



Evaluation of different oncoplastic procedures used in the treatment of early breast cancer located in the upper outer quadrant

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Abstract: Background: In order to resolve the conflict between cosmetic satisfaction and oncologic safety a several procedures named "Oncoplastic Surgery" have appeared and gained wide acceptance all over the world. Oncoplastic procedures allow the treatment of large tumors with conservation rather than mastectomy. **Aim of work:** is to assess the oncoplastic techniques used for treatment of early breast cancer located in the upper outer quadrant which are donut mamoplasty, radial segmentectomy and lateral mamoplasty, as regard oncological safety surgical outcomes and patient satisfaction. **Patients and method:** This study included 30 female patients with early breast cancer located at upper outer quadrants. They all were treated by wide excision with safety margin followed by immediate reconstruction of defects using donut mamoplasty, radial segmentectomy or lateral mamoplasty; the patients were followed for postoperative complications, cosmetic outcome and local recurrence. **Result:** the mean age for our study was 48.7 ± 10.27 . The mean operative time for Donut mamoplasty was 102.36 ± 9.86 minutes, while they were 100.75 ± 8.47 minutes and 127.57 ± 10.63 minutes for radial segmentectomy and lateral mamoplasty respectively. Donut mamoplasty was a simple technique which had the least amount of intra-operative blood loss, post-operative drain amount and post-operative stay. The mean cosmetic outcome of donut mamoplasty was 4.86 ± 0.40 which fall between very good and excellent, for radial segmentectomy was 4.33 ± 0.65 which fall between good and very good and for lateral mamoplasty was 3.14 ± 0.69 which fall between fair and very good. **Conclusion:** The donut mamoplasty technique has the best cosmetic outcome with average simplicity of the surgical procedure; while lateral mamoplasty was the most complex technique with the least cosmetic outcome. Radial segmentectomy was the simplest technique, its cosmetic outcome falls between the other two techniques and it can be done for any breast size.

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Key words: Donut mamoplasty, radial segmentectomy, lateral mamoplasty.

1. Introduction:

Worldwide breast cancer is the most common cancer in females, with about 1.7 million new cases diagnosed in 2012 (the second most common cancer). This represents about 12% of all new cases of cancer and 25% of all cancers in women. (13).

Breast cancer diagnosis is a life –changing experience. it does not only bring the women face to face with her mortality, but also breast cancer surgical treatment is accompanied by physical changes to the body and the breast that will often, significantly and permanently, alter her perception of her emotional, physical and sexual wholeness. (4).

The goal of modern breast surgery is to cure patients with preservation of breast tissue as much as possible with satisfactory physical and psychological outcome. This goal has led to introduction of a new scope of surgery into our clinical practice called oncoplastic breast surgery. it was first coined by

audretsh et al. in 1998, it has the advantage of combining oncological safety and satisfactory cosmetic outcome. (1).

The fact that up to 30% of women undergoing breast conservation surgery (BCS) will have a residual deformity that necessitate surgical intervention lead to the use of oncoplastic techniques. These deformities are generally seen in breast conserving surgery when more than 20% of the breast volume has been resected as well as in tumors that are located superiorly, medially or in the retro-areolar region. (11).

Nowadays it is well known that up to 60% of the breast cancers are located in the upper outer quadrant. In oncoplastic techniques devoted for upper outer breast lesions, the reshaping is made easy after wide local excision by mobilizing the nipple and areola complex medially through peri-areolar incision separating the nipple areola complex from the surrounding tissue, excision of this peri-areolar zone

then re-attaching the nipple- areola complex to the newly formed skin margin. The need for those surgical techniques rises, to minimize the superolateral distortion of the breast by the counteraction effect of the medially displaced nipple- areola complex. (9).

In oncoplastic techniques, reduction or reconstruction of the contra-lateral side can be done in the same session to optimize the results and to obtain symmetry of the two breasts which improves the overall psychological outcome and reduces the bad impact of the surgery on the patient. (9).

