EVALUATION OF EARLY RESULSTS OF BREAST CONSERVING THERAPY IN TREATMENT OF BREAST CANCER

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ABSTRACT

Background: Breast cancer is a devastating illness both physically and emotionally for the patients and their families. Over the years, as understanding of the pathophysiology of breast cancer has improved and utilization of radiation therapy as an adjuvant mode of therapy was optimized, modifications to the original operations have evolved. Breast conserving surgery (BCS) has emerged as a new approach to allow excision of the tumor with adequate safety margin as will as axillary clearance without compromising the natural shape of the breast.

Objective: Evaluation of early results of breast conserving therapy in treatment of breast cancer as regards cosmetic appearance, psychological state and early recurrence.

Patient and methods: The study included 21 female patients with operable breast cancer stage I or II treated with BCS with reconstruction according to the tumor site then followed by post- operative irradiation, chemotherapy and hormonal therapy. This study was carried out in the departments of General Surgery and Clinical oncology, Faculty of medicine, Zagazig University from February 2010 to August 2012.

Results: Breast conserving therapy (BCT) is considered to be oncologically equivalent to modified radical mastectomy and as safe as it. BCT appears to offer advantages over mastectomy with regard to quality of life and aesthetic outcomes.

Conclusion: BCT is a safe and satisfactory surgical method for most of patients with early breast cancer.

Key words: Breast, Breast cancer, Breast conserving therapy, Oncoplastic surgery

INTRODUCTION

Breast cancer is a worldwide problem and its surgical treatment has changed significantly over time. The same has happened with the role of the surgeons. Today they do more than just remove the tumor. They are the patient's first contacts, leaders of a multidisciplinary team, guiding the patient through the many diagnostic and therapeutic modalities comprising the modern management of breast cancer. (1)

Until the mid-1980s, the surgical treatment for stage I or II breast cancer was modified radical mastectomy Since then, evidence from randomized trials has shown that breast-conserving surgery (BCS) with radiotherapy i.e. breast conserving therapy (BCS) produces results equivalent to those obtained with modified radical mastectomy in terms of survival. These results have led to the adoption of BCT as the treatment of choice for patients with early breast cancer. (2)

In the Western world, BCT is recommended as the standard treatment for most of those patients with early breast cancer. Postoperative irradiation of the remaining breast tissue represents an integral part of BCT to decrease the risk of local recurrences. (3)

Breast conservation involves resection of the primary breast cancer with a margin of normal-appearing breast tissue, axillary clearance and adjuvant radiation therapy. (4)

Oncoplastic surgery (OPS) has emerged as a new approach to allow wide excision for BCS (OPS-BCS) without compromising the natural shape of the breast. It is based upon integration of plastic surgery techniques for immediate breast reshaping after wide excision for breast cancer. The conceptual idea of OPS is not new, and its oncologic efficacy in terms of margin status and recurrence compare favorably with standard BCS. (5)

Objective

Evaluation of early results of breast conserving therapy in treatment of breast cancer as regards cosmetic appearance, psychological state and early recurrence.

PATIENTS AND METHODS

This study was carried out in the departments of General Surgery and Radiotherapy, Faculty of medicine, Zagazig University during the period from February 2010 to August 2012.

From the whole number of breast cancer patients admitted to Zagazig University hospital during the period of the study, which were **74** only **21** of them were subjected to BCT with a period of follow up; one year from the last case and a median follow up period of **21** months.

Patient's selection:

(I) Inclusion criteria for BCS :

(1)The breast/tumor volume ratio allows a resection with good cosmesis and the size of the tumor ≤4 cm.
(2) Free margins can be obtained.
(3) There are no contraindications to radiotherapy.
(4)True cut needle biopsy showing
< 25% intraductal component.

(II) Exclusion criteria for BCS

(1) When clear margins cannot be assured without performing a mastectomy.

(2) In patients with tumors> 4 cm.

(3)In those patients with mammography showing multicentric lesion.

(4) In patients with extensive malignant mammographic microcalcification.

