. Inclusion criteria comprised adult male complaining of unilateral or bilateral grade IIB-III gynaecomastia per modified Simon scale and pseudogynaecomastia following massive weight loss with excess skin and laxity, patients with chronic liver and renal disease, hyperthyroidism, alcoholics, diabetics, smokers and patients with medical treatment as anabolic steroids were excluded.

Thirty-three patients undergoing a total of 42 calculated round block excision were identified. The follow-up protocol consisted of weekly follow up in 4 weeks, followed by once monthly for 12 months clinical examinations. Patients were followed up for a mean duration of 12 months (median 10 months, range 9 to 12 months). The procedure was prospectively analyzed.

All patients gave their informed consent to participate in the study. Informed consent was also given for clinical photographs to be used for academic purposes.

The primary end point was the local wound complication and explanation rates. Secondary end points were the impact of the surgery on patient quality of life, patient satisfaction with the esthetic outcome, and an objective assessment of the esthetic outcome. The quality of life was assessed using Questionnaire based on the Breast Q questionnaire, a method of assessing patient reported outcomes to study the effectiveness and impact of breast surgery from the perspective of the patient.[9] This was posted out to patients following their surgery and can be seen in **Table 2**.

Table 2: Questionnaire for patient satisfaction

	Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied
How you look in the mirror clothed	1	2	3	4
How normal you feel in your clothes	1	2	3	4
Being able to wear clothing that is more fitted	1	2	3	4
How your breasts are lined up in relation to each other	1	2	3	4
How equal in size your breasts are to each other	1	2	3	4
How closely matched your breasts are to each other	1	2	3	4
How you look in the mirror unclothed	1	2	3	4

The Q score, which was out of 28, was calculated and converted into percentages. The results were then further classified as very satisfied, satisfied, and dissatisfied as seen in **Table 2**.

Table 3: Q score classification

Classification	Very satisfied
Very Satisfied	50-75%
Satisfied	50-75%
Dissatisfied	≤50

Patients were also asked to complete a patient satisfaction questionnaire to assess the esthetic outcome of surgery subjectively, which was scored between 0 and 10, where 10 indicated a good esthetic outcome and 0 indicated a poor outcome In addition, an objective assessment of esthetic outcome was judged by an independent observer using a visual analog scale from 0 to 10. This assessment was based on the Harvard scale described by Harris et al.[10] In our modified scale, scores of 9 to 10 count as excellent (symmetrical with no apparent distortion), 7 to 8 as good results, 4 to 6 as fair, and less than 4 as poor results (with major distortion and asymmetry).

Preoperative marking

Mammometric points

Various anatomical points were first identified on a three-dimensional breast image **(Figure 1)**. On the anteroposterior view, the following points were marked:

- N point (nipple point): The center of each nipple
- S point (sternal point): The sternal notch
- I point (inferior point): The inferior most point of each breast
- L point (lateral point): The lateral inframammary fold point
- M point (medial point): The medial inframammary fold point.[11]

Fig 1: Mammometric points. The nipple (N), sternal (S), inferior (I), lateral (L), and medial (M) points are shown on an anterior view.

Mammometric Planes

The three-dimensional image of the patient was then oriented on x-y-z coordinate axes, and the following planes were created **(Figure 2)**:

1. Chest wall plane (CW plane): A curved plane that matches the curvature of the patient's torso, with the breasts removed.

2. Horizontal-split plane (HS plane): A xz coordinate plane through both right and left points of the inframammary fold.

3. Vertical-split plane (VS plane): A yz coordinate, or sagittal, plane through the center of each breast determined by the midpoint of the base width.

4. Inframammary fold plane (IMF plane): The natural inframammary fold of each patient.[11]

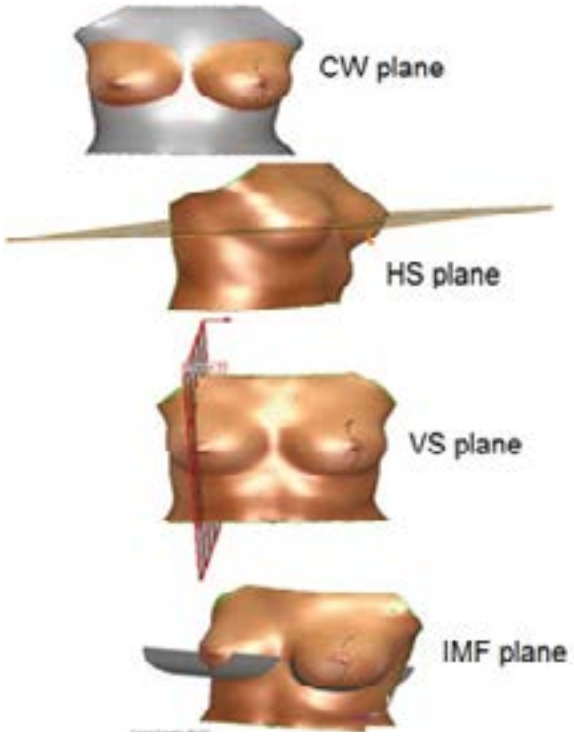

Fig 2: Mammometric planes. Shown here are multiple angles of the curved chest wall plane with and without a breast overlay. This curvature is based on the individual's torso. (Second row) A horizontal-split plane is a xy plane that intersects the lateral borders of the inframammary fold. (Third row) A vertical split plane is a yz plane, or sagittal plane, through the midpoint of the breast width. (Below) An inframammary plane is a plane through the patient's natural inframammary fold.[11]

Mammometric Vectors and Surface Distances

The following distances represented important clinical measurements to obtain from three-dimensional images **(Figure 3)**:

- CW-A (chest wall to anterior) distance: The most direct vector from the chest wall plane to the A point that gave the maximal projection of the breast.

- HS-to-I (horizontal-split to inferior) distance: The distance from the horizontal split plane to the I point, or the inferior most point of the breast. This may be calculated as a surface measurement or as a direct vector measurement.

- S-to-N distance: The distance from the S point to the N point. Similarly, this may be generated as either a surface distance, similar to what was commonly performed today and a vector measurement.

- N-to-I distance: The distance from the N point

to the I point. The N-to-I surface distance wraped around the inferior pole of the breast and described the length of tissue between the N point and the inferior most point of the breast. The most direct path from these points represented the N-to-I vector distance.

- L-to-M distance: The most direct vector from the L point to the M point on each breast represents the width of the breast between the medial and lateral borders of the inframammary fold. A surface distance of the width of the breast from the L point to the M point could also be calculated.[11]

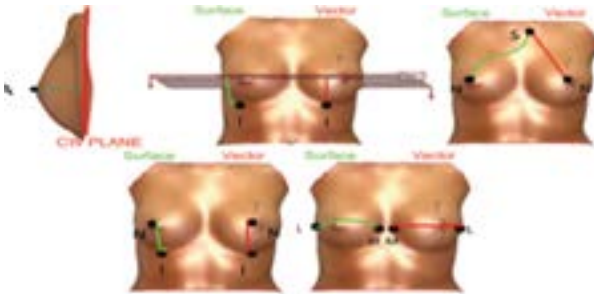

Fig 3: Mammometric vector and surface measurements. By using the points and planes described by mammometrics, clinically relevant surface and vector distances can be measured. Shown here are examples of the chest wall plane–to–anterior most point (CW-A) distance, the horizontal-split plane–to–inferior most point (HS-I) distance, the sternal notch–to–nipple point (S-N) distance, the nipple-to–inferior most point (N-I) distance, and the lateral IMF point–to–medial IMF point (L-M) distance. IMF, inframammary fold.[11]

Surgical technique

Marking in unilateral gynaecomastia

Basic marking of the midline, sternum, infra-mammary folds and areola was done with the patient in an upright position. In case of wide areolae, the areola was marked to a diameter of 25-30 mm.

A concentric circumareolar incision was drawn connecting A, B, C, D points according to following calculation.

The width of the breast: The surface distance between L point and M point, the difference in cm, between the two breasts, was divided by 2, the resulted no. was marked as Points A and B on the HS plane representing the horizontal diameter of the outer concentric circle.

N to I distance was measured in both breast and the difference between the 2 number is drawn at point C on VS plane.

N to midclavicular point was measured in both breast and the difference between the 2 numbers was marked as point D on the VS plane, CD represented the vertical diameter of the outer concentric circle.

Outer concentric circle connecting the 4 points (A, B, C, D) was drawn with 2 perpendicular diameter AB and CD, we had now 2 concentric circles calculated precisely.

Marking in bilateral gynaecomastia

Same basic marking as described before, then the four cardinal points were drawn in both breasts using the difference between LM surface and vector in both breasts determining the A, B point on HS plane.

The difference between NI surface and vector in both breasts to determine the C point on VS plane, D point was measured as the difference between N to mid-clavicular point surface and vector on VS plane.

Outer concentric circle connecting the 4 points (A,B,C,D) was drawn with diameter AB and CD. We had 2 concentric circles calculated precisely. **(Figure 4)**.

Fig 4: Preoperative marking and the 4 cardinal point.

Under general anesthesia, the "doughnut" shaped epidermal ring was de-epithelialized, followed by a semicircular inferior transdermal incision within the de-epithelialized area extending from 3 to 9 o'clock position, then the excessive glandular tissue was excised raised using electrocautery by dissecting through the avascular plane between the subcutaneous tissue and breast tissue. Care was taken to leave a sufficiently thick glandular tissue about 4mm below the nipple areola complex (NAC) flap to maintain the viability of the NAC and avoid a saucer deformity. Then, the glandular tissue was shaved off the pectoralis fascia. An additional 2/0 PDS intradermal circumareolar purse-string suture was used to decrease the diameter of the breast skin border then the breast skin was sutured to the areola inverting the de-epithelized segment in 2 layers **(Figure 5A)**. In all cases, 20 cc of xylocaine local anesthetic was instilled in the surgical bed, and the suction was applied to the drain. The drain was routinely removed 2 days postoperatively. For each operation, the surgical prophylaxis included povidone-iodine skin preparation and intravenous antibiotics 30

minutes before the surgical incision. Patients were maintained on oral antibiotics for 7 days.