Aim of the work:

The aim of our work was to evaluate donut mammoplasty, radial segmentectomy and lateral mammoplasty as oncoplastic procedures for treatment of upper outer quadrant breast cancer as regard oncological safety, postoperative complications and cosmetic outcome.

2. Patients and method:

This prospective study was conducted on 30 patients diagnosed to have early stages of breast cancer in between 2016 and 2018 at General Surgery Department in Ain Shams University Hospitals with approval of the Ethical Committee and written informed consent was obtained from all participants.

Patient selection was done through inclusion and exclusion criteria.

Inclusion criteria:

1. Female patients with age ranging from 26-60 years.
2. Upper outer quadrant lesions more than 2 cm away from the areola and nipple complex.
3. Primary breast malignancy stage I and II (Manchester) or T2 N1 M0 or less (TNM classification).
4. Patients whom oncoplastic surgery for outer quadrant of breast were possible on oncologic grounds.

Exclusion criteria:

1. Advanced primary breast cancer stage III, IV (Manchester) or T2 N1 M0 or more (TNM classification) with nipple and areola involvement including Paget disease of the nipple.
2. Multicentric lesions.
3. Patient with extensive in situ component (more than 25%).
4. Recurrent malignancy following conservative breast surgery.
5. Inflammatory breast cancer with extensive skin involvement.
6. Previous breast irradiation.
7. Non-compliant patients including patients demanding mastectomy for fear of local recurrence, patients not convinced with proposed procedure after

adequate explanation and patients refusing postoperative adjuvant radiotherapy.

All the patients were subjected to Clinical assessment (history, full breast and axillary examination), pre-operative investigation (routine laboratory investigations, bilateral sonomammography, pelvi-abdominal u/s, CT chest bone).

The selection of the oncoplastic technique was based on the size of the breast. Small sized breast with Cup A, B and C were handled by donut mammoplasty. Larger breasts with cup D, E, F and G were approached by lateral mammoplasty. Radial segmentectomy fits any size of the breast with exception of a very small breast Cup A.

Mark up and design of planned incision were done **on the morning** of the surgery in the holding area of the operating theatre using **water proof skin markers** in the presence of the breast nurse and the surgical team.

Operative technique:

1. Radical segmentectomy:

This procedure is an ideal approach for excision of lesions present adjacent to the skin or chest wall or extending radially toward the nipple. At first the mass was resected with adequate safety margins and frozen section confirmation is done, the specimen consists of an ellipse of skin glandular tissue and the underlying pectoralis fascia. As an elliptical incision the length of the ellipse is about three times the width. The length and width of the glandular part nearly approximate the dimensions of the skin margin with care to maintain a macroscopic glandular margin of one cm or more to ensure microscopically clear margins. (Fig.1).



Figure (1): radial segmentectomy, elliptical wound.

To prepare for the closure of the wound, full thickness dermoglandular advancement flaps were created by undermining the gland perpendicular to the long axis of segmentectomy cavity. During this step care was taken so as not to extensively undermine the breast tissue in order not to compromise the blood supply of the flap which in turn will raise the

incidence of complications like wound infection seroma and edema. (Fig. 2).



Figure (2): radial segmentectomy, glandular displacement flaps

Both flaps were the approximated and sutured by Vicryl sutures. Until the glandular defect was closed. After closure of the flap and regaining the contour of the flap a cosmetic evaluation was made by inspecting the breast from all angles, the surgical table also was elevated to check for the symmetry, volume of both breasts and site of the nipple. Closure was made on three layers and drain was inserted. (Fig.3).



Figure (3): final outcome, lateral view.

2. Donut mammoplasty:

This procedure is best used in the cases of malignancy that does not extend to the skin or nipple-areola complex; also it leaves no visible scar as the incision is made at transitional zone around the areola.

