Adding quilting sutures to Y plasty to avoid postmastectomy lateral dog ears in patients with large cup sized breast

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Background
Total mastectomy without reconstruction is a commonly adopted procedure for managing breast cancer. Formation of lateral dog ears is very common, especially with large breast cup size. In this study, we assessed the feasibility of adding quilting sutures to the Y plasty technique to achieve more acceptable results in the avoidance of lateral dog ears in comparison to using Y plasty alone.
Methods
The study included 150 female patients with large breast cup size. Patients were randomized 2 : 1 between group A and group B. In group A, 3–5 quilting sutures were added to the lateral flaps of Y plasty. In group B, Y plasty only was adopted without the quilting sutures. Patients were followed up at 4-month intervals for at least 1 year. One year after surgery, patients filled in a questionnaire inquiring about the degree of discomfort in the area beneath the arm. Also, a plastic surgeon was asked to give a score about the cosmetic outcome of managing lateral dog ears both at 3 weeks and 12 months after surgery.
Results
Both groups were comparable in regard to age, BMI, breast cup size, and postoperative radiotherapy exposure. Patients in group A had better scores for satisfaction with the shape of the scar and comfort with the bra. Also, the blinded cosmetic outcome assessment was in favor of group A.
Conclusion
Adding quilting sutures to the lateral flap of the V-Y plasty technique is associated with a better cosmetic outcome in the management of lateral dog ears in mastectomy patients with large breast cup size.

Keywords:
breast cancer, breast conserving surgery, dog ears, mastectomy, postoperative complication

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Introduction

The incidence of breast cancer cases is increasing, with an estimated female lifetime risk of 1 in every 8 females. As screening regimes have the potential to pick up cancers earlier, there has been an inevitable increase in the number of patients undergoing surgery for early-stage breast cancers [1].

Surgical management of invasive and in situ disease can range from wide local excision to total mastectomy. With the emergence of oncoplastic techniques, more patients now have the chance of breast preservation. Still, many patients are subjected to mastectomy for many reasons, including but not limited to a multiplicity of the lesions, persistent positive margins during conservation, patient preference . . . .etc [2]

Despite the increase in skin/nipple-sparing mastectomy and reconstruction, many patients are not offered or are not accepting breast reconstruction [3]. Presence of lateral dog ears after mastectomy is a common and troublesome complaint among many patients [4,5]. Formation of lateral dog ears is influenced by Obesity and BMI as well as the type of incision chosen for the mastectomy. Among many incisions described to perform mastectomy, the transverse elliptical incision is the most widely adopted, thus mostly incriminated in dog ear formation [6,7].

Modifications of this incision were described to decrease/prevent lateral dog ears. The Y plasty is widely used for the same purpose. However, on follow-up, many patients showed redundancy of the lateral chest wall flaps after 3–6 months [8]. In this article, we propose a simple combination between Y plasty technique and quilting sutures to decrease the incidence of postmastectomy lateral dog ears in patients with breast cup size greater than or equal to D.

Patients and methods

Study design and approvals

A prospective randomized study including one hundred and fifty female patients with breast cancer and breast cup size greater than or equal to cup D was conducted. The study was conducted in Alexandria Main University Hospital.

Sample size

The sample size was calculated using the G-power program with α. Error=0.05 and power 80% and it was equal to 53 patients according to population size in a previous study by El-deen *et al.*, (2022).

Population and grouping

150 female patients with breast cancer and breast cup size greater than or equal to cup D were included in the study. Patients were randomly distributed among both groups in 2 : 1 design into two groups:

(1) Group A: included 100 patients for whom quilting sutures were added to Y plasty technique.
(2) Group B: included 50 patients with only Y plasty.

Randomization type

Blind- randomization. All patients were blinded as regards their group in the study.

Randomization technique

Closed envelope technique.

Inclusion criteria

Female patients of any age who were diagnosed with breast cancer, planned for total mastectomy, accepted to participate in the study, and signed the written consent were included in the study.