(5) In patients with inflammatory carcinoma**,** or during pregnancy.

(III) Patient preferences

It is the most difficult aspect of patient evaluation, we discuss with the patient the benefits and risks of mastectomy compared to breast conservation treatment in her individual case, with thoughtful consideration of each.

A number of factors were considered:-

1. Long-term follow up.
2. The possibility and consequences of local recurrence.
3. Psychological adjustment (including the fear of cancer recurrence) and cosmetic outcome.

Techniques:

I-Pre operative:

All patients were examined clinically and investigated by:

(A) Laboratory: complete blood count (CBC), bleeding profile (BT,CT,PT, and INR), Liver function tests, Kidney function tests, Random blood sugar and Hepatitis markers.

(B)Imaging: breast ultrasound, breast mammography.

(c) True cut needle biopsy .

The day before surgery, a discussion between us and the patient to plan the surgical approach and the final location of the scars. The breasts should be analyzed with the patient in the standing position and any existing asymmetry of shape, position or size should be noticed, and the patients were consented for possibility of modified radical mastectomy

II- Operative measures:

All patients were operated upon under general anesthesia and underwent resection of the tumor with safety margin at least 2 cm and axillary clearance then local reconstruction was carried out with the most suitable technique by the same breast surgeon that resected the tumor.

Table (1): Showing different tumor site and techniques used in each one.

Tumor site	Technique	No. of cases
Upper outer	Lateral radial technique	13
Upper inner	Medial radial technique	2
Lower inner	Medial radial technique	1
Lower middle (6 o'clock)	Inverted T mammoplasty	2
Upper middle(12 o'clock)	Vertical scar mammoplasty	1
Retroareo-lar	Advancement flap technique	2

General principles irrespective of the technique used:

- The drawing was made while the patient in the sitting position.
- The patient was laid in a supine position with both arms extended 90° and operated under general anesthesia on a flexible adjustable operating table.
- Tumor excision involves incising from skin down the pectoralis major muscle with a macroscopic margin of at least 1 cm around the tumor.
- Suction drain is placed in the dissected glandular space and in the axilla.
- Axillary lymphadenectomy was performed during the same operation through the same incision in 10 patients and through a separate incision in 11 patients.
- The Resected specimens were assessed by the pathologist for histpathological and immunohistochemical studies.

The lateral radial technique

preoperative drawing as shown in photo(1) .

Photo (1)*: Pre- operative drawing in case of lateral radial technique*

Surgery:

Axillary dissection was done through the same incision or through separate incision, photo (2,3) . A lateral radial cutaneoglandular incision

was made until reaching the pectoral plane removing a large lateral quadrantectomy including the tumor, the peripheral gland and the overlying skin. The mammary gland was then freed from the deep pectoral plane to facilitate its mobilization.

After clipping the bed and placing the suction drain in the tumorectomy cavity, the lower and upper glandular excision edges were approximated and sutured together with simple, absorbable sutures. The patient was positioned seated for remodeling and the skin was closed with subcuticular sutures with some supportive interrupted sutures;
Photo (5).

Photo (2): *Incision for tumor excision and a separate incision for axillary clearance.*

Photo (3)*: The cavity after removal of the tumor.*

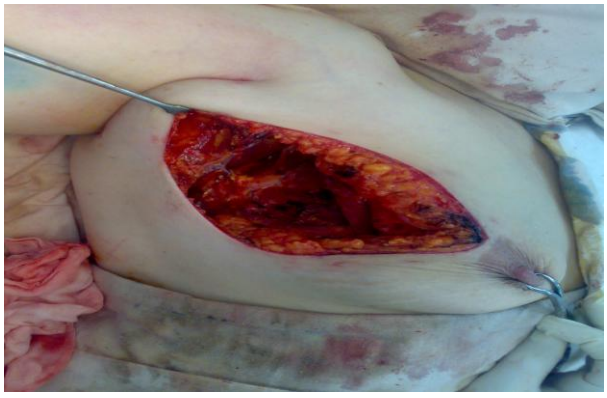

Photo (4)*: Showing removal of the pectoral fascia.*

Photo (5)*: The breast after closure of the wound.*

Medial radial technique :

- **Preoperative drawing:** as shown in photo (6).

