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# Vertical axillary approach for conservative treatment of outer breast tumors

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**Abstract:**

**Background:** Breast cancer is the second most common cancer among women, with an estimated 3.5 million survivors as of 2015. There is continuous annual improvement of the overall survival of breast cancer patients, with 5-year overall survival estimates increasing from 84.6% to 90.9% over the previous two decades.**Objective:**To improve aesthetic satisfaction and oncological outcome of patients with breast outer quadrant tumors.**Patients and Methods:**This study is an Interventional study conducted in onco-surgery unit, General Surgery Department, Faculty of Medicine, Zagazig University on 18 cases with early breast cancer at upper and lower outer quadrants of breast during the period from December 2020 to May 2021. All patients were subjected to demographic data taking, complete clinical examination, Laboratory investigations included imaging, biopsies, and histopathology. **Results**: the Histopathological type of tumor, all of them had Invasive ductal carcinoma. Most of the tumors in our study were (ER) and (PR) Positive with HER2/neo Negative. The mean duration of operation per minutes was 86.94±10.45 (range 70–105) minute and the mean blood loss per milliliter was 286±12.34 range (250-315) and all patients had no intraoperative complication.**Conclusions:** The vertical axillary incision is a safe and effective approach for the management of tumors of the outer quadrant of the breast; and cosmetically appropriate maneuver for these tumors.

**Keywords:**Breast Conserving Surgery, Breast cancer, quadrant tumors.

## INTRODUCTION

Breast cancer is the most common cancer among women. There is continuous annual improvement of the overall survival of breast cancer patients, with 5- year overall survival estimates increasing from 84.6% to 90.9% over the previous two decades[(1)].

The outer quadrant of the breast is the most common for breast cancer quadrant and axillary extension of the breast[(2)].

Breast Conserving Surgery (BCS) is nowadays the standard surgical approach for the treatment of most cases of early breast cancer. During the last decades, the trend of breast conserving surgery has shifted from quadrantectomy , to large excision, to lumpectomy with the intent to minimize the excision volume in order to reduce breast shape deformaties, asymmetry, and scar length[(3)].

The possibility of carrying out this conservative treatmentwill depend, on one hand, the tumor volume compared tothat of the breast (tumor volume / breast volume ratio), and on the other hand,tumor location[(4)].

The possible distortion of breast shape and the following poor cosmetic result led surgeons to develop different surgical techniques in order to overcome the aesthetic discomfort for the patient[(5)].We performed this study to evaluate vertical axillary incision as an option for improving aesthetic satisfaction and oncological outcome in the management of breast outer upper and lower quadrant tumors.

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## PATIENTS AND METHODS

This an Interventional study conducted in onco-surgery unit, General Surgery Department, Faculty of Medicine, Zagazig University on 18 cases with early breast cancer at upper and lower-outer quadrants of breast during the period from December 2020 to May 2021.The duration of the study was from 6 months.Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

**We considered the following Inclusion criteria:**Patients with early breast cancer at upper and lower-outer quadrants of breast provided that tumour pathology is invasive ductal carcinoma, less than 5cm in the biggest diameter and the skin overlying it is not involved. **Exclusion criteria:** Patients not eligible to breast conservative treatment. Patients presenting with advanced malignant that is (More than 5cm in diameter and the skin overlying it is involved). Patients refuse to have breast conservative treatment.

**Preoperative investigations:**

All patients were subjected to demographic data taking, complete clinical examination, Laboratory investigations included imaging, biopsies, and histopathology. Bilateral breast mammo- ultrasound was performed. The breast was assessed in the four main quadrants, namely outer upper, outer inner, lower outer, and lower inner quadrants and the retro areolar space. Any lesions identified during the examination were marked as a breast 'o clock position for future follow up sessions. US-Guided Core needle biopsy was performed for all patients.

For histopathological exam and Assessment of PR, ER, HER2/ neo in specimen for all patients.

Routine Pre-operative Labs; Complete blood picture, PT, PTT and INR, Random blood sugar, Liver and Kidney function tests, Cardiac investigation if needed.