A pair of concentric circumareolar skin incision was done; one placed at the areolar margin and a second whose radius was at least one cm longer. (Fig.4). the intervening ring of the skin was excised (either full or partial thickness). De-epithelisation was done around the areola using a small blade scalpel after injection of adrenaline in the epidermis of the skin around the areola at the site of de-epithelisation. With about 1 cm thickness, de-epithelisation was

made in a circular manner allowing a sufficient access to the glandular tissue of the breast through a crescent incision in the de-epithelized part of the skin at the upper outer zone towards the site of the tumor. (Fig.5).

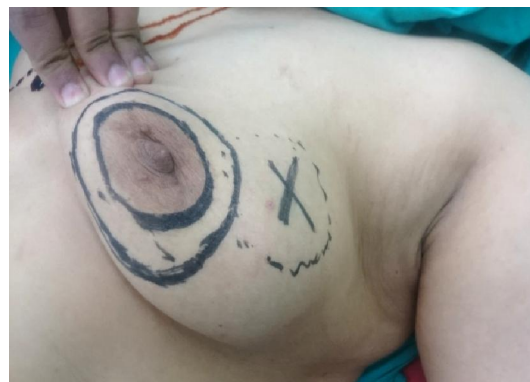


Figure (4): donut mammoplasty, tumor site.



Figure (5): de-epithelisation step.

Next step was incising the skin at the de-epithelized area to approach the breast mass and excising it with a safety margin. At this step a good retraction is mandatory to allow good access to the glandular tissue of the breast and excising the mass with adequate safety margin due to the narrow field of the procedure. (Fig.6).



Figure (6): donut mammoplasty, adequate retraction to reach the mass

The defect was sutured by Vicryl sutures, after frozen confirmation.

A burse string suture was taken by non-absorbable suture (Prolene) at the outer margin of the de-epithelized skin, then traction of the burse string was made gently allowing narrowing of the de-epithelized area, tighten of the burse string until the diameter of the operated nipple and areola is similar to the contralateral breast was done to obtain the optimum cosmetic outcome and symmetry. (Fig. 7).

After that closure of the skin was made either by absorbable sutures in a subcuticular manner or by non-absorbable sutures in a simple interrupted manner. A drain was left in case of presence of a dead space especially when excising a large mass or when fear of hematoma or seroma formation is warranted. (Fig.8).

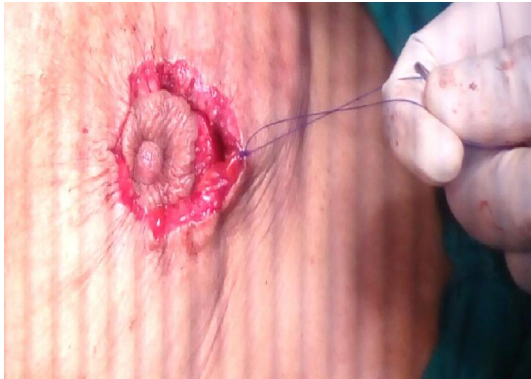


Figure (7): the burse string suture



Figure (8): Final closure by subcuticular suture

3. Lateral mammoplasty:

It is an oncoplastic technique that is used for patients with breast cancers at the upper outer quadrant especially if the tumor is of large volume, which its resection with traditional breast conserving surgery would leave a significant defect reflected on the cosmetic outcome and leads to lateral shift of the nipple-areola complex due to the traction force made by the lateral scar.

A small disc of skin around the nipple-areola complex was de-epithelialized and every attempt was made to preserve the sub-dermal plexus of veins for nipple viability. Then wide local excision of the tumor was done with a triangular skin wedge down to the clavi-pectoral fascia. (Fig.9,10).



Figure (9): preoperative marking



Figure (10): de-epithelization and wide local excision



Figure (11): final result after closure of skin by subcuticular sutures

The defect resulted from the excision was closed by deep glandular stitches, using absorbable sutures. At this step the nipple areola complex was slightly shifted laterally, this was corrected by reattachment of the nipple- areola complex to the newly formed edge

of the skin after the periareolar de-epithelisation leading to reposition of the nipple-areola complex back to the middle of the breast mound. A burse string is taken in the edge of the skin around the NAC to approximate it until the diameter of the NAC is identical to that of the opposite side. Then closure can be made by subcuticular sutures. (Fig.11).

