

## Comparative Study between Matrix Rotation Technique versus Wide Local Excision of Carcinoma of The Breast Located in The Upper/Upper Outer Quadrant

Ahmed Mahmoud Galal, Mohamed Ahmed Mohamed Khalaf Abotaleb,  
Ahmed Gamal El Din Osman, Mohamed El azazy\*

General Surgery Department, Faculty of Medicine, Ain Shams University, Egypt

Corresponding Author: Mohamed El azazy, Mobile: (+20) 01119972275, E-mail: mohamedelazazy1984@gmail.com

### ABSTRACT

**Background:** The breast is a cornerstone image of femininity, and the heart of womanhood, as nourisher and comforter. The term "oncoplastic surgery" (OPS) refers to more than only the fusion of plastic and oncologic concepts. Surgeons can do wider excisions with free margins by modifying the residual breast tissue using different mammoplastic techniques, which lowers the incidence of re-excision.

**Objective:** To assess and evaluate wide local excision technique as an oncoplastic procedure for management of breast carcinoma in the upper/upper lateral quadrant with matrix rotation technique regarding cosmetic, surgical outcomes, and patient satisfaction

**Patients and Methods:** This prospective randomized controlled study included 30 patients with cancer breast scheduled for oncology breast surgery. They were divided to two equal groups: Group I: wide local excision technique. Group II: matrix rotation technique.

**Results:** When testing the postoperative outcomes for all included patients, we found that 63.3% of patients had good cosmetic outcome postoperatively. 16.7% of patients had very good cosmetic outcome. Concerning patients' point of view, 80% of patients (24 patients) were totally satisfied about their postoperative outcome. 63.3% of them (19 patients) thought they had equal breast sizes while 36.7% of them (11 patients) thought they had a better breast shape as shown in table 3.

**Conclusion:** Wide local excision is a safe oncoplastic technique, causing significantly less post-operative hematoma, mild seroma, minimal blood loss, less areolar deviation and better breast symmetry than matrix rotation technique.

**Keywords:** matrix rotation technique, wide local excision.

### INTRODUCTION

Since 1996, the World Health Organization Committee of Investigations for Evaluation of Methods of Diagnosis and Treatment of Breast Cancer has approved breast-conserving surgery (BCS), providing an option to radical mastectomy for the treatment of early-stage breast cancer <sup>(1)</sup>.

Malignant illness surgical treatment involves a multidisciplinary strategy. Primary surgical intervention, radiation therapy, and chemotherapy are all part of the management process, and careful balancing and synchronisation of these modalities with cutting-edge reconstructive breast cancer surgery procedures is required <sup>(1)</sup>.

Additionally, oncoplastic breast surgery improved quality of life by lessening the negative effects of mastectomy on psychosocial adjustment, body image, and sexual function. The removal of the tumour with sufficient margins and post-operative radiation are the cornerstones of BCS success. BCS has emerged as the go-to therapy for breast cancer in its early stages because it produces positive clinical results. The ultimate objectives of BCS for breast cancer are to totally remove the breast tumour with sufficient margins while still maintaining the breast's natural form <sup>(2)</sup>.

The removal of a tumour that is huge in relation to the size of the breast without losing aesthetics might be challenging, notwithstanding how

paradoxical that seems. Without the right surgical approach, deformity can frequently develop in medium- to large-sized breasts, and this might lead to the patient being advised to have a mastectomy. Additionally, 5% to 18% of typical BCS patients had positive margins, which resulted in significant re-excision rates. Re-excision rates this high can result in substantial problems, morbidity, and deformity <sup>(3)</sup>.

The leftover lower breast tissue from tumours in the upper and middle area may be placed into the defect as a glandular flap using the inferior dermoglandular pedicle (IDP) mammoplasty procedure <sup>(4)</sup>.

