

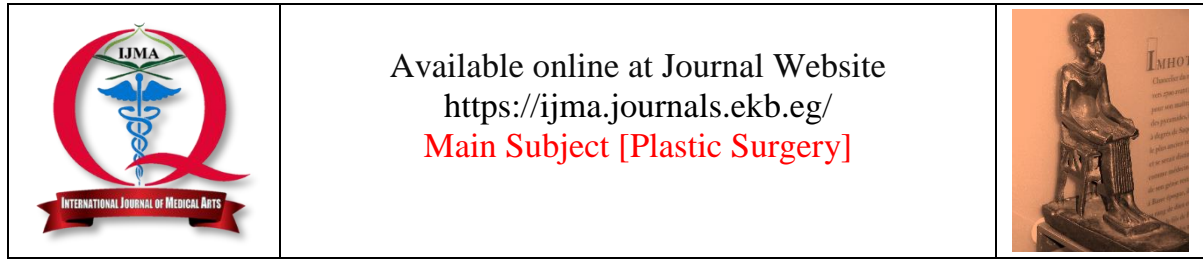
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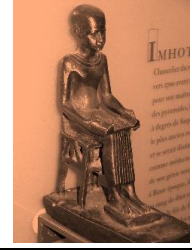
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Original Article

Reference Rectangle Method for Objective Calculation of Resectable Skin Area in Gynecomastia

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ABSTRACT

Article information

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Background: Many aspects of gynecomastia surgeries lack standardization. One of the debatable issues is the suitable area of skin resection. We suggest an objective method that could help determine the excised skin area on the basis of specific measurements. Moreover, we applied the suggested method to a series of gynecomastia patients and reported the surgical and aesthetic outcome.

Patients and Methods: The present prospective study was conducted on 30 patients with bilateral Simon grade III-IV gynecomastia. Reduction mastectomy with liposuction was performed. The resectable skin area was determined using the reference rectangle method.

Results: The present study included 30 patients with bilateral grade III-IV gynecomastia. They had an age of 28.1 ± 8.0 years and a duration of illness of 2.8 ± 1.5 years. Operative complications included minimal bleeding [16.7 %] and seroma formation [3.3 %]. Post-operatively, patients were either very satisfied [6.7 %], more than satisfied [20.0 %] or satisfied [73.3 %]. Also, independent observers reported favorable outcome.

Conclusion: The reference rectangle method provides an objective and easily applicable method for calculation of resectable skin area in gynecomastia patients with minor complications and favorable aesthetic outcome.

Keywords: Gynecomastia; Mastectomy; Liposuction.



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INTRODUCTION

Gynecomastia is a common condition defined as benign enlargement of male breast due to proliferation of stromal components and glandular ducts. In most instances, the condition resolves spontaneously without significant consequences [1].

In spite of its benign nature, gynecomastia may be associated with disturbing cosmetic appearance and considerable psychological burden. When patients seek medical intervention, optimal treatment should be individualized on the basis of patients' characteristics and needs. Strategies range from simple assurance to surgical excision [2].

Evidence concluded that traditional surgical excision of glandular tissue combined with liposuction provides most consistent results with low morbidity [3]. In fact, a wide variation of gynecomastia surgeries does exist. Unfortunately, however, many aspects of these surgeries lack standardization and many improvements including better classifications were suggested to enhance precision and objectivity [4, 5].

One of the debatable issues is the suitable area of skin resection. Many approaches were suggested for appropriate estimation of skin resection area. Examples of these approaches include the Horizontal ellipse method [6], the geometric approach [7] and the double donut technique [8].

In this study, we suggest an objective method that could help determine the excised skin area on the basis of specific measurements. Moreover, we applied the suggested method to a series of gynecomastia patients and reported the surgical and aesthetic outcome

PATIENTS AND METHODS

The present prospective study was conducted at Helwan and Al-Azhar University Hospitals, in conjunction with Sehha Alakkad Hospital and Safwat Algolf hospital [private hospitals] in the period from January, 2020 through March, 2023. The study protocol was approved by the ethical committee of the Faculty and all patients gave informed consent before enrollment. The study included 30 patients with bilateral Simon grade III-IV gynecomastia. All patients were subjected to thorough physical examination, laboratory assessment and bilateral mammary ultrasound.

Preoperative markings

1. Measurement of reference skin markings

In adjusted room temperature, with patient in the erect position and both arms abducted at 90°, we measured the reference skin markings to be restored after skin resection. First, a reference rectangle is illustrated. Its horizontal sides include the infra-mammary line and upper border of the breast while vertical sides include mid-sternal and anterior axillary lines [Fig. 1a]. Then, we measure the horizontal [A] and vertical [B] sides of the reference rectangle using a metal right-angled scale [Fig. 1b].

2. Measurement of actual skin dimensions

Using a plastic measuring tape, we measure the maximal horizontal [C] and vertical [D] distances between the reference rectangle sides without applying any pressure to the skin surface [Fig. 1c].