Photo (6)*: Pre operative drawing in case of medial radial technique*

Surgery:

Axillary clerance was done through a separate incision. The cutaneo-glandular incisions were oriented along an internal radius and were carried down to the pectoral fascial plane resulting in a wide internal quadrantectomy encompassing the tumor with clean glandular margins and overlying skin; photo (7).The adjacent glandular tissue was then undermined in the pre-pectoral plane to facilitate its re-approximation.

After placement of clips to mark the tumor bed and a suction drain, the lower and upper glandular margins were re-approximated with interrupted absorbable sutures. The patient was put in a sitting position for breast remodeling. A provisional skin closure was performed with staples. Final skin closure was performed with a running subcuticular suture with some supportive interrupted sutures as shown in photo (8).

Photo (7)*: The cavity after removal of the tumor.*

Photo (8)*: The breast after removal of the tumor and closure of the wound.*

Superior Pedicle Mammoplasty (Inverted T mammoplasty based on superior pedicle technique)

Pre-operative drawings: As shown in photo (9).

Photo (9) *:pre- operative drawing in case of superior pedicle mammoplasty*

Surgery

Axillary dissection was done through a separate axillary incision before removal of the tumor.

The skin was incised along the drawn marking as shown in photo (10). The epidermis overlying the outlined ‘‘keyhole’’ was removed with scalpel dissection. As shown in photo (11).

Photo (10)*: Incision for superior pedicle reduction mammoplasty .*

Photo (11)*: De-epitheililization around nipple and areola (NAC).*

The incision begins in the lateral side down to the inframammary crease and extends deeply to and then along the pectoral muscle plane removing the full thickness of the gland. The upper portion of the breast remains fixed to the chest wall and is perfused by branches of the internal mammary and lateral branches of intercostal arteries.

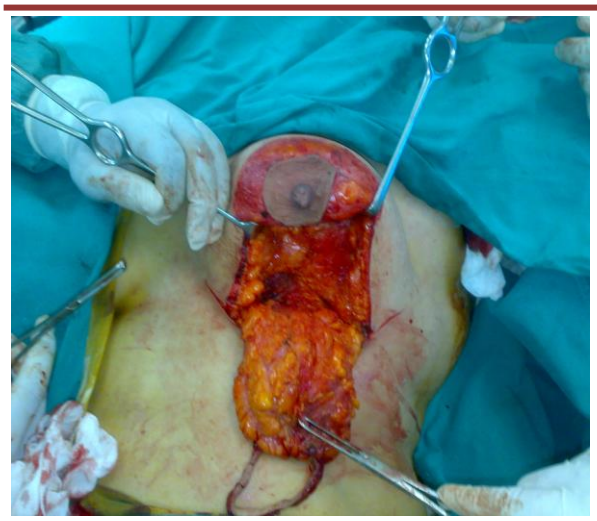

***Photo (12)**: The inferior pedicle containing the tumor.*

Grasping the elevated portion of the gland, and performing a wide inferior quadrantectomy with wide resection of the tumor and the overlying skin as shown in photo (13).

***Photo (13)**: The cavity after removal of the tumor*

After tumor resection and elevation of the gland from of the pectoralis layer, the lateral glandular pillars were approximated and sutured to each other with interrupted sutures , photo (14) The patient is positioned sitting to guide final breast remodeling and provisional placement of skin sutures.

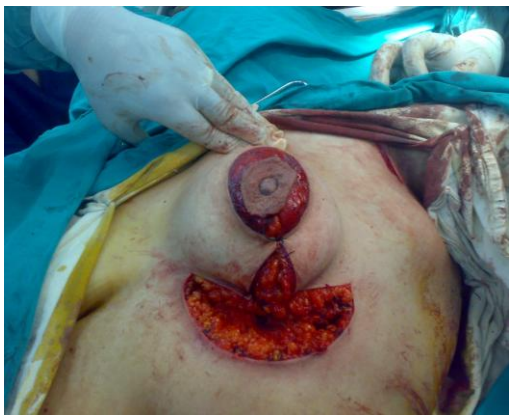

***Photo (14)**: Approximation of the edges with stay sutures*

The specimen was oriented and the tumor bed was marked with clips suction drain was placed .The skin was closed with subcuticular sutures with some supportive interrupted sutures, photo (15).

***Photo (15)**: The breast after closure of the wound.*

Advancement flap technique

Pre-operative drawings: photo (16).

***Photo (16)**: Pre operative drawing in case of advancement flap technique*

Surgery

Axillary clearance was done firstly through a separate incision. The skin was incised along the drawn marking as shown in photo (17).

The nipple –areola complex (NAC) was removed with the tumor and surrounding safety margin (2 cm. grossly), photo (18-A) as well as the underlying pectoral fascia.

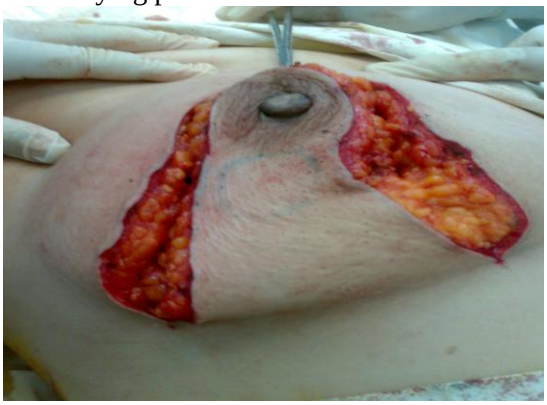

***Photo** (17) Incision in case of rotational flap technique*

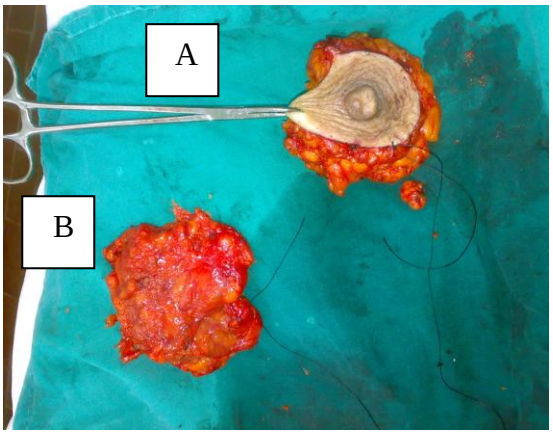

***Photo (18)**: Nipple-areola complex with the tumor (A) .Axillary contents (B).*

Following resection of the tumor, the defect is reconstructed using the glandular- cutaneus flaps as shown in photo (19) , and closure of the defect with suction drain as shown in photos (20 ,21) .

***Photo (19):** Approximation of the edges with stay sutures*

***Photo (20)**: The breast after closure of the wounds (Lateral view).*

***Photo (21)**: The breast after closure of the wounds (Anterior view).*

III- Post-operatively:

Post-operatively all patients were submitted to careful follow up by:

- Monitoring of the vital signs of the patients every one hour, and the amount of the drain every 12 hours,
- Patients were encouraged for early mobilization from bed after 6 hours and started oral intake on regaining of intestinal motility,
- Post-operative analgesia was given in the form of diclofenac sodium 75mg IM,
- Patients were encouraged for early mobilization of the upper limb from the 2nd post-operative day,
- Follow up of any post-operative complications such as wound infection, seroma and haematoma,
- The suction drain was removed when the serous discharge decreased to less than 30 ml in 24 hours,
- The sutures of the wound were removed from days 10-12,
- The specimen was examined histopathologically for type of tumor, safety margin number of affected axillary lymph nodes and also for ER,PR and HER 2 neu receptor
- After discharge from the hospital, all patients were seen by the clinical oncologists, which prescribe the appropriate adjuvant treatment and radiotherapy protocol that has been given to every patient.
- Patients were then followed every 3 months, with mammograms and complementary ultrasound when it was needed
- The period of follow up was ranged from 12 to 30 months.

Post-operative adjuvant treatment:

Adjuvant systemic therapies:

- **Adjuvant chemotherapy**

In this study 15 (71.4%) patients had ER+ve, PR+ve and HER2 –ve, all those patients treated with FAC for 6 cycles every 3 weeks. While 5 patients (23.8 %) had ER-ve, PR-ve and HER2+ve , those patients treated with Herceptin , Taxotere and Indoxan for 6 cycles every 3 weeks and Herceptin alone monthly for one year .

- **Adjuvant endocrine therapy**

In the present study 12(57.1%) Premenopausal patients had ER+ve and PR +ve and treated with tamoxifen which will be used for 5 years. While 3 (14.3 %) postmenopausal patients had ER+ve and PR +ve and treated with tamoxifen for 2 years followed by AI which will be used for 3 years.

Adjuvant radiation therapy

All patients in this study treated with conventional radiotherapy to the entire breast and its peripheral lymphatics .

The dose is 50 Gy over 5 weeks (2 Gy per day) followed by booster dose 1000cGy to the tumor bed.

RESULTS

Patient, procedures and tumor characteristics of the 21 patients are summarized in tables (2-4).

Table (2): shows the age distribution.

Age groups / year	No.	%
30-40	6	28.6%
41-50	11	52.4%
51-60	3	14.3%
61-70	1	4.7%
Total	21	100 %

Table (3): shows tumor location.

Tumor location	No.	%
Upper outer	13	61.9 %
Upper inner	2	9.5 %
Lower middle	2	9.5 %
Upper middle	1	4.8 %
Retro-areolar	2	9.5 %
Lower inner	1	4.8 %

Table (4): staging of the patients.

Stage	No.	%
Stage I	6	28.6 %
Stage II	15	71.4 %

Table (3): shows complications after surgery.

Complication	No.	%
Wound infection	2	9.5 %
Wound hematoma	1	4.8 %
Abscess formation	1	4.8 %
Fat necrosis	1	4.8 %
Local recurrence	1	4.8 %
No complication	15	71.4 %

Two patients complained of recurrent mass in the site of the previous operation, the first after 12 months, and the second 20 months after surgery, the first was operated with lateral radial technique while the second operated with vertical scar technique, true cut biopsy was done for each of them, the first was diagnosed as fat necrosis and managed by local excision, the second was diagnosed as local recurrence and she was managed by modified radical mastectomy.

Two patients developed wound infection, one of them treated conservatively by antibiotic and the second treated by antibiotic, drainage, follow up and secondary suture.

One patient had serous collection in the lower part of the breast and treated by drainage.

In this study we made the first cosmetic assessment according the patient preference and their own think and the results were as the following (table (4)).

Table (4): Patient assessment of cosmosis:

Degree	No. of patient	Percentage
Good	15	71.4%
Fair	6	28.6%
Poor	0	0

The second cosmetic assessment was done on both clinical and photography based assessment by four general surgeons, one plastic surgeon ,one clinical oncologist and two nurse shared in this assessment , all scores were collected and average score calculated to achieve this cosmetic score , as in table (5) .

Table (5): Clinical and photography based assessment of cosmosis:

Degree	No. of patient	Percentage
Excellent	2	9.5%
Good	15	71.4%
Fair	4	19.1%
Poor	0	0

(a) Excellent(9-10): identical to other breast;
(b) Good (7-8): slightly different from the other breast;
(c) Fair (5-6): as (b), but not seriously distorted;
(d) Poor (1-4): seriously distorted. [6]

Photo (22): Lateral radial technique: 5 days post operative

Photo (23) :Lateral radial technique: one year after surgery.

Photo(24) :Medial radial technique:one year after surgery.

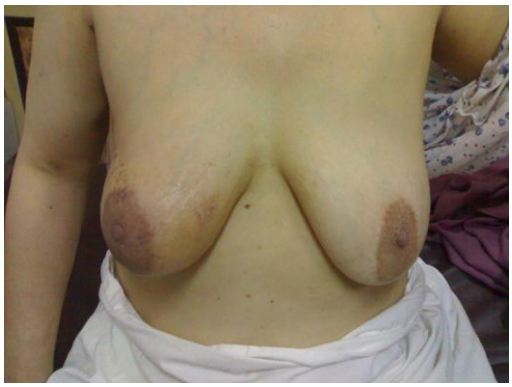

Photo (25) : Lateral radial technique: one and half year after surgery.

Photo(26): Retro-areolar tumor :one month after removal of sutures.

Photo (27) : Superior pedical mammoplasty : two years after surgery .

DISCUSSION

Oncoplastic breast conserving surgery (OPS-BCS) has the potential to improve the aesthetic outcome of BCS as well as extending the role of BCS in situations previously considered unsuitable for conservation (large tumor size, central or lower pole tumor location or multifocality) . [7]

In spite of worldwide acceptance of the merits of BCS for cosmesis and safety from tumor recurrence, the patient, surgeon and paramedical in our locality most of them not accepting BCS as a surgical tool for early breast cancer and this explained the low number of cases in this study 21 patient from 43 patient represented with early breast cancer in our department in the same period of the study.

In this study the most important selection criteria is the breast/tumor volume ratio and this criterion was matched with Da Silvaa et al. [8] and Pillarisetti et al. [9]

All patients with tumor size more than 4 cm were excluded from our study and this is in agreement with Rainsbury and Paramanathan . [10]

In our study 13 patient (61.9 %) with a tumor in the upper outer quadrant were operated with lateral radial technique and this the same technique adopted by Berry et al. [11] and Malaka et al. [12], while Schrenk [13] performed S – reduction mammoplasty and round block technique and Schondorf [14] perfomed B- plasty technique, and no differences were found between the different techniques.

We operated 2 patient (9.5%) with a tumor in the upper inner quadrant with medial radial technique and this matched with Berry et al.[11]and Malaka et al.[12], while Schrenk p. [13]performed S –reduction mammoplasty and round block technique with accepted cosmetic results in both techniques.

Two patient (9.5 %) with lower middle tumor operated with inverted T – mammoplasty based on superior pedical and this the same technique adopted by Schrenk.[13], while Berry et al. [11] Performed inverted T – mammoplasty based on superior pedicel and purely vertical scar technique.

Two patient (9.5%) with retro areolar tumor treated with modification of grisotti[15] technique ,while Huemer et al.[16]performed semi-elliptical excision with transverse scar. Schrenk[13] performed Grisotti technique, Fitzal [17]perform Batwing technique.

One patient (4.8 %) with upper middle tumor operated with vertical scar technique as the tumor was away from the nipple and the breast was pendulous while Schrenk [13] performed Batwing, round block and inferior pedicel reduction techniques.

In the present study the surgical margins were examined by frozen section in one case but due to difficult in availability other patients were examined by post excision histo-pathological examination. No surgical margin involvement occurred .Clough et al. [18] found surgical margin involvement in 11 (10.9%) of their 101 breast cancer patients treated with BCT. Losken et al. [19] treated 20 breast cancer patients with reduction mammaplasty technique and reported surgical margin involvement in 4 (20%) patients requiring a reoperation. McCulley and Macmillan. [20] reported a series of 50 breast cancer patients treated with therapeutic mammaplasty in which 4 patients (8%) required a reoperation due to surgical margin involvement. Caruso et al . [21]reported a series of 61 breast cancer patients treated with bilateral breast reduction ,The margins were positive in 5 patients (8.2%) in intraoperative histological analysis but negative after re-excision in the same operation . Meretoja et al. [22] reported 11 patients (16.2%) had an inadequate surgical margin and required a completion mastectomy.

The interpretation of the cause of negative margins in our study may be due to the extent of safety margin of 2 cm. all around the tumor and also the small number of patients.

In this study the early surgical complication rate was 19%, which is accepted in comparison to other similar studies .Clough et al. [18] reported an early surgical complication rate of 20%, Losken et al. [19] reported a surgical complication in 30% of their patients, Caruso et al. [21]in 9.8%, McCulley and Macmillan. [20] in 16%, Da Silva et al. [8] in 13.3% and Meretoja et al. [22] in 16.7% .

In the present study the most common complication was infection which occurred in two

patient (9.5 %) , other complications as haematoma and abscess formation occured in one patient (4.8 %).

Fat necrosis developed in one patient (4.8%) in our study at the site of the scar and it did not cause any wound complications in the early postoperative period and resulted in palpable masses. The lesions was proved to be fat necrosis after excisional biopsy.

In our study recurrence occur in one patient (4.8 %), in this patient the tumor was found at upper middle part of the breast (at 6 o clock), away from the nipple in a large pendulous breast and the tumor size was 18x15mm. , the patient was operated upon with vertical scar technique , the hisopathological examination revealed invasive duct carcinoma with 2 cm safety margin and –ve L.N., after 20 month the patient felt a mass in the same site of the previous tumor ,true cut biopsy reveal invasive duct carcinoma and modified radical mastectomy was done .

As regards the rate of recurrence in our cases, it is not away from the international results .Clough et al. [18] From Institut Curie published their first evaluation of 101 patients and concluded a higher recurrence rate of 9% was reported with median follow up of 5 years. Shwartz et al . [23] Stated that the 10-year cumulative ipsilateral tumor recurrence rate should be no more than 5%. .Reitjens et al. [24]from the European Institute of Oncology have reported long term results with a 5 year local recurrence rate of 3%. . Takashi et al. [25] reported recurance rate of 4.2 %, .Fitoussi et al . [26] Review of 540 oncoplastic conservation procedures between 1986 and 2008 revealed a local recurrence rate of 6.8% , and Meretoja et al. [22] reported no recurrence after a median follow up of 26 months

To date the selection of the most valid method to evaluate aesthetic outcome following BCT remains challenging. [27]

Change in breast appearance is dependent on the response of various tissues (e.g. skin, subcutaneous fat, glandular epithelium, pectoral muscle), and also to interventional measures (e.g. surgery, radiotherapy, chemotherapy, hormonal therapy) . [28]

Baildam,[29] in his leading article of 2002 recommended contra-lateral symmetrization ,But in our study all patients were uncomfortable with the idea of surgery to an unaffected breast and refused contra-lateral symmetrization.

To interpret aesthetic outcomes, we have to differentiate between objective and subjective measurements. [30]Objective methods use measurements taken directly from the patient or from photographs, and are based essentially on asymmetries between treated and non-treated breasts. They are associated with increased reproducibility of assessment, but they do not take into account the global appearance of aesthetic results.[31]Subjective methods have been largely used, either through direct patient evaluation or through photographs, performed by one or several observers. [30]However, subjective methods of aesthetic evaluation of BCT are only modestly reproducible, even when performed by experts. [31] Harris et al describe a scale which divides outcomes into one of four categories: excellent, good, fair or poor . [32]

In our study good cosmetic results occurred in 71. 4% of patients, and asymmetry between the two breast occurred in 19 patient (90.4%) and this is matched with Bajaj et al. [33] who noted that breast conservation therapy patients had significant treatment-related asymmetry in all patient (100%) when reviewed 21 patients treated with BCT. The patient own declare about the over all cosmetic appearance post surgery was surprisingly very satisfactory in this work.

The patient's perception of cosmetic outcome is more important in determining psychological response than the type of treatment which she had experienced. A good perception of cosmetic outcome was associated with a favorable psychological outcome. [34]

We recommend long term follow up to evaluate up to 10 year recurrence rate of those patients.

We again advocate to explain the techniques , post operative results achieved and the rate of recurrence which was very low comparable to the international rates and to perform local meeting and work shops for all medical staff to achieve wide application of this principles with respect of inclusion and exclusion criteria .

CONCLUSION

Breast conserving therapy is a safe and satisfactory surgical method for most of those patients with early breast cancer and we suppose that it will take more share and land with little effort in the future days.

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