Results

Thirty-three patients undergoing a total of 42 round block excisions were identified, the mean age of the patient cohort was 28.5 years (range 18-38 median age 30 years). The mean BMI was 29.7 (range 21 to 34; mean=29.7; median=28.3). Seven patients (21.2%) were current smokers at the time of surgery, nine patients (27.2%) had bilateral procedures. The primary end point was the local wound complication. Wound complications were observed in 2 patients (6%). One patient experienced partial necrosis of the areola, which was treated with debridement and primary closure, whereas another patient had partial wound dehiscence which was treated by primary closure, there were no cases of nipple or skin flap necrosis. As for the secondary endpoints, over a mean follow-up of 10 months, of 33 patients, 28 questionnaires were returned, the mean percentage Breast Q score was 88% (median 90%; range = 61.66%–100%). There was a high level of satisfaction with 83% of the cases having a Breast Q score more than or equal to 75% and 11.86% between 50% and 74%. None of the patients were dissatisfied. A high level of patient satisfaction was likewise established through a mean subjective score of esthetic outcome of 9.2 out of a possible 10, with a median score of 10 (range 7 to 10). The mean objective esthetic score as marked by an independent observer was 9.3 out of a possible 10, with a median score of 9.5.

Fig 5A: Immediate postoperative
5B: 7 days post operative.

Discussion

The leading cause of Gynaecomastia is idiopathic, followed by obesity and the use of anabolic steroids. Gynaecomastia has peaked in incidence within three age groups, although the highest prevalence is among middle-aged and older men (50-80 years old).[12] The oldest patient in our cohort was 38 years old. This may relate to the fact that the most common trigger for surgery was emotional distress, and middle-aged/older men may be less affected by this stimulus compared to the younger age group.

There are a number of aesthetic surgical techniques used to treat Simon grade IIB and III Gynaecomastia by transfer the nipple areola complex to its proper position on different pedicles of glandular flaps in an attempt to minimize scarring.[13,14]

Many techniques utilizing various skin excision patterns and pedicles similar to those used in female mastopexy and reduction mammoplasty have been used. However, these techniques present many drawbacks for male patients. Not only do these procedures often leave excess glandular tissue behind, but also cause coning of the breast and unacceptable scarring. Huang et al recognized these issues and in 1982 described a series of patients treated with a circumareolar excision to allow for skin excision without extra-areolar scarring.[15]

Many surgeons seem to avoid round block excision incisions as care should be taken in designing the extent of skin and areolar excision to prevent closing the wounds under excessive tension, which can worsen scarring, cause nipple distortion with high rates of NAC necrosis and skin flap necrosis.[16] We didn't face such difficulty in our study as our measures and calculations facilitate the procedure and minimize adverse effect.

We reported one case of primary wound dehiscence and one case of partial necrosis of the areola (6%), both of which were treated with primary closure, which was less than most studies with different techniques with complication rate between 11-16%.

Our patient cohort had a relatively low BMI of 21.9 and a low percentage of smokers which may have led to more favorable outcomes. Therefore, with very few reported complications in our series, a calculated round block incision approach would be the ideal procedure with low-complication rates in selected, low-risk patients. Overall, patients in our case series were satisfied with the results of their surgery. The high Questionnaire score indicates that the use of this technique leads to a measurable improvement in the quality of life, making it an excellent choice in selected patient cohorts. Similar findings were established in various other studies. Even in studies showing the highest rate of complications at 53%, patients were found to have a satisfaction rate of 86%.[17] In addition, the high-patient satisfaction scores demonstrated in our study indicate that the majority of patients were pleased with the outcome of their surgery. This was further validated by the high score in the objective assessment demonstrating an excellent cosmetic outcome associated with the use of the calculated round block incision. Our findings are consistent with those in the literature. Petty et al[20] showed an overall cosmesis judged by the patient and surgeon as good or excellent in the majority

of their cases.

This study is not without its limitations. First, we report on a relatively small patient cohort. There is a need in the future for studies with larger patient cohorts being followed up over longer periods of time in order to fully evaluate potential long-term complications. Finally, the questionnaires sent were not blinded which may have weakened the objectivity of the reported excellent esthetic outcomes. Nonetheless, our findings do demonstrate the safety and feasibility of our novel approach to a rapidly emerging modality.

Conclusion

Our novel calculated round block excision provide a safe and feasible technique for mastectomy in large gynaecomastia grade IIB, III overcomes the complication in round block technique facing the surgeon in designing the extent of skin and areola excision and preventing closing the wounds under excessive tension, which worsen scarring, cause nipple distortion with high rates of NAC necrosis.

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