3. Calculation and determination of skin resection markings

The two skin resection markings on the right and left sides of the areola in the horizontal axis are calculated by the equation $\frac{C-A}{2}$ while the two skin markings above and below the areola in the vertical axis are calculated by the equation $\frac{D-B}{2}$. The resectable skin area is marked by fashionably connecting these four markings [Fig. 1d].

Surgical technique

Surgery was conducted under general anesthesia with the patient in prone position and both arms abducted at 90°. Prophylactic antibiotic was administered and complete asepsis was secured.

Then, 250 ml of saline-adrenaline-xylocaine fluid [1/400000] with 10 cm xylocaine were infiltrated in each breast and in the dermis of the skin between the circles. The inner and outer circles were marked again by using a tip of number 11 surgical blade, followed by liposuction using number 4 rounded tip liposuction cannula in the deep fatty tissue in the mammary and perimammary area.

The excess skin between the two circles was de-epithelialized. Transdermal incision was done on the inferior portion of the de-epithelialized skin and the remnants of the mammary gland was removed via this incision leaving a small pad of

fat under the areola-nipple complex to prevent depression. Peri-areolar closure in layers was accomplished with interrupted vicryl 3-0 and 4-0 sutures, followed by purse string suture all around the areola using prolene 4-0 to prevent

widening of the scar. A Redivac drain number 16 was applied followed by pressure dressing and pressure bandage over it. The drain was removed after 4-5 days on the third or fourth dressing.

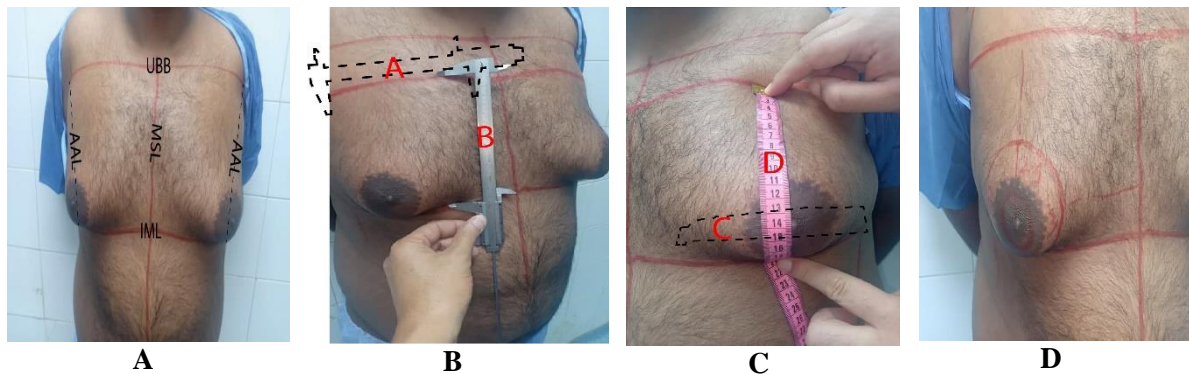


Figure [1]: A): Reference rectangle markings, B): Measurement of reference markings, C): Measurement of actual skin dimensions, D): Calculation and determination of skin resection markings

Assessment of operative and postoperative outcome

All patients were observed for operative and postoperative complications including bleeding, infection and seroma. Six months or more postoperatively, patients were invited to express their satisfaction with the aesthetic outcome as very satisfied, more than satisfied, satisfied, partly satisfied and not satisfied. In addition, four independent and blinded experienced surgeons assessed the aesthetic outcome and reported their ratings of five outcome aspects: [1] Symmetry of breasts, [2] Nipple shape, [3] Areola shape, [4] Contour regularity and [5] Overall appearance. Outcome assessment was achieved using 5-point Likert scale on the basis of pre and postoperative images of variable views. Higher scores indicated more satisfaction with outcome. Data obtained

from the present study were expressed as mean \pm standard deviation [SD] or number and percent.

RESULTS

The present study included 30 patients with bilateral grade III-IV gynecomastia. They had an age of 28.1 ± 8.0 years and a duration of illness of 2.8 ± 1.5 years. Operative complications included minimal bleeding [16.7 %] and seroma formation [3.3 %]. Other clinical and operative data are shown in table-1. Post-operatively, patients were either very satisfied [6.7 %], more than satisfied [20.0 %] or satisfied [73.3 %] [Table-2]. Observers' ratings of aesthetic outcome are shown in table-3. The surgical results of two different cases are presented in Fig 2 and 3.