**Operative:**

**Surgical technique**

The design of the incision was done either at the night of the surgery or in the operating room before induction of an anesthesia. The patient was instructed to sit and her arm is abducted 90 degree to expose the axillary hollow part. A vertical line was drawn just behind anterior axillary fold starting at the intersection of long head of biceps and pectoralis major then extended downward for 7-10 cm according to the site of tumor. Then the patient was placed in supine position with arms abducted to 110 degrees and a pillow was placed under the patient shoulder & back to elevate it for more exposure. The incision was done according to the mark through skin & subcutaneous, then dissection was advanced medially through the plane between the breast tissue and the subcutaneous fat. The upper flap was undermined until reaching beyond the tumor with the enough safety margin needed. Then resection of the tumor with safety margin all around was done and continued laterally towards the axilla. Then axillary lymph node dissection proceeded as the classic operation. After retrieval of specimen, hemostasis was ensured, suction drain was inserted in tumor bed & axilla. Closure of the wound.

**Postoperative follow up**

Early Post-operative Follow up during Two Weeks after ensuring the general patient stability post-operatively; The Patients were examined for wound infection ,seroma or nerve injury.The safety of post-operative tumor margin in histopathological examination of the specimen.

Late Post-operative Follow up during three month. Assessment of both patient & surgeon satisfaction regarding the Cosmetic outcome.Any limitation in shoulder mobility.

**Statistic analysis**

All data were collected, tabulated and statistically analyzed using (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.). Quantitative data were expressed as the mean ± SD & (range), and qualitative data were expressed as & (percentage).

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**RESULTS:**

**Table (1):** Patient personal data

| Item | Frequency (N=18) |
|---|---|
| Mean age | 54.7 ± 8.93 |
| **Occupation** | |
| Employee | 5 |
| House wife | 13 |
| **Special habits** | |
| No habits | 18 |
| **Parity** | |
| Nulli-para | 3 |
| Para 1 | 3 |
| Multi-para | 12 |
| **Breast feeding** | |
| Yes | 13 |
| No | 5 |
| **Oral contraception use** | |
| Yes | 4 |
| No | 14 |
| **Menstrual state** | |
| Pre-menopausal | 5 |
| Post-menopausal | 13 |

Table 1; showed that the mean age of patients in the study was 54.7±8.93 years with most of them (72.2 %) were housewives. That most of the patients were Multipara havingbreast fed their babies, most of them didn't have contraceptive pills and at the study, most of them were post-menopause.

**Table (2):** Pathological data

| Item | Frequency (N=18) |
|---|---|
| **Laterality** | |
| LT | 12 |
| RT | 6 |
| **Quadrant site of tumour** | |
| UOQ | 14 |
| LOQ | 4 |

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| | |
|---|---|
| **Size of tumour** | |
| Mean | 2.56 ± 0.71 cm |
| Range | 1.4 : 3.8 cm |
| **LN status** | |
| N0 | 11 |
| N1 | 7 |
| **Presence of skin changes** | |
| No changes | 18 |
| **PR receptor status** | |
| Positive | 12 |
| **ER receptor status** | |
| Positive | 13 |
| **Her2/neo receptor status** | |
| Positive | 3 |

Table 2; showed that the mean size of tumor was 2.56±0.71 with most of them were in the upper outer quadrant on the left site and most of them had no palpable lymph node figure 1,2,3.Thatthe Histopathological type of tumor all of them were Invasive ductal carcinoma. Most of the tumors in our study were (ER) and (PR) Positive with HER2/neo Negative.