In all the techniques the safety margin was assessed by frozen section and axillary lymph node dissection was done.

Patients were discharged at the second day post-operative if everything is fine. Patients were discharged on antibiotics, analgesics and anti-edema agents. They were advised to wear well-fitting sports bra following all reconstruction procedures Drains were removed in follow up visits when daily volume is less than 40-50 ml.

A follow up schedule was given to the patients as the following first week every three days for dressing, the following two weeks every four days until removal of the stitches.

Our patients were followed up for both oncologic and cosmetic grading and were referred to receive postoperative suitable adjuvant chemo and or radiotherapy according to the final pathology reported after conventional pathological evaluation.

Patients were asked to follow up in the surgical department clinic after completion of the adjuvant therapy once every three months for one year.

3. Result:

This prospective study included 30 female patients with early breast cancer who underwent oncoplastic breast surgery via two major technical steps, excision of the tumor with wide safety margin along with formal axillary dissection, followed by immediate reconstruction using the following oncoplastic techniques:

1- **Eleven patients** underwent **donut mammoplasty**.

2- **Twelve patients** underwent **radial segmentectomy**.

3- **Seven patients** underwent **lateral mammoplasty**.

The age of the patients varied from 26-60 years old (mean age was 48.7), five patients had medical comorbidities. 3 patients had diabetes mellitus, 1 patient had hypertension and 1 patient had ischemic heart disease.

The tumor size was evaluated by ultrasound, the smallest tumor size was 1cm and the largest was 3.2 cm with mean tumor size for the whole study $2\text{cm} \pm 0.47$. The mean tumor size varied in-between the 3 surgical procedures. The mean tumor size for those who underwent Donut mammoplasty was 1.66 ± 0.45 cm. While the mean tumor size for radial segmentectomy was 2.18 ± 0.42 cm and 2.2 ± 0.31 for lateral mammoplasty. (table1). The mean breast cup size for the whole study was C. The minimum breast cup size was A, while the maximum was G.

Table (1): tumor size for every surgical procedure

	Group						P	Sig
	Donut mammoplasty		Radial segmentectomy		Lateral mammoplasty			
	Mean	±SD	Mean	±SD	Mean	±SD		
U/s Size	1.66	0.45	2.18	0.42	2.20	0.31	0.008*	HS

The nearest tumor was 2 cm from NAC and the farthest was 5.5 cms from NAC with mean distance for the whole study was 2.84 ± 0.93 cms. The mean distance of the tumor from NAC in donut mammoplasty was 2.3 ± 0.39 cms. They were 3.36 ± 0.43 cms and 3.6 ± 0.54 cms for radial segmentectomy and lateral mammoplasty respectively. The mean breast cup size for the whole study was C. The minimum breast cup size was A, while the maximum was G.

Our mean operation time in all the thirty patients was 107.60 ± 14.50 minutes. The minimum operation time was 85 minutes while the maximum was 145 minutes. The mean operative time for Donut mammoplasty was 102.36 ± 9.86 minutes, while they were 100.75 ± 8.47 minutes and 127.57 ± 10.63 minutes for radial segmentectomy and lateral mammoplasty respectively. (table 2).

Table (2): mean operative time for each surgical procedure

	Group						P	sig
	Donut mammoplasty		Radial segmentectomy		Lateral mammoplasty			
	Mean	±SD	Mean	±SD	Mean	±SD		
Operative time	102.36	9.86	100.75	8.47	127.57	10.63	0.001*	HS

The variance between the three surgical procedures as regard intra-operative blood loss wasn't large, the donut mammoplasty showed the lowest amount of intra-operative blood loss with mean amount 60 ml, while the lateral mammoplasty showed the largest amount of mean intra-operative blood loss which was 120 ml. Worth noting that donut mammoplasty showed the least amount of 1st day drain (75.00 ml) due to relatively smaller wound, less dissection and smaller glandular flaps in comparison to the other techniques. Radial segmentectomy (85.45 ml) had good wound exposure by its long incision allowing better hemostasis than lateral mammoplasty which showed the largest amount of intra-operative bleeding and post-operative 1st day drain (96.45 ml) due to complexity of the surgical procedure and relatively larger incision and more glandular dissection and displacement. The mean post-operative stay period for donut mammoplasty was 27.27 ± 6.76 hours, it was 30 ± 9.57 hours for radial segmentectomy and 34.29 ± 8.28 for lateral mammoplasty.



Figure (12): post-operative haematoma in donut mammoplasty



Figure (13): post-operative wound infection with Secondary closure in lateral mammoplasty Only

Post-operative complications occur only in five patients in the form of 3 cases of infection and 2 cases of haematoma formation. The three patients who have

had wound infection two of them were diabetics. The three patients received oral antibiotics and instructed to have the wound daily dressed twice until the infection was eradicated. One of the three patients required wound opening to allow adequate drainage, which was later secondarily sutured. This didn't compromise final cosmetic outcome. Post-operative hematoma occurred in two cases both of them had donut mammoplasty. The tumor distance from NAC in both cases was 5.2 cm and 5 cm respectively. They were discovered 2st day post-operative and managed conservatively. Patients were prescribed anti-edema measures and were already on parenteral antibiotic. Hematoma resolved spontaneously after 3 days. None of the previously stated complications resulted in delay of post-operative adjuvant therapy and all patients were sent to receive their appropriate therapy according to schedule. (**fig.12,13**).

One case in our study developed local recurrence with incidence of 3.3 %. The recurrence occurred after 11 months of surgery.

Cosmetic outcome was estimated using a scoring system which was made up from the three independent grading parties (Surgeon, Patient and MDT of the breast) based on the level of satisfaction to give an overall score for cosmetic outcome.

Table (3): number of cases for every score of cosmetic outcome

Cosmetic outcome	Mean	%
Score 5	14	46.7%
Score 4	10	33.3%
Score 3	5	16.7%
Score 2	1	3.3%
Score 1	0	0 %
Score 0	0	0 %

The cosmetic outcome score was based on multiple items that made up a check list to be evaluated by our team and the MDT of the breast for every single case, this check list:

- 1-The overall shape of the breast
- 2-The symmetry of both breasts
- 3-The site and direction of the nipple
- 4-The volume of the breast
- 5-The skin incision shape

These elements was discussed for every single case and analyzed to give a scoring system graded from 1 to 5 as the following:

- 5 = Excellent**
- 4 = Very good**
- 3 = Good**
- 2 = Fair**
- 1 = Poor**
- 0 = Ugly**

The overall mean score of our study was 4.23 which fall between very good and excellent.

The mean cosmetic outcome of donut mammoplasty was 4.86 ± 0.40 which fall between very

good and excellent, for radial segmentectomy was 4.33 ± 0.65 which fall between good and very good and for lateral mammoplasty was 3.14 ± 0.69 which fall between fair and very good. (table 4). (fig.14,15,16).

Table (4): mean cosmetic outcome for the three procedure

	Group						P	sig
	Donut mammoplasty		Radial segmentectomy		Lateral mammoplasty			
	Mean	±SD	Mean	±SD	Mean	±SD		
Cosmetic outcome	4.82	.40	4.33	.65	3.14	.69	0.001*	HS



Figure (14): donut mammoplasty after 1m



Figure (15): lateral mammoplasty after 1 m



Figure (16): radial segmentectomy after 1 m

Discussion:

Up to 50% of the breast cancers occur at the upper outer quadrant; this is because the upper outer quadrant of the breast occupies nearly more than 50% of the volume of the breast. The cosmetic outcome of all the oncoplastic techniques at this quadrant is better than any other quadrant of the breast as result of the relatively higher volume. (5).