Exclusion criteria

Breast cancer patients who were planned for breast-conserving surgery, and patients who refused to participate in the study or sign the consent were excluded from the study. Also, patients with breast cup size less than cup D were excluded.

Steps of the procedure

(1) All skin markings were drawn while the patient was standing and her arms beside her.
    (a) Parasternal line, anterior axillary line, and mid axillary line were identified and marked.
    (b) A transverse elliptical incision was drawn, extending from the parasternal line medially to the midaxillary line laterally, including the nipple-areolar complex.
(2) Mastectomy was done in the traditional way. Skin flap thickness was designed in a manner that maintains the viability of the flaps while nearly leaving no residual breast tissue. A closed suction drain was inserted through a small stab incision in the lateral part of the inferior flap.
(3) Closure of the subcutaneous tissue was started from medially to laterally till the anterior axillary line (3–0 polyglactin).
(4) The design of the anchoring suture was as follows: this is a 3-in-1 suture designed between the lateral end of the scar which was approximated medially by the stitch and the already sutured part of the wound at the anterior axillary line (suture designed and not tied yet). This suture should not be placed medial to the anterior axillary line.
(5) In group A only, multiple interrupted sutures (3–5 sutures) were taken to fix the created lateral flap to the underlying chest wall (quilting sutures) before tying the previously mentioned anchoring suture. (This step was omitted in group B)
(6) Anchoring suture was tied.
(7) Excess skin folds that appeared superolateral and inferolateral to the anchoring suture were excised. The angle between these 2 arms was kept as wide as possible for the sake of viability of the skin at the angle.
(8) This was followed by closure of the subcutaneous tissue at the upper and lower lateral arms (3–0 polyglactin).
(9) And lastly, closure of the skin by continuous subcuticular 3–0 polypropylene sutures was done in both arms.

All patients were followed-up at 4-month intervals for at least 1 year postoperatively.

Assessment of the outcome

All patients had to answer a simple 4 points questionnaire about their degree of satisfaction and comfort 1 year after surgery. We did an orientation of the patients as regards the aim of the questionnaire to eliminate (as possible) the degree of dissatisfaction due to the mastectomy procedure itself.

Do you feel satisfied with the shape of the scar? 0/1/2.

Do you feel comfortable while wearing your bra or external prosthesis? 0/1/2.

Do you feel any fullness under the arm?0/1/2.

Would you accept another surgery to improve your scar? 0/1.

A plastic surgeon (blinded as regards the patients' group) was asked to assess the quality of the scar as regards the elimination of dog ears both 3 weeks after surgery and 1 year after with a score 0 (bad),1 (fair) or 2 (good)

Ethical consideration

The study was approved by the ethical committee and institutional reviewing board, Faculty of Medicine, Alexandria University, under protocol No. (0306279). All patients signed an informed written consent form before enrolment in the study.

Statistical analysis

All data will be tabulated in SPSS sheet version 29. Categorical data were expressed as numbers and percentages. Continuous data were expressed as mean and standard deviation if parametric data or median and interquartile ranges if nonparametric data. Suitable statistical tests according to data type were used: χ^2 test: for categorical data, Student *t*- test: for parametric continuous data, Mann–Whitney test: for nonparametric continuous data; A *P* value less than 0.05 is considered of statistical significance.

Results

The study included 150 breast cancer women with a mean age of 59.4±11 years with no statistically significant age differences between both groups. All patients had breast cup size greater than or equal to D and most of them were D/E (83% vs. 78%; *P*=0.46) with no statistically significant difference between both groups. More than two-thirds of the patients had body mass index greater than 30 especially within the range of 30–35 (72% vs. 70%; *P*=0.67) without significant differences between both groups. Postoperative radiotherapy was given to 86% of group A patients and 92% of group B patients with no statistically significant differences (Table 1). The results of the comfort and satisfaction questionnaire were compared. Most of the patients in group A were satisfied with the shape of the scar (75%). On the other hand, 54% of patients in group B were not satisfied with a statistically significant difference (*P*<0.001). About 78% of group A patients were comfortable with wearing bra while 82% of group B patients did not feel comfort with a statistically significant difference (*P*<0.001). About 68% of group A patients did not feel fullness under the arm while 86% of group B patients suffered from this fullness with a statistically significant difference (*P*<0.001). In group A, two (2%) patients only accepted to undergo another operation to improve the scar while 70% of group B patients accepted to do so. In group B, 4 patients preferred not to answer this last question, with no statistically significant difference (*P*<0.001). Plastic surgeon gave score 2 (fair) after 3 weeks to 69% of group A patients and 64% of group B patients with no statistically significant difference. After 1-year, a higher percentage of group B were given score of 0 (22%) and score 1 (52%) than group A (6%, 37%) while most of group A patients were given score 2 (fair) (57% vs. 26%; *P*=0.003) (Table 2).

Discussion

Breast cancer is the commonest female cancer worldwide with an estimated 1.67 million new cases being diagnosed worldwide in 2012. Modified radical mastectomy is a commonly performed surgical procedure worldwide for breast cancer. However, if the mastectomy incision is not planned properly, it can result in a dog ear laterally [9].

The most common and simplest way to prevent dog-ears is a straight-line wound extension, but the trade-off for the better contour is a longer scar, with potential for reduced shoulder mobility if the incision extends into the axilla [10–12]. Another common strategy

Table 1 Patients' characteristics and postoperative radiotherapy

	Group A (*n*=100) No. (%)	Group B (*n*=50) No. (%)	† X^2	*P* value
Age:				
<55	59 (59%)	37 (74%)	3.26	0.07
≥55	41 (41%)	13 (26%)		
Breast cup size:				
D/E	83 (83%)	39 (78%)	0.56	0.46
F/G	17 (17%)	11 (22%)		
Body mass index:				
<30	9 (9%)	3 (6%)	0.79	0.67
30- <35	72 (72%)	35 (70%)		
35≤	19 (19%)	12 (24%)		
Postoperative radiotherapy	86 (86%)	46 (92%)	1.13	0.29

† Chi square test; Level of significance less than 0.05.

Table 2 Degree of satisfaction and comfort

	Group A (*n*=100) No. (%)	Group B (*n*=50) No. (%)	† X^2	*P* value
Do you feel satisfied with the shape of the scar?				
0=No	9 (9%)	27 (54%)	43.7	***<0.001***
1=To some degree	16 (16%)	11 (22%)		
2=Yes	75 (75%)	12 (24%)		
Do you feel comfortable while wearing your bra or external prosthesis?				
0=No	9 (9%)	41 (82%)	80.1	<0.001
1=To some degree	13 (13%)	2 (4%)		
2=Yes	78 (78%)	7 (14%)		
Do you feel any fullness under the arm?				
0=No	68 (68%)	3 (6%)	82.5	***<0.001***
1=To some degree	21 (21%)	4 (8%)		
2=Yes	11 (11%)	43 (86%)		
Would you accept another surgery to improve your scar?				
0=Yes	2 (2%)	35 (70%)	94.2	***<0.001***
1=No	98 (98%)	11 (22%)		
Preferred not to answer	0 (0%)	4 (8%)		
Plastic surgeon score 3 weeks after surgery				
0=Bad	3 (3%)	2 (4%)	0.41	0.82
1=Good	28 (28%)	16 (32%)		
2=Fair	69 (69%)	32 (64%)		
Plastic surgeon score 1 year after surgery				
0=Bad	6 (6%)	11 (22%)	16.2	***0.003***
1=Good	37 (37%)	26 (52%)		
2=Fair	57 (57%)	13 (26%)		

†Chi square test; Level of significance less than 0.05.

employed is the 'hockey stick' incision, which involves extending the shorter side of the wound at an approximately 120-degree angle from the original axis that necessarily causes a longer scar [9]. Lastly, the 'fish-tail' incision or 'Y closure' and its variations ('tear-drop' incision, 'L' scar technique) have been described [4,13].

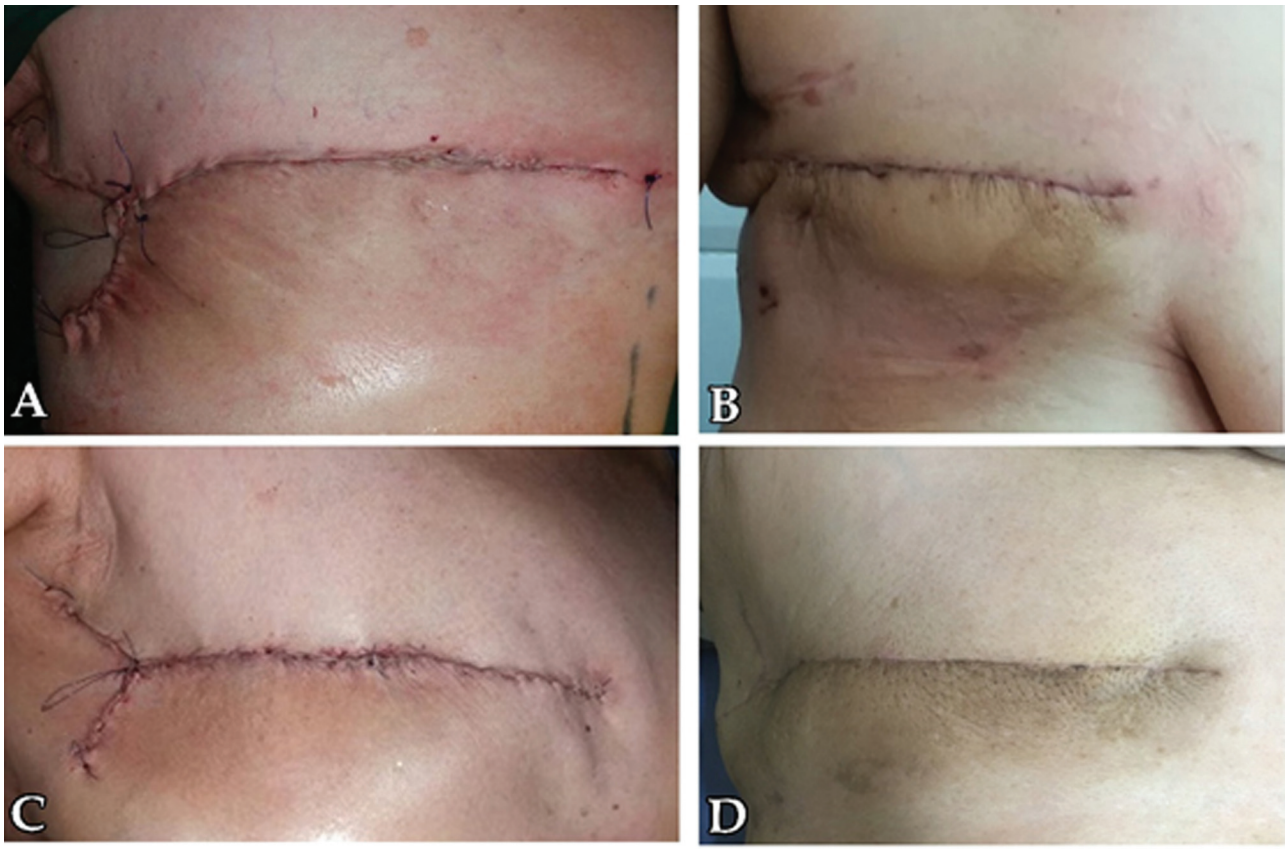
The current study included 150 patients where 100 patients were operated using Y plasty technique. Mean age for the included patients was 59.4±11 years and most of patients had average BMI between 30 and 35. Hussein and colleagues conducted fish tail (Y plasty) in his study on 27 cases with higher mean age (70.6 years) and lower BMI (30.4) [14] El-Deen and colleagues, included 60 breast cancer women with similar mean age (59±8.5 years) but he included patients with higher BMI (all patients were over 35) with large breast size and they were operated by Y- plasty technique [8].

The results of the current study showed a higher percentage of patients in Y plasty group (group A) were satisfied with the shape of the scar, felt comfort with the bra, did not feel fullness under the arm and did not want to be re-operated to improve the scar than group B with statistically significant differences. The plastic surgeon gave better score for group A patients after 1 year with significant difference.

These results came in agreement with previous studies. Farrar and Fanning advocated closing the medial aspect of the wound initially, then advancing the lateral corner medially and excising the resultant two skin flaps. The remaining wound was closed in two parts, leaving a Y-shaped scar [4]. Nowacki and colleagues also reported good results with Y plasty [7]. Hussien *et al.* reported good results after evaluating this technique in 28 patients and found that patients most likely to require a fish-tail plasty were older, obese and had large breasts [14]. Lim *et al.*, in his meta- analysis included 12 articles reported that Y plasty technique was the most described technique to prevent ear dog and concluded that it was safe and effective [13]. El- Deen *et al.*, proposed in his study on 60 patients that in obese women Y shaped incision can overcome cosmetic operation obstacles and provide excellent accessibility to axilla and satisfied scare and less complication [8]. Goel and colleagues evaluated the efficacy of this technique among patients with modified radical cystectomy. He concluded that the Y-shaped approach for modified radical mastectomy is a simple and safe technique. It improves cosmesis and prevents discomfort in obese women by eliminating lateral dog ear deformity [15].

Sinha and colleagues described previously small modification to the Y plasty called reverse fish- tail

Figure 1



Lateral dog ears managed by Y plasty (A) and developed lateral redundancy 6 months after surgery (B). Combination of Y plasty with quilting of lateral flaps (C), 6 months after surgery (D).

technique in single patient and good results were obtained [16]. Thomas and colleagues also reported another modification for the Y plasty called waisted teardrop technique. His technique was easy to apply and effective [17].

However, some disadvantages of this method had been reported. In the current study, incomplete excision of the dog ears to avoid posterior and/or axillary extension of the wound was reported. Furthermore, many patients noticed few months later redundancy of the lateral flap and hence discomfort still exists. (Fig. 1). In concordance to the current study, one study reported similar disadvantages. It involves additional scarring, potentially creates two smaller dog ears, and can be complicated by skin necrosis at the Y confluence [18].

In an attempt to overcome this, many surgeons would approximate the lateral end of the scar more medially. In addition to the unsightly scar, this approximation increases the tension on the anchoring suture with subsequent risk of wound gaping. This article proposes this combination between Y plasty and quilting sutures as a simple procedure that has the following advantages:

(1) The apex of the Y plasty is kept at the anterior axillary line and thus the two limbs are kept hidden under the arms.
(2) It avoids the extra tension over the anchoring suture if sutured more medially.
(3) The excess lateral tissue is distributed over the lateral chest wall, hence, decreasing the need for lateral extension of the Y limbs.
(4) Quilting sutures enhances fibrosis between lateral flaps and lateral chest wall thus no redundancy develops in the next few months.

The study had the advantage of being a blind-randomized study that included a relatively large sample size in comparison to similar studies. The study proposed a simple but novel modification (addition of quilting sutures) that can overcome some potential drawbacks of the original Y plasty alone. To the best of our knowledge, this is the first study to include a comparative control group, which in

turn confirms the results and improves generalizability and reliability of the technique.

Conclusions

In female patients with large breast cup sizes who are subjected to mastectomy, the addition of quilting sutures to the lateral flap of the V-Y scar achieves a better cosmetic outcome and a higher degree of satisfaction both immediately postoperative as well as long after.

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Conflicts of interest

There are no conflicts of interest.

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