The nipple-areola complex zone was reliably preserved by the inferior pedicle surgical method in breasts of nearly any size and shape. It is an easy process to learn and use in real-world situations. In most surgical case circumstances, it requires some flap undermining and the wise pattern, although it can still be completed in ~2 to 3 hours. Because the inferior position removes dead space inside the dependent area of the breast, some surgeons believe the inferior pedicle approach has a reduced risk of problems <sup>(5)</sup>.

Cases with breast cancer who want to maintain their breasts but have moderate- to large-sized breasts and ptosis are indications for an inferior pedicle oncoplastic reduction. Radiation therapy is more easily tolerated by smaller breasts than by larger breasts, and smaller breasts often provide more attractive results <sup>(6)</sup>.

For extensive excision of a breast cancer situated in the upper central portion of the breast a few centimetres away from, but not directly affecting, the nipple, the batwing resection may be utilised as an alternative to the crescent mastopexy resection. The batwing excision consists of two triangle-shaped or winglike regions of skin and gland that extend from both sides of the areola, as well as a centre area of skin and gland that is shaped like a crescent. By raising the bottom part of the breast and the nipple-areolar complex, the batwing incision, like the crescent mastopexy resection, enables correction of breast ptosis. The aesthetic outcome is a smaller, less ptotic breast with two horizontal scars at the 9–10 and 2-3 o'clock locations, joined by a circumareolar incision at the top part of the areola that is less noticeable <sup>(7)</sup>.

Other methods for fixing this defect have been published, including rotating the breast tissue next to it, a lateral thoracic rotation flap, a latissimus dorsi myocutaneous rotational flap, and a matrix rotation flap <sup>(8)</sup>.

Our method consists of a two-step process. After removing a wedge-shaped block of tissue containing the tumour, either with or without removing the donut-shaped patch of skin covering the nipple, reconstruction using matrix rotation flap advancement is then carried out <sup>(1)</sup>. While retaining the structural matrix that promotes angiogenesis and tissue regeneration, tissue processing eliminates the cellular antigens that might elicit an immune response <sup>(9)</sup>.

The aim of this work is to assess and evaluate wide local excision technique as an oncoplastic procedure for management of breast carcinoma in the upper/upper lateral quadrant with matrix rotation technique regarding cosmetic, surgical outcomes, and patient satisfaction.

## PATIENTS AND METHODS

**Type of Study:** Comparative prospective, randomized, single blinded study

**Study settings:** Thirty Patients with cancer breast scheduled for oncology breast surgery divided to two equal groups: **Group I:** wide local excision technique, and **Group II:** matrix rotation technique.

**Site of study:** Ain Shams University Hospitals and Sohag Oncology Center.

**Study Period:** 6 months.

**Inclusion Criteria:** T1 or T2 breast mass, and the tumours were situated between 11 and 1 o'clock in the upper/upper lateral quadrant.

**Exclusion Criteria:** Remote metastasis. Previous ipsilateral breast cancer treatment history. breast cancer that is inflammatory. Microcalcification that is diffuse. Patients with multicentric breast cancer in more than one quadrant who are concerned about local recurrence are requesting mastectomy. Patients with a complete contraindication to adjuvant radiation or those with previously irradiated breasts, and positive

margins after frozen section examination of the specimen.

## Methodology:

### Each patient was subjected to:

Patient demographic information includes age, a complete biographical history, compliance, and a disease analysis.

Comprehensive medical and family history, including how it relates to the disease.

In the outpatient clinic, receive a thorough clinical examination.

Laboratory tests such as complete blood counts, liver profiles, kidney profiles, coagulation profiles, and blood sugar were conducted as part of the preoperative examinations. As part of our metastatic workup protocol, we perform radiological exams like bilateral digital mammography in at least two views (cranio-caudal and medio-lateral oblique), computed tomography chest, computed tomography pelvis-abdomen with contrast, and bone scans as needed and in response to the patient's complaint of bone pain.

When necessary, an anesthesiologist requested that an ECG and echocardiogram be done.

All patients required true-cut needle core biopsies of the tissue.

The patients were assessed for: complications as hematoma and seroma, mean length of hospital stays (days), the duration of the surgery, blood loss, weight of resected tissue on average (range, g), and tumor stage. The cosmetic outcome was determined using a grading method on a scale of 1 to 5, with 1 denoting bad results and 5 denoting great results. The surgeon, the patient, and the breast multidisciplinary team (MDT) assessed the cosmetic outcome after the operation and again at two weeks and one month. Before and after surgery photos were taken to compare the form of the skin incision, the volume of the breasts, the degree of ptosis, the new areola deviation, and the degree of asymmetry <sup>(10)</sup>.

Patients were required to complete a questionnaire that was developed from **Chan *et al.*** <sup>(10)</sup> method's for the evaluation of subjective satisfaction with the result (one patient was lost to follow-up). After the patients had finished their radiation treatments in August 2015, the surveys were distributed. The following inquiries were among them: pertaining to whether or not patients were pleased with their postoperative look. From the patients' perspective, how the cured breast contrasted with the opposite breast. If they had opted for a different form of breast surgery. if they would think about doing any more surgeries to remodel the cured breast.

## Ethical consent:

**The study was authorised by Ain Shams University's Ethical Institutional Review Board. All study participants provided written informed permission after being informed of our research's**

goals. The Declaration of Helsinki for human beings, which is the international medical association's code of ethics, was followed during the conduct of this study.

**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 ( $\chi^2$ ) 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**

30 patients were eligible to participate in the study. Their age ranged between 32 and 77 years old with a mean of  $47.53 \pm 11.66$  years old. They were randomly assigned into 2 groups; the first group went for matrix rotation technique while the other one went for local excision one as shown in table 1.

**Table (1):** The socio demographic characteristics of included patients (n=30)

Variable		N (%)
Age	Mean $\pm$ SD	47.53 $\pm$ 11.66
	Min – Max	32 – 77
Stage		
T1		5 (16.7)
T2		23 (76.7)
T3		2 (6.7)
Procedure		
Matrix rotation (group A)		15 (50)
Local excision (group B)		15 (50)

**All 30 patients went for surgical excision of the tumor. Over all, we found that:**

All patients experienced mild degree of ptosis. This was followed by seroma which was prevalent among 76.7% of patients (23 patients). Similarly, 66.7% of patients (20 patients) experienced mild asymmetry between both breasts postoperatively.

We also found that only 2 patients (6.7% of patients) developed moderate hematoma. 23.3% of patients (7 patients) developed moderate seroma. Mild blood loss (10 – 20 cc) was discovered in half of included patients. On the other hand, large amounts of blood loss (50 – 60 cc) was present among only 4 patients (13.3% of patients) as shown in table 2.

**Table (2):** Post-operative complications for all included patients (n=30).

Complication	N (%)
Hematoma	
Mild	6 (20)
Moderate	2 (6.7)
Seroma	
Mild	23 (76.7)
Moderate	7 (23.3)
Blood loss	
10 – 20 cc	15 (50)
20 – 30 cc	11 (36.7)
50 – 60 cc	4 (13.3)
Mild degree of ptosis	30 (100)
Mild areola deviation	5 (16.7)
Symmetry	
Symmetrical	10 (33.3)
Mild asymmetrical	20 (66.7)

When testing the postoperative outcomes for all included patients, we found that 63.3% of patients had good cosmetic outcome postoperatively. 16.7% of patients had very good cosmetic outcome.

Concerning patients' point of view, 80% of patients (24 patients) were totally satisfied about their postoperative outcome. 63.3% of them (19 patients) thought they had equal breast sizes while 36.7% of them (11 patients) thought they had a better breast shape as shown in table 3.

**Table (3):** The postoperative outcomes for all included patients (n=30)

Outcome	N (%)
Cosmetic outcome	
Accepted	6 (20)
Good	19 (63.3)
Very good	5 (16.7)
Patient satisfaction	
Satisfied	24 (80)
Not satisfied	6 (20)
Patient perception of operated breast size	
Equal	19 (63.3)
Better in shape	11 (36.7)

**We compared between both groups concerning their sociodemographic characteristics and found that:**

Age was not significantly different between both groups (p=0.156).

On the other hand, we found that T2 represented the stage of about half of group patients among group A and all of patients included in group B. this was statistically significant (p=0.006) as shown in table 4.

**Table (4):** The difference between both groups concerning sociodemographic characteristics:

Variable	Group A (n=15)	Group B (n=15)	P value
Age	44.47 ± 7.87	50.6 ± 14.12	0.156 T
Tumor staging	5 (33.3)	0	0.006 F
T1	8 (53.3)	15 (100)	
T2	2 (13.4)	0	
T3			

T; Independent sample T test. F; Fissure exact test.

**We compared between both groups concerning their postoperative complications and found the following:**

Concerning hematoma, we found that 33.3% of patients (5 patients) in group A experienced mild degree of hematoma while only 1 patient of group B (6.7% of patients experienced this type of hematoma post operatively. This was statistically significant (p=0.042) as shown in table 5.

Concerning seroma, we found that 7 patients among group A experienced moderate seroma in contrast to no one among group B. this was statistically significant (p=0.006) as shown in table 5.

Concerning blood loss, we found that most patients of group A (73.3%; 11 patients) developed moderate bleeding (between 20 – 30 cc). while 100% of patients in group B experienced mild post operative bleeding (between 10 – 20 cc). this was statistically significant (p<0.001) as shown in table 5.

Concerning Areola deviation, we found that 100% of patients in group A experienced mild areola deviation. In contrast to Group B; among whom, 33.3% did not experience any deviation of the new areola. This was also statistically significant (p=0.042).

Concerning symmetry of both sides, we found that according to surgeons' point of view; most patients in both groups; 60% of group A and 73.3% of group B; had mild asymmetry of both sides. This was not significantly different (p=0.710) as shown in table 5.

**Table (5):** The difference between both groups concerning Post operative complications:

Variable	Group A (n=15)	Group B (n=15)	P value
Hematoma			0.042 F
No	8 (53.5)	14 (93.3)	
Mild	5 (33.3)	1 (6.7)	
Moderate	2 (13.3)	0	
Seroma			0.006 F
Mild	8 (53.5)	15 (100)	
Moderate	7 (46.7)	0	
Blood loss			<0.001 F
10 – 20 cc	0	15 (100)	
20 – 30 cc	11 (73.3)	0	
50 – 60 cc	4 (26.7)	0	
Areola deviation			0.042 F
Mild	15 (100)	10 (66.7)	
No deviation	0	5 (33.3)	
Symmetry			0.710 C
Symmetrical	6 (40)	4 (26.7)	
Mild asymmetrical	9 (60)	11 (73.3)	

F; Fissure exact test. C; Chi square test.

**We also compared between both groups concerning their postoperative outcomes and found the following:**

Concerning cosmetic outcome, we found that 33.3% of patients in group A (5 patients) reported very good cosmetic outcome. In contrast to patients in group B among whom no one reported this category. This was statistically significant (p=0.017) as shown in table 6.

We tested the patients' satisfaction and found that most patients were satisfied among both groups as shown in table 6. This was not significantly different (p=0.651).

Concerning patients' perception, we found that 73.3% of patients in group A (11 patients) thought that both sides are better in shape than preoperatively. While all patients in group B thought that both sides are equal in size when compared to preoperative period. this was statistically significant (p<0.001) as shown in table 6.

**Table (6):** The difference between both groups concerning Post operative outcomes:

Variable	Group A (n=15)	Group B (n=15)	P value
Cosmetic outcome			
Accepted	4 (26.7)	2 (13.3)	0.017 F
Good	6 (40)	13	
Very good	5 (33.3)	(86.7) 0	
Patient satisfaction			
Satisfied	11	13	0.651 F
Not satisfied	(73.3) 4 (26.7)	(86.7) 2 (13.3)	
Patient perception of operated breast size			
Equal	4 (26.7)	15 (100)	<0.001 C
Better in shape	11	0	
	(73.3)		

**F; Fissure exact test. C; Chi square test.**

## DISCUSSION

The current study was conducted on 30 cancer breast patients scheduled for oncology breast surgery. Their age ranged between 32 and 77 years old with a mean of  $47.53 \pm 11.66$  years old. The majority of this study participants (76.7%) were T2 stage, 16.7% of them staged T1 and 6.7% of them staged T3.

In a research by **Lin et al.**<sup>(1)</sup>, 36 patients with breast cancer in the upper/upper inner quadrant received matrix rotation mammoplasty as part of breast-conservation surgery. The average age of the patients was consistent with this research (54.6 years).

Similarly, **Wong et al.**<sup>(11)</sup> in a previously conducted study reported that the mean age of breast cancer patients underwent wide local excision was 51 years. Also, in the **Szynglarewicz et al.**<sup>(12)</sup> research, the mean age of patients who had breast segmentectomy with rotation mammoplasty in conserving treatment for ductal carcinoma in situ (DCIS) with or without an invasive component was  $54.9 \pm 10.1$  years.

All the present study patients experienced mild degree of ptosis. 76.7% of this study patients had a mild seroma and 23.3% of them had moderate seroma. Mild and moderate hematoma were developed in 20% and 6.7% of patients.

**van Paridon et al.**<sup>(13)</sup> conducted a study on patients undergoing oncoplastic breast surgery, it was found that postoperative complications included seroma (4.3%), hematoma (2.1%), breast asymmetry necessitated late revisional surgery in 4.3% of cases. The occurrence of these complications was lower than the present study which might be attributed to that their study sample included both benign and malignant pathologies.

Mild blood loss (10 – 20 cc) was discovered in half of included patients, while 36.7% and 13.3% of them showed 20 – 30 cc and 50 – 60 cc blood loss. Similarly, 66.7% of patients (20 patients) experienced mild asymmetry between both breasts postoperatively. Mild areola deviation was detected in 16.7% of the current study population.

When testing the postoperative outcomes for all included patients, it was found that 63.3% of patients had good cosmetic outcome postoperatively and 16.7% of patients had very good cosmetic outcome. Concerning this study patients' point of view, 80% of patients (24 patients) were totally satisfied about their postoperative outcome. 63.3% of them (19 patients) thought they had equal breast sizes while 36.7% of them (11 patients) thought they had a better breast shape.

In agreement with the present study, the study of **Fitoussi et al.**<sup>(14)</sup>, which had 540 patients who underwent primary oncoplastic breast surgery for cancer, 90.3 percent had a good cosmetic result after five years.

A systematic evaluation of 25 studies examined the aesthetic results of 1,962 individuals who underwent oncoplastic breast conserving surgery (OBCS). In 55.2%, 31.0%, 9.4%, and 4.4% of patients, respectively, OBCS produced excellent, good, fair, or poor results. Most studies indicate that over 90% of individuals who had OBCS had satisfactory aesthetic results<sup>(15)</sup>.

The current study patients were randomly assigned into 2 equal groups. 50% of them underwent matrix rotation (15 patients) (group A) and 50% of them underwent wide local excision (15 patients) (group B).

We compared between both groups concerning their postoperative complications and found the following:

On comparing between both groups concerning sociodemographic characteristics, age was not significantly different between both groups ( $p=0.156$ ).

In this study the most commonly detected t stage among patients underwent matrix rotation (group A) was T2 (53.3%) followed by T1 (33.3%). All group B patients had T2 stage tumor.

Concerning post-operative hematoma, it was found that 53.5% of group A patients had no hematoma, 33.3% experienced mild degree and 13.3% experienced moderate hematoma. Among group B patients the majority of the patients didn't develop post-operative hematoma (93.3%). This was statistically significant ( $p=0.042$ ).

In contrast, **Lin et al.**<sup>(1)</sup> discovered that no hematoma was found throughout the 3-year follow-up period following breast-conservation surgery using matrix rotation mammoplasty.

Post-operatively, about half of group A patients developed mild seroma and the other half

developed moderate seroma, while, all group B patients developed mild seroma. The difference was statistically significant ( $p=0.006$ ).

Concerning blood loss, we found that most patients of group A (73.3%; 11 patients) developed moderate bleeding (between 20 – 30 cc). While, 100% of patients in group B experienced mild post-operative bleeding (between 10 – 20 cc). This was statistically significant ( $p<0.001$ ).

In agreement with the current study findings **Lin et al.**<sup>(1)</sup>, low blood loss occurred during breast-conservation surgery with matrix rotation mammoplasty among patients with breast cancer in the upper/upper inner quadrant (approximately 30 mL).

Concerning Areola deviation, we found that 100% of patients in group A experienced mild areola deviation. In contrast to Group B; among whom, 33.3% did not experience any deviation of the new areola. This was also statistically significant ( $p=0.042$ ).

Concerning symmetry of both sides, we found that according to surgeons' point of view; most patients in both groups; 60% of group A and 73.3% of group B; had mild asymmetry of both sides. This was not significantly different ( $p=0.710$ ).

We also compared between both groups concerning their postoperative outcomes and found the following:

Concerning cosmetic outcome, it was found that 40% of group A patients had good outcome, 33.3% of them had very good outcome and 26.7% of them had accepted outcome. The most commonly detected cosmetic outcome among group B patients was good (86.7%). The difference was statistically significant ( $p=0.017$ ).

The patients' satisfaction was tested and it was found that most patients were satisfied among both groups. This was not significantly different ( $p=0.651$ ). Concerning patients' perception, we found that 73.3% of patients in group A (11 patients) thought that both sides are better in shape than preoperatively. While all patients in group B thought that both sides are equal in size when compared to preoperative period, this was statistically significant ( $p<0.001$ ).

In concordance with the current study findings, **Kaviani et al.**<sup>(16)</sup>, found that when comparing oncoplastic breast surgery (OBS) with breast-conserving treatment (BCT), OBS appears to have a more hopeful future because BCT's aesthetic results are not always satisfying to patients or surgeons. After BCT, cosmetic failure rates are about 30%, compared to 0–18% with OBS.

This can be supported and explained by **Massey et al.**<sup>(17)</sup> study, who reported that after performing conservative surgery for breast cancer, with rotation glandular flap shape and contours are maintained. Also, it was shown that when less than 20% of the breast volume was removed, patients' satisfaction with the aesthetic outcome remained high

<sup>(17)</sup>. Even for varied tumour locations, this cut-off point continues to be predictive.

The aesthetic results of oncoplastic BCS (broad local excision), as measured by patient satisfaction, were excellent and very good in 72% of patients, and fair in the other 21 (28%) patients, according to **Wong et al study's**<sup>(11)</sup>.

According to **Lin et al.**<sup>(1)</sup>, despite the S-shaped incision and scar, the majority of breast cancer patients who got matrix rotation mammoplasty for breast preservation appeared to be satisfied with or accepting of the treated breast.

According to **Chan et al.**<sup>(10)</sup> to evaluation of the surgery cosmetic outcome, 94% of patients who received oncoplastic breast-conserving surgery reported being extremely happy or somewhat satisfied with the aesthetic outcome. The form of 89% of the treated breasts was found to be almost identical to the untreated breast or to change very slightly.

## CONCLUSION

Wide local excision is a safe oncoplastic technique, causing significantly less post-operative hematoma, mild seroma, minimal blood loss, less areolar deviation and better breast symmetry than matrix rotation technique.

**Supporting and sponsoring financially:** Nil.

**Competing interests:** Nil.

## REFERENCES

1. **Lin J, Chen D, Wang Y et al. (2016):** Oncoplastic surgery for upper/upper inner quadrant breast cancer. *PLoS One*, 11: e0168434. <https://doi.org/10.1371/journal.pone.0168434>
2. **Kwait R, Pesek S, Onstad M et al. (2016):** Influential forces in breast cancer surgical decision making and the impact on body image and sexual function. *Annals of Surgical Oncology*, 23(10):3403-11.
3. **Bertozzi N, Pesce M, Santi P et al. (2017):** Oncoplastic breast surgery: comprehensive review. *Eur Rev Med Pharmacol Sci.*, 21: 2572-2585.
4. **Di Micco R, O'Connell R, Barry P et al. (2017):** Bilateral mammoplasty for cancer: surgical, oncological and patient-reported outcomes. *European Journal of Surgical Oncology (EJSO)*, 43(1):68-75.
5. **Degnim A, Throckmorton A, Boostrom S et al. (2012):** Surgical site infection after breast surgery: impact of 2010 CDC reporting guidelines. *Annals of Surgical Oncology*, 19: 4099-4103.
6. **Farquharson M, Hollingshead J, Moran B (2014):** Farquharson's textbook of operative general surgery: CRC Press. 10th Edition London. Doi: <https://doi.org/10.1201/b17431>
7. **Holmes D, Schooler W, Smith R (2011):** Oncoplastic approaches to breast conservation. *International Journal of Breast Cancer*, 11:303879. doi: 10.4061/2011/303879.
8. **Lee J, Bae Y, Audretsch W(2012):** Combination of two local flaps for large defects after breast conserving surgery. *The Breast*,21: 194-198.

9. **Margulies I, Salzberg C (2019):** The use of acellular dermal matrix in breast reconstruction: evolution of techniques over 2 decades. *Gland Surg.*, 8: 3-10.
10. **Chan S, Chueng P, Lam S (2010):** Cosmetic outcome and percentage of breast volume excision in oncoplastic breast conserving surgery. *World Journal of Surgery*, 34: 1447-1452.
11. **Wong J, Chen Y, Gadd M et al. (2014):** Eight-year update of a prospective study of wide excision alone for small low-or intermediate-grade ductal carcinoma in situ (DCIS). *Breast Cancer Research and Treatment*, 143(2):343-50.
12. **Szynglarewicz B, Maciejczyk A, Forgacz J et al. (2016):** Breast segmentectomy with rotation mammoplasty as an oncoplastic approach to extensive ductal carcinoma in situ. *World Journal of Surgical Oncology*, 14(1):1-8.
13. **van Paridon M, Kamali P, Paul M et al. (2017):** Oncoplastic breast surgery: achieving oncological and aesthetic outcomes. *Journal of Surgical Oncology*, 116(2):195-202.
14. **Fitoussi A, Berry M, Famà F et al. (2010):** Oncoplastic breast surgery for cancer: analysis of 540 consecutive cases [outcomes article]. *Plastic and Reconstructive Surgery*, 125(2):454-62.
15. **Haloua M, Krekel N, Winters H et al. (2013):** A systematic review of oncoplastic breast-conserving surgery: current weaknesses and future prospects. *Annals of Surgery*, 257(4):609-20.
16. **Kaviani A, Sodagari N, Sheikhabaei S et al. (2013):** From radical mastectomy to breast-conserving therapy and oncoplastic breast surgery: a narrative review comparing oncological result, cosmetic outcome, quality of life, and health economy. *International Scholarly Research Notices*, 13:742462. doi: 10.1155/2013/742462.
17. **Massey E, Gouveia P, Nos C et al. (2013):** A new level 1 oncoplastic technique for breast conserving surgery: rotation glandular flap. *The Breast*, 22(2):186-9.