# Comparative Study between Early Surgical Complications of Conservative Breast Surgery versus Modified Radical Mastectomy in Early Breast Cancer

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## ABSTRACT
**Background:** Breast cancer is the second most common form of cancer in women, comprising of 16% of all female cancer**.** The present study was carried out to compare the early (1 month postoperative) surgical complications of Conservative Breast Surgery to early surgical complications of Modified Radical Mastectomy of patients with early breast cancer. **Patients and methods:** This study was carried out in General Surgery Department, Beni-Suef University Hospitals and 6th October Health Insurance Hospital in Dokki - Geza. It included 40 patients with early breast cancer. All patients were divided into two groups: Group A (conservative breast surgery) 20 patients. Group B (modified radical mastectomy) 20 patients.
**Keywords*:*** breast cancer; Conservative Breast Surgery; Modified Radical Mastectomy.

## INTRODUCTION

Primary operable breast cancer can be treated by modified radical mastectomy or conservative breast surgery.

Modified radical mastectomy involves the removal of both entire breast tissue and axillary lymph nodes in which level I and II of axillary lymph nodes are removed. No muscles are removed from beneath the breast. During subcutaneous ("nipple-sparing") mastectomy, all of the breast tissue is removed, but the nipple is left alone **(Bland, 2007).**

Breast conservation involves resection of primary breast cancer with a margin of normal appearing breast tissue, adjuvant radiation therapy and assessment of regional lymph node status **(Baskin et al., 2005).**

Early complication after modified radical mastectomy:

Seroma formation, wound infection and oedema of arm were major early complications, while haematoma and skin flap necrosis were observed in few cases after modified radical mastectomy with axillary dissection **(Hynes et al., 2004).**

Early complications after breast-conserving surgery:

Infection, bleeding, poor wound healing, or a reaction to the anesthesia used in surgery. Blood or clear fluid may also collect in the wound and need to be drained. You may have breast pain and feelings of pulling, pinching, tingling, or numbness **(El-Tamer et al., 2007).**

Four hundred eighty patients had conservative breast surgery and 217 had modified radical mastectomy. All patients were followed post operatively for development of seroma. About 37% of BCT develops seroma and about 68% of MRM develop seroma **(Fourquet et al., 2006).**

## AIM OF THE WORK

The aim of this study is to compare the early (1 month postoperative) surgical complications of Conservative Breast Surgery to early surgical complications of Modified Radical Mastectomy of patients with early breast cancer.

Group A (Conservative Breast Surgery 20 patients).

Group B (Modified Radical Mastectomy 20 patients).

The comparative study will include the following postoperative complications:

- Postoperative wound seroma.
- Postoperative wound dehiscence (viability of flaps).
- Postoperative wound infection.
- Postoperative cosmetic outcome.
- Postoperative wound haematoma.
- Residual tumour.

## PATIENTS AND METHODS

Type of the study: prospective study. This study was carried on 40 patients with early breast cancer from March 2018 to June 2019.

Selection of the patients: fourty patients were admitted to General Surgery Department, Beni-Suef University Hospitals and 6th October Health Insurance Hospital in Dokki - Geza. Patients were divided into two groups:

Group A (Conservative Breast Surgery 20 patients).

Group B (Modified Radical Mastectomy 20 patients).

### *Inclusion criteria:*

Patients with early breast cancer (Doctors may refer to stage I to stage IIA cancer as early stage, and stage IIB to stage III as locally advanced) according to TNM staging **(Chustecka, 2014).**

TNM staging system:

The most commonly used tool that doctors use to describe the stage is the TNM system. Doctors use the results from diagnostic tests and scans to answer these questions:

- Tumor (T): How large is the primary tumor? Where is it located?
- Node (N): Has the tumor spread to the lymph nodes? If so, where and how many?
- Metastasis (M): Has the cancer metastasized to other parts of the body? If so, where and how much?

### *Exclusion criteria:*

Some patients with locally advanced breast cancer (stage IIB, stage III) who need neo-adjuvant therapy before surgery, or all patients with systemic manifestations indicating distant metastasis who need systemic treatment.

### *Statistical Methods*

Data were statistically described in terms of mean ± standard deviation (± SD), median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using Kruskal Wallis test. Within group comparison of distance was done using paired t test. For comparing categorical data, Chi-square (x2) test was performed. Exact test was used instead when the expected frequency is less than 5. Accuracy was represented using the terms sensitivity, and specificity. Receiver operator characteristic (ROC) analysis was used to determine the optimum cut off value for the studied diagnostic markers. P values less than 0.05 was considered statistically significant. All statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 22 for Microsoft Windows.