Oncoplastic breast surgery depends on three basic principles which are: wider excision of the breast cancer, immediate breast reconstruction, and immediate symmetry of the other breast whenever needed. This can be achieved through several techniques which based on size and location of the tumor, size of the breast, distance of the tumor from nipple-areola complex and clinical evaluation of the patient. These techniques are divided into either volume displacement or volume replacement procedures. The volume displacement techniques use the remaining breast tissue, while the volume replacement techniques use other autologous tissue to replace the insufficient breast tissue. (8).

In our study a small to medium sized breast (Cup A, B and C) was managed by donut mammoplasty. The mean breast cup size for donut mammoplasty was B to C. Larger breast size was approached with the other 2 techniques. The large excision made by donut mammoplasty would disfigure the breast and may compromise safety due to possibility of excision of less volume and consequently not enough safety margins. This is similar to the retrospective study made by Joseph et al. published at 2016 that preferred donut technique to approach breast cancer in a small breast size.

A slightly large tumor in a large breast (Cup C, D and E) was approached by radial segmentectomy. The pivotal element of the radial segmentectomy is the direction of the incision being radial and the glandular flaps made after excision to obliterate the space of excision. The mean breast cup size for radial segmentectomy was E to D.

A huge breast with larger mass needs large excision which would lead to shift the nipple-areola complex laterally deforming the breast. This can be corrected by the periareolar de-epithelisation done in

lateral mammoplasty for the nipple-areola complex to rest perfectly on the top of the breast mound. The mean breast cup size for lateral mammoplasty was C to D. it is difficult to obtain symmetry by lateral mammoplasty.

In **Dennis et al (2011)** study, large tumor masses within large breast was handled by lateral mammoplasty and radial segmentectomy. They claimed less satisfactory cosmetic outcome for donut mammoplasty if done to a large breast.

The operation time was quite different between the three procedures. The mean operation time For Donut mammoplasty was 102.36 minutes, 100.75 minutes for Radial segmentectomy and 127.57 minutes for lateral mammoplasty.

The complexity of the surgical technique of lateral mammoplasty wasn't only reflected on the operation time but also on the overall intra-operative blood loss. The mean blood loss for lateral mammoplasty was 120 ml. while the donut mammoplasty showed the least amount of intra-operative blood loss with mean amount of 60 ml. Radial segmentectomy falls between the two groups, the mean intra-operative blood loss in radial segmentectomy was 80 ml. The study made by **Royal College of Surgeons in 2007** showed that lateral mammoplasty is a complex surgical technique with the disadvantages of; prolonged operation time, more intra-operative blood loss and higher incidence of complications like flap necrosis and wound infection.

In our study 80% of the cases (24 patients) fall in excellent and very good score groups. The other 20% (6 cases) fall in good and fair score groups, none of our cases had a poor or an ugly score.

In our study only 5 cases (16%) had complications, 3 cases got wound infection, and the other two cases had wound hematoma. Two patients of those who developed infection were diabetics reflecting the immune compromisation with diabetes mellitus. Statistically DM has increased the risk of post-operative wound infection thrice. Two patients of those who developed infection after lateral mammoplasty were diabetic. So it's better to avoid lateral mammoplasty technique in diabetic patients as the complexity of the technique raises the incidence of complications like flap necrosis and wound infection. This is quite similar to the study made by **Kronowitz et al. and Krishna et al.** with complications rate of **18% and 10% respectively.**

Both cases who had wound hematoma underwent donut mammoplasty with tumor distance from the nipple-areola complex more than 4 cms. So we recommend that tumors that are far from the nipple-areola complex with more than 4 cm distance are better approached by radial segmentectomy and lateral mammoplasty rather than donut mammoplasty. This is

the similar to what is published by **Humayun and Ardeshir (2008)** who developed geometrical calculation method to be an easily reproducible technique for intra-operative evaluation of site of the nipple-areola complex and the tumor and determining the best oncoplastic technique for the tumor distance. They claimed that tumors that are far away from the nipple are better handled by lateral mammoplasty than by donut mammoplasty.

Only one case (with incidence 3.3%) of local recurrence was discovered during follow up period after 11 months. She was treated with salvage mastectomy. This is quite equivalent with the study done by **Delly et al (2009)** conducted on 100 cases of oncoplastic surgery which reported 3 cases of local recurrence with incidence of 3%.

Conclusion:

The choice of the oncoplastic technique depends on multiple factors, the location of the tumor, size of the breast and distance of the tumor from the nipple areola complex, so all patients must be adequately reviewed in order to decide the best technique for every single case.

Our three techniques have the same oncologic safety as the conventional conservative mastectomy; however the cosmetic outcome was more satisfactory.

The donut mammoplasty has the highest cosmetic outcome score which approaches the excellent score. The wound being obscured around the nipple- areola complex at the transitional zone between nipple-areola and skin played an integral role in improving cosmetic outcome and patient satisfaction, it is better avoided in large breasts; while lateral mammoplasty is the most complex technique with the least cosmetic outcome but fits for large breast, Radial segmentectomy is the simplest technique and its cosmetic outcome falls between the other two techniques and can be used for any size of the breast except very small breasts.

References:

1. Audretsch W, Rezai M, Kolotas C, et al. (2006): Is mastectomy still justified; Recent advances in breast cancer surgery, other choices *Perspect Plast Surg*; 11: 71-106.
2. Delly Eamonn (2009): Development of oncoplastic surgery in breast cancer. Local recurrence after breast oncoplastic surgery. *Ann Chir Plast. Esth'etique*; 55: 85-7.
3. Dennis R, Wesley S, Robina S (2011): Oncoplastic approaches to breast conservation. The best aesthetic selection for oncoplastic technique. *International Journal of Breast Cancer*. Volume 1, Article ID 303879, 211-227.

4. Dennis R, Wesley S, Robina S (2012): International Journal of Breast Cancer. Article ID 303879, page 16.
5. El-Bolkainy R, Nouh M, Amber N (2005): Topographical pathology of cancer, 3rd edition; National Cancer Institute, Cairo University; Chapter 10: 18 – 5.
6. Humayun Khan and Ardeshir Bayat (2008): A geometric method for nipple localization, a guide to oncoplastic breast surgery. Can J Plast Surg. Spring; 16 (1): 45–47.
7. Joseph Lin, Dar-Ren Chen, Yu-Fen Wang, et al. (2016): Oncoplastic surgery for upper outer/upper inner quadrant breast cancer. PLoS ONE; 11 (12): e0168434.
8. Jung Yang, Woo lee, Young Kyoo, et al. (2012): Surgical techniques for personalized oncoplastic surgery in breast cancer patients with small sized breast. Ho Yong Park Jour. Breast Cancer; 15 (1): 1-.
9. Krishna B, Gabriel J, Kaufman L, et al. (2012): Improving Breast Cancer Surgery: A classification and Quadrant per Quadrant Atlas for Oncoplastic Surgery. Ann Surg Oncol; 35 (2) 117-22.
10. Kronowitz S, Hunt K, Kuerer M, et al. (2007): Practical guidelines for repair of partial mastectomy defects using the breast reduction technique in patients undergoing breast conservation therapy. Plast Reconstr Surg; 120 (7): 1755–68.
11. Malcom R. Kell (2011): Evolution of breast surgery. J Surg Oncol; 103 (4): 341- 347.
12. Royal College of Surgeons (2007): On behalf of the Association of Breast Surgery at BASO, BAPRAS and the Training Interface Group in Breast Surgery. Advantages and disadvantages of different oncoplastic techniques. EJSO Jour of cancer surgery. doi: 10.1016/j.ejso.2007.04.014
13. Warren K (2013): Priority Medicines for Europe and the World. Advances in breast cancer surgery. Eur Jour of Surg; (125) 201-220.

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