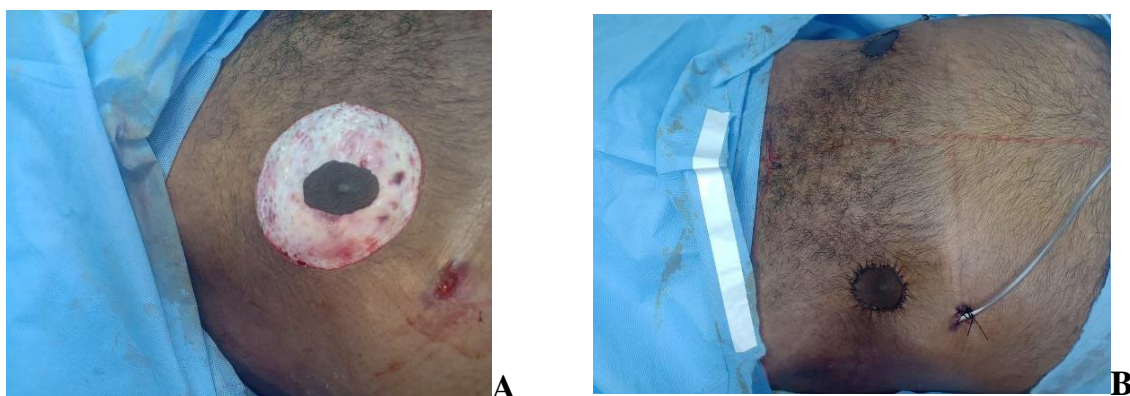


Figure [2]: A): Case 1: De-epithelialization of the excess peri- areolar skin; B): Case 1: Skin closure and drain application



Figure [3]: Upper: Case 2: Preoperative markings; Lower: Case 2: Postoperative view

Table [1]: Baseline and operative data in the studied group [n=30]

Variables		Findings
Age [years] mean \pm SD		28.1 \pm 8.0
Body mass index [kg/m ²]		27.2 \pm 2.0
Duration of illness [years]		2.8 \pm 1.5
Bilateral affection n [%]		30 [100.0]
Simon grade n [%]	III	12 [40.0]
	IV	18 [60.0]
Operative duration [min.] mean \pm SD		80.3 \pm 7.2
Lipo-aspiration volume [ml] mean \pm SD		365.0 \pm 57.5
Glandular resection volume [ml] mean \pm SD		261.7 \pm 48.6
Operative complications n [%]	Minimal bleeding	5 [16.7]
	Significant bleeding	-
	Infection	-
	Seroma	1 [3.3]

Table [2]: Patients satisfaction in the studied group [n=30]

Patients satisfaction	n [%]
Very satisfied	2 [6.7]
More than satisfied	6 [20.0]
Satisfied	22 [73.3]
Partly satisfied	-
Not satisfied	-

Table [3]: Observers rating of postoperative outcome

	Observers' ratings [mean \pm SD]
Breasts symmetry	4.3 \pm 0.4
Nipple shape	4.9 \pm 0.1
Areola shape	4.4 \pm 0.4
Nipple areolar complex projection	4.4 \pm 0.4
Contour regularity	4.5 \pm 0.5
Overall assessment	4.2 \pm 0.4

DISCUSSION

The present study describes an objective method for precise measurement of resectable skin area in patients with gynecomastia grade III-IV subjected to glandular removal with lipo-suction and skin resection. In spite of the fact that evidence indicates that this combined surgical

approach has the most favorable outcome [5], many technical issues including amount of lipo-aspiration volume and resectable skin area are determined mostly by surgeon's own discretion. Improvement of surgical techniques to render them more precise and objective is essential for development of better practice and achievement of more aesthetic outcome.

The method uses a simple technique for measurement of the reference and excess skin markings within a reference rectangle. This method has many advantages. First, it uses simple and easily identified and marked skin markings. Second, it measures the actual dimensions of the excess skin area making benefit of the fitting of the plastic tape with the breast contour. Third, it's an easily applicable method that doesn't require specific training or experience.

Patients' management using this method showed high level of satisfaction and independent observers reported very good judgement of the aesthetic outcome.

Regarding outcome, the results of the current work are comparable to those reported by Varlet *et al.*^[9] who reported that, postoperative complications reported for 20.8%: 2- or 3 mm second-degree burns in 16.7% and subcutaneous seroma in 4.1%. All complications were mild and did not need further treatment. Aesthetic results were very good in 87.5%.

Prasetyono *et al.*^[10] conducted a meta-analysis to discuss liposuction assisted surgery for gynecomastia. They concluded that, small incisional design for removal of breast parenchyma in gynecomastia assisted by liposuction revealed a good technical method for consistent improvement in aesthetic outcome and quality of life

Our results are in line with previous reports demonstrated that, the overall complication rate after gynecomastia surgery has been reported between 14.5 to 53%, with hematoma being the most common^[11, 12]. In mild cases treated with liposuction with or without an arthroscopic shaver, reported hematoma rates are as low as 1%, whereas open subcutaneous mastectomies show a higher complication rate between 11 to 16%^[3, 13, 14]. Even in studies showing the highest rate of complications at 53%, patients were found to have a satisfaction rate of 86%^[3].

Conclusively, the reference rectangle method provides an objective and easily applicable method for calculation of resectable skin area in gynecomastia patients with minor complications and favorable aesthetic outcome.

Declarations: No conflict of interest or financial disclosure.

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