## RESULTS

This study was carried out on 40 patients who had early breast cancer. All patients were divided into two equal groups. Group A (underwent conservative breast surgery) and Group B (underwent modified radical mastectomy).

The collected results were statistically analyzed taking the following in consideration:

- Age distribution.
- Sex distribution.
- Site and Size of the breast lesion.
- Associated risk factors (hypertension-diabetes mellitus-family history).
- Description of BIRAD in the studied patients.
- Postoperative wound seroma.
- Postoperative wound dehiscence (viability of flaps).
- Postoperative wound infection.
- Postoperative cosmetic outcome.
- Postoperative wound haematoma.
- Residual tumour.

Regarding the age of the patients, it was found to be ranged from 30 - 67 years in group (A), with mean value of 51.3 ± 10.8 and ranged from 46 - 73 years in group (B) with mean value of 61.2 ± 7.1.

Table (1) Description of age in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | Modified radical mastectomy (n = 20) |
|---|---|---|---|
| Age (years) | Mean | 51.3 | 61.2 |
| | ±SD | 10.8 | 7.1 |

Table (2) Description of sex in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | |
|---|---|---|---|---|---|
| Sex (n, %) | Male | 0 | 0% | 2 | 10% |
| | Female | 20 | 100% | 18 | 90% |

This table shows description of sex in the studied patients. In Conservative mastectomy, there were 20 females (100%) with no male patients. In modified radical mastectomy, there were 2 males (10%) and 18 females (90%).

Table (3) Description of risk factors in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | |
|---|---|---|---|---|---|
| DM (n,%) | No | 16 | 80% | 12 | 60% |
| | Yes | 4 | 20% | 8 | 40% |
| HTN (n, %) | No | 14 | 70% | 10 | 50% |
| | Yes | 6 | 30% | 10 | 50% |
| IHD (n, %) | No | 20 | 100% | 18 | 90% |
| | Yes | 0 | 0% | 2 | 10% |
| Preg. (n, %) | No | 19 | 95% | 20 | 100% |
| | Yes | 1 | 5% | 0 | 0% |
| F.H (n, %) | No | 18 | 90% | 19 | 95% |
| | Yes | 2 | 10% | 1 | 5% |

This table shows description of risk factors in the studied patients.

- In conservative mastectomy: there 4 diabetic patients (20%), 6 hypertensive patients (30%), 1 pregnant female (5%) and 2 patients (10%) with positive family history.
- In modified radical mastectomy: there 8 diabetic patients (40%), 10 hypertensive patients (50%), 2 ischemic heart patients (10%) and 1 patient (5%) with positive family history.

Table (4) Description of tumor site in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | |
|---|---|---|---|---|---|
| Site (n, %) | Rt. | 9 | 45% | 9 | 45% |
| | Lt. | 11 | 55% | 11 | 55% |
| Quadrant (n, %) | LIQ | 2 | 10% | 3 | 15% |
| | UIQ | 1 | 5% | 0 | 0% |
| | LOQ | 4 | 20% | 2 | 10% |
| | UOQ | 10 | 50% | 6 | 30% |
| | Multiple | 2 | 10% | 5 | 25% |
| | Retro-areolar | 0 | 0% | 4 | 20% |
| | Axillary tail | 1 | 5% | 0 | 0% |

This table shows description of tumor site in the studied patients.

- In conservative mastectomy: there were 9 righted patients (45%) and 11 left sided patients (55%). There were 2 patients (10%) in the LIQ, 1 patient (5%) in the UIQ, 4 patients (20%) in the LOQ, 10 patients (50%) in the UOQ, 2 patients

(10%) had multiple quadrants and 1 patient (5%) in the axillary tail.

- In modified radical mastectomy: there were 9 righted patients (45%) and 11 left sided patients (55%). There were 3 patients (15%) in the LIQ, 2 patients (10%) in the LOQ, 6 patients (30%) in the UOQ, 5 patients (25%) had multiple quadrants and 4 patients (20%) retro-areolar.

Table (5) Description of tumor size in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | Modified radical mastectomy (n = 20) |
|---|---|---|---|
| Size (cm) | Mean | 2.2 | 4.2 |
| | ±SD | 0.7 | 0.75 |

This table shows description of tumor size in the studied patients. In Conservative mastectomy, the mean tumor size of studied patients was 2.2 ± 0.7cm. In modified radical mastectomy, the mean tumor size of studied patients was 4.2 ± .75 cm.

Table (6) Description of BIRAD in the studied patients.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | |
|---|---|---|---|---|---|
| BIRAD (n, %) | 4A | 2 | 10% | 0 | 0% |
| | 4B | 3 | 15% | 1 | 5% |
| | 4C | 4 | 20% | 1 | 5% |
| | 5 | 11 | 55% | 18 | 90% |

This table shows description of BIRAD in the studied patients.

- In conservative mastectomy: There were 2 patients (10%) 4A, 3 patients (15%) 4B, 4 patients (20%) 4C and 11 patients (55%) 5 BIRAD.
- In modified radical mastectomy: There were 1 patient (5%) 4B, 1 patient (5%) 4C and 18 patients (90%) 5 BIRAD.

Table (7) Comparison between studied operations as regard post-operative complications.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | | P-value |
|---|---|---|---|---|---|---|
| Wound seroma | Negative | 16 | 80% | 12 | 60% | 0.167 NS |
| | Positive | 4 | 20% | 8 | 40% | |
| Wound dehiscence | Negative | 20 | 100% | 18 | 90% | 0.147 NS |
| | Positive | 0 | 0% | 2 | 10% | |
| Wound infection | Negative | 19 | 95% | 17 | 85% | 0.292 NS |
| | Positive | 1 | 5% | 3 | 15% | |
| Wound hematoma | Negative | 20 | 100% | 19 | 95% | 0.311 NS |
| | Positive | 0 | 0% | 1 | 5% | |
| Residual tumor | Negative | 18 | 90% | 20 | 100% | 0.147 NS |
| | Positive | 2 | 10% | 0 | 0% | |

**NS: p-value > 0.05 is considered non-significant.**

This table shows no statistical significant difference **(p-value > 0.05)** between studied operations as regard post-operative wound seroma, dehiscence, infections, hematoma and residual tumor.

Table (8) Comparison between studied operations as regard cosmetic outcome.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | | P-value |
|---|---|---|---|---|---|---|
| Cosmetic outcome | Bad | 1 | 5% | 7 | 35% | 0.046 S |
| | Fair | 5 | 25% | 5 | 25% | |
| | Good | 14 | 70% | 8 | 40% | |

**S: p-value < 0.05 is considered significant.**

This table shows statistically significant difference **(p-value < 0.05)** between studied operations as regard post-operative cosmetic outcome.

Table (9) Comparison between studied operations as regard patient & doctor satisfaction.

| Variables | | Conservative mastectomy (n = 20) | | Modified radical mastectomy (n = 20) | | P-value |
|---|---|---|---|---|---|---|
| Satisfaction | Bad | 3 | 15% | 9 | 45% | 0.095 NS |
| | Fair | 5 | 25% | 2 | 10% | |
| | Good | 12 | 60% | 9 | 45% | |

This table shows no statistical significant difference (p-value > 0.05) between studied operations as regard post-operative patient and doctor satisfaction

## DISCUSSION

The age of the included patients is ranged from 30-67 years in group (A), with mean value 51.3 ± 10.8 which is agreed with Bland and Copeland, 2004, with mean value of 51, and ranged from 46-73 years in group (B) with mean value 61.2 ± 7.1 which is agreed with **Burstein et al., 2008** with mean value of 58.

In the present study regarding the risk factors family history, it was found that 2 patients having positive FH (10%) and 18 patients having negative FH (90%) in group A which is agreed with **Corrado et al., 2013** with about 15% of his patients have positive FH, and 1 patients having positive FH (5%) and 19 patients having negative FH (95%) in group B which is agreed with **Fischer and Josef, 2006** with about 10% of his patients having positive FH.

In the present study regarding the size of the tumor it was found to be ranged from 1.5-3.5 cm with mean value of 2.2 ± 0.7 in group A which is agreed by **Fisher et al., 2002** with mean value of 2.3, and ranged from 3.5-5.5 cm with mean value 4.2 ± 0.75 in group B which is agreed by **Fitzal et al., 2008** with mean value of 4.5.

Regarding site of the tumor the most common site was the UOQ in both groups (A and B) with percentage 50% and 30% respectively which is agreed by **Fourquet et al., 2005.**

In the present study regarding wound complication seroma, there was significant difference between both groups and incidence of seroma in group A (20%) is less than group B (40%) which is agreed by **Newman and Washington, 2003** and also agreed with **Riedl et al., 2008.**

This compares well with the study of **J.-C. Gil-Londoño et al., 2016** that showed there was percentage of seroma or haematoma post MRM was (27.8%), post CBT (23.6%).

This compares well with the study of **Naman Chandrakar and Raju K. Shinde** that showed there was seroma (26.8%) post MRM (**Naman and Raju, 2018).**

This compares well with the study of **Diana Vilar et al. (2004)** that showed seroma post MRM was (25.6%), post CBS was (23.9%).

In the present study regarding wound complication, wound infection post CBS (5%) and post MRM (15%). This agreed with study of **J.-C. Gil-Londoño et al. (2016)** that showed wound infection post MRM was (23.1%), post CBS was (9.9%). This also agreed with study of **Naman and Raju (2018)** that showed there was wound infection post MRM (24.39%).

This compares well with the study of **Diana Vilar et al., (2004)** that showed wound infection post MRM was (38%), post CBS was (18%).

In the present study regarding wound complication, wound dehiscence was post MRM (10%), post CBS (0%).This against study of **Naman and Raju (2018)** that showed wound dehiscence post MRM was (31.7%).

In the present study regarding margin of excision there was significant difference between both groups and incidence of involved margin in group A (10%), group B (0%) which is comparable to that of **Sabel, 2009** that showed there was 303 (32%) patients from 948 patients were deemed eligible for BCT underwent re operation for either close or positive margins.

In the present study regarding patient satisfaction there was insignificant difference between both groups as p value was 0.095 which is comparable with **Van Dongen, 2000** as his p value was 0.020. But about cosmetics, patient results in group A were good (70%), fair (25%), bad (5%), P value was 0.046 which are agreed with **Veronesi et al., (2002)** as their results were (80%) good, (10%) fair, and (10%) bad. This agreed also with study of **satsuki Fuiishiro et al., (2000)** that showed there was (92%) excellent to good post CBS.

Several previous retrospective and prospective randomized trials have shown that BCS followed by adjuvant radiotherapy is equivalent to mastectomy in terms of survival for patients with early stage breast cancer, despite of a higher rate of LR **(Litière et al., 2012).** Consequently, BCT has been used routinely in clinical practice for more than 20 years in many Western countries. The comparatively low take-up rate of BCT in Egypt may relate to factors such as social and economic circumstances, although concern over the increased risk of relapse and metastasis seems to have been the primary consideration for both breast cancer patients and their surgeons.

In order to minimize the selection bias of patients between these groups, the data should be analyzed using 5 baseline variables: patient age, axillary lymph node status, hormone receptor status, the use of neoadjuvant chemotherapy and tumor diameter. All these factors were considered likely to be associated with LR, distant metastasis, and survival, based on previous studies **(Lize et al., 2015).** The present study has a short follow-up period than any previous study conducted regarding the relative efficacy of BCT and MRM for primary breast carcinoma in Egypt, so, not all these variables were considered.

The ultimate aim of the present study was to help patients and physicians in Egypt to decide whether BCT or MRM is the better option in any given case. It was found that BCS followed by radiotherapy provides comparable results to those of MRM in terms of local control. This is consistent with the findings of earlier, randomized trials **(Du et al., 2000 and Fisher et al., 2002).**

One possible concern in interpreting these results is that ipsilateral breast tumor recurrence (IBTR) may actually represent 2 distinct entities: a true recurrence (TR) and a new primary tumor (NPT). Some study suggest that NPTs are associated with a more favorable outcome than TR **(Yoshida et al., 2010).** However, as no standard method for sub-classifying IBTR as either TR or NPT has been established yet, there are no attempts to distinguish these entities in the present time.

Breast cancer has a prolonged natural history, and hence competing causes of mortality (for example heart disease and stroke) may potentially skew the disease-free survival (DFS) and distant disease-free survival (DDFS) data. **Lize et al.,** found that the BCT group had significantly better 6-year DFS and rates than the MRM group. These results are striking and suggest that BCT is likely to be the superior treatment option in most cases. This is consistent with the findings of several recent studies **(Hwang et al., 2013, Kurian et al., 2014, and Agarwal et al., 2014).** However, because **Lize et al.,** study was retrospective, this study is not sufficient to conclusively prove that BCT is superior to MRM. Unknown biases may have prevented them from identifying the true differences between the efficacy of BCT and MRM in these patients.

Some studies on the efficacy of BCT have found higher locoregional recurrence rates in younger patients **(Zhou et al., 2004, Jones et al., 2009, and Darby and McGale, 2011).** There was no such finding in a mastectomy series **(Katz et al., 2000, and Zellars et al., 2000),** and some investigators postulated that the higher locoregional recurrence rates were due to limited breast resection in younger patients **(Zhou et al., 2004).** Younger age itself, however, was also

shown to be associated with diverse, aggressive pathological features **(Darby and McGale, 2011; Katz et al., 2000; Zellars et al., 2000; and van der Leest et al., 2007).**

Neoadjuvant chemotherapy is an important method for enabling otherwise ineligible patients to undergo **BCT (Beriwal et al., 2006, Wolmark et al., 2001).**

In **Lize et al.,** study, 59.7% of patients in each of the BCT and MRM groups received neoadjuvant chemotherapy. Within the BCT group, the 6-year DFS of patients who received neoadjuvant chemotherapy was significantly lower than that of patients who did not receive this treatment. This may reflect the fact that patients undergoing neoadjuvant chemotherapy did so because on average they had larger tumors and more positive axillary lymph nodes. Their subgroup analysis showed that both tumor size and axillary lymph node status at initial treatment are strongly associated with both the 6-year local recurrence free survival (LRFS) rate (lymph node status only) and the 6-year DFS and DDFS rates (lymph node status and tumor size). Tumors insensitive to neoadjuvant chemotherapy generally have more aggressive behavior, resulting in a poor prognosis for patients undergoing MRM.

Lize and his colleagues found statistical differences in the distribution of pathological types between the BCT and MRM groups in their study (P=0.017), suggesting that this potential selection bias might not be have been completely controlled. Previous studies have shown that invasive lobular carcinomas have similar rates of local control to invasive ductal carcinoma. Furthermore, the survival and local control afforded by BCT in patients with invasive lobular tumors do not differ statistically from those achieved in patients with invasive ductal tumors **(Santiago et al., 2005; and Vo et al., 2006).**

HER-2 is an important prognostic marker of primary breast cancer. It was not included in the present study. As compared with luminal A-like subtype, HER-2-positive was associated with a worse DFS in node-positive patients. Anti-HER-2 therapy results in a significant survival advantage when given after chemotherapy to early breast cancer patients over observation alone **(Perez et al., 2014)** and even to metastatic breast cancer patients **(Yan et al., 2014).** The short follow-up period in the present study also limits full comparison of BCT and MRM. This might be addressed by future studies with an extended follow-up period.

In Egypt, breast cancer is the most common cancer among women, representing 18.9% of total cancer cases (35.1% in women and 2.2% in men) among the Egypt National Cancer Institute's (NCI) series with an age-adjusted rate of 49.6 per 100,000 people. In **Salem et al.,** study, they reported the progress of the availability of breast cancer management and evaluation of the quality of care delivered to breast cancer patients. The total number of patients with a breast lump presented during the study period was 1,463 patients (32 males and 1431 females); 616 patients from the total number were admitted at the surgical department .There was a decline in advanced cases. Since 2001, facilities for all lines of comprehensive management have been made accessible for all patients. They found that better management could lead to earlier presentation, and better overall outcome in breast cancer patients. The incidence is steadily increasing with a tendency for breast cancer to occur in younger age groups and with advanced stages **(Salem et al., 2010).**

As worldwide, young Egyptian females with breast cancer are generally treated similarly to their older counterparts; for example, the neoadjuvant chemotherapy is given to those who present with locally advanced breast cancer, and the surgical options are either mastectomy (with or without immediate breast reconstruction) or breast-conserving surgery followed by radiotherapy. As in older women, factors affecting surgical decisions include tumor size, location, ability to achieve a free safety margin with good cosmetic outcome, and patient preference. In **Farouk et al., study,** the percentage of breast-conserving surgery was 22.7% versus 77.3% for mastectomy. This may be attributed to that the relatively local advanced disease is present among those patients and most of the young females are worried about intramammary recurrence, so they prefer to do mastectomy **(Farouk et al., 2016).**

## CONCLUSION

The present study conclude that it is better to do CBT rather than MRM, as CBT can offer to the patients with early breast cancer treatment of the tumor with less postoperative complications

and the desired goal to avoid removal of the breast and psychological trauma that occurs to most of the patients after mastectomy.

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