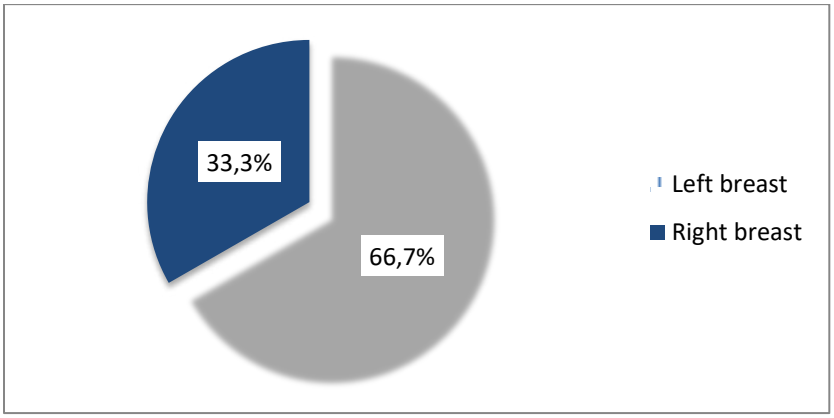


**Figure (1):**Pie chart showing laterality of tumor.

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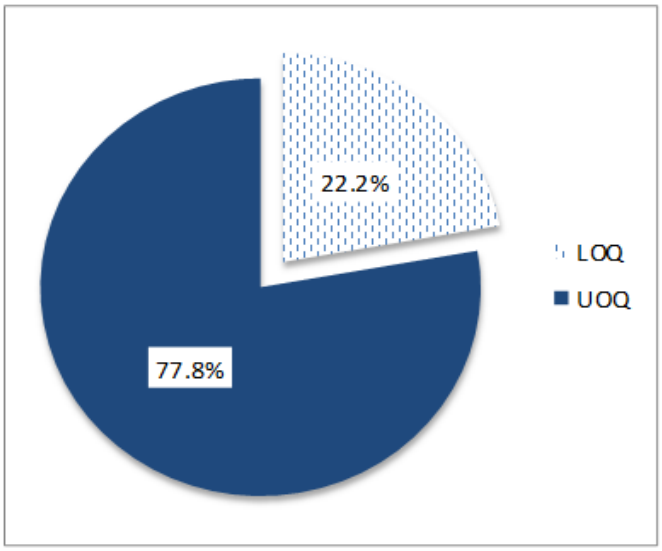


**Figure (2):**Pie chart showing quadrant site of tumor

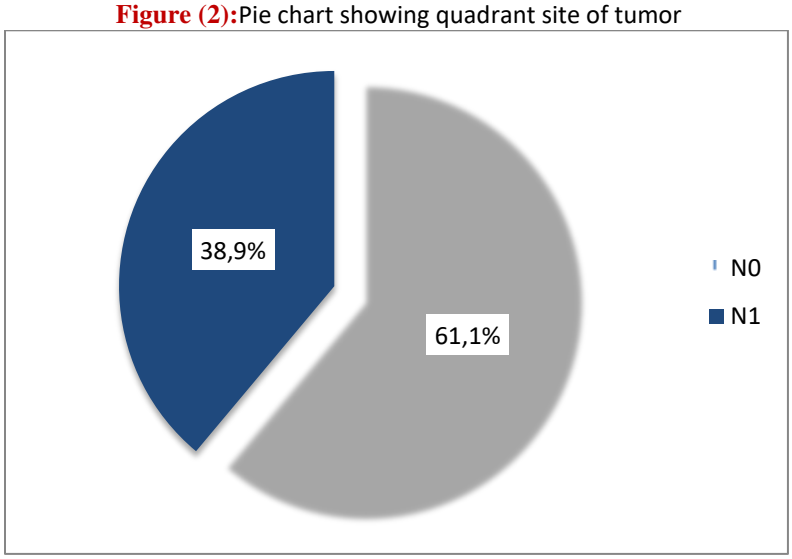


**Figure (3):**Pie chart showing lymph node state

**Table (3):** Operative data

| Item | Frequency (N=18) |
|---|---|
| Duration of the operation | 86.94 ± 10.45 min |
| Amount of blood loss | 286 ± 12.34 |
| **Intra-operative complications** | |
| No | 18 |

The only recorded complication in our study is seroma in 4 cases table 5**.**

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**Table (4):** Post-operative follow up data.

| Item | Frequency (N=18) |
|---|---|
| **Safety of resection** | |
| Free safety margin | 18 |
| **Complications** | |
| Seroma | 4 |
| Wound infection | 0 |
| Wound dehesince | 0 |
| **Patient satisfaction regarding cosmoses** | |
| Excellent | 15 |
| Good | 3 |
| **Surgeon satisfaction regarding cosmoses** | |
| Excellent | 18 |
| Good | 0 |

All the tumour were resected with free surgical margin.that the most of the patient's evaluation for cosmetic outcome by patients showed complete satisfaction (83.3%), while all of the patients evaluation by surgeons was excellent (100%)table 4.


**Picture(13):** Two patients with upper outer quadrant tumour with the tumour site and the incision are marked.

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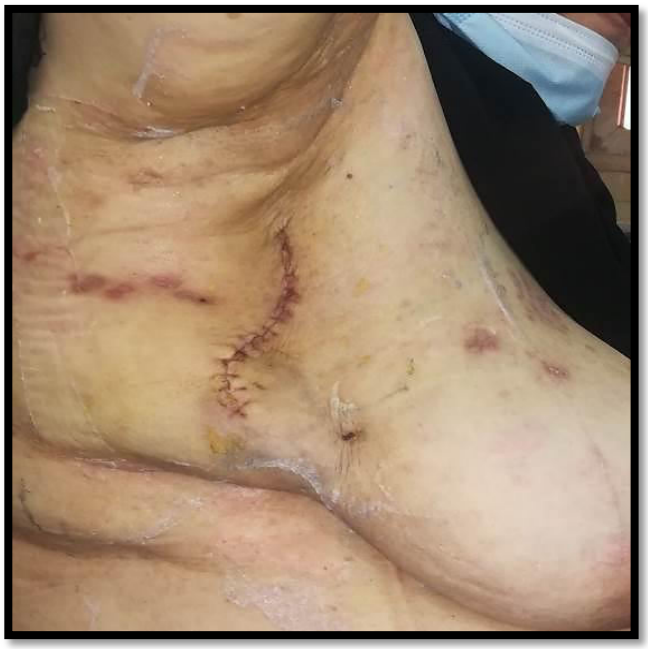
**Picture(14):** Lateral view at the end of surgery

**Picture(15):** Lateral view for the patient in sitting position showing the incision 2nd day of operation

**Picture(16):** Front view for the patient in sitting position with no visible axillary scar



**Picture(17):** Lateral view for the patient in sitting position showing scar after four month of the surgery

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**DISCUSSION:**

Regarding the mean age of patients in the study was **54.7±8.93** years. This came in agreement with **Bordoni et al.**[6]who reported the Patients' mean age was **57.5**years .In contrast **Haytham et al.** [7]reported younger mean age **46.3 ± 7.1**. Also **Elnahas et al.** [8]revealed that the mean age of patients of vertical mammoplasty technique were **45 years**. While **Foissac et al.** [4]reported older mean age of study participants with mean age **62.34** years. And all these findings are consistant with the fact that breast cancer as most of other malignancies affects female at 5th& 6th decades with recent tendency to affect younger ones at 4th decade of life.

The current study showed that multi-parous represented(66.6%), (72.2%) of the patients practised breastfeeding, (77.7%) didn't receive Oral contraceptiveand(72.2%) were post-menopausal. While **Redondo et al**. [9] reported similar findings, that parity was reported in (82.9%), breastfeeding (65.8%) and (89.6%) of the patients were post-menopausal.

Several case-control and cohort studies have examined the association between parity and breastfeeding and the risk of Triple negative breast cacer. Although an inverse association of parity with risk of ER+ breast cancer has been found by many studies, studies of ER– breast cancer indicate a positive, risk-enhancing association with parity[10,11]**.**

**Fortner et al.** [12]found that breastfeeding was inversely associated with ER− breast cancer, no association was observed for the ER+ subtype. In contrast, parity was associated with lower risk of ER+ breast cancer, but not associated with ER− disease**.**

In this study, Most lumps (**77.8%**) located at UOQ of breast in agreement with **Haytham et al.** [7]who investigated the lateral mammary sulcus incision as an oncoplastic approach for laterally located breast cancer the study reported that (**83.6%**) of cases had their tumors located in the upper outer quadrant. Also, **Acea-Nebril et al.** [13]reported that UOQ tumor was the most frequent site for breast cancer(**58.41%**).

In our study, all lesions were not attached to the skin and the mean size was **1.4-3.8 cm** in agreement with **Elnahas et al.** [8]who reported that the tumor size ranged from **1.5- 3.5 cm**. Also, in agreement with our findings **Haytham et al.** [7]reported that mean size **1-3.7cm**.

In the current study majority of patients (61.1%) were without lymph node involvement (N0), and those with lymph node involvement (N1) represented (38.9%).This were concordant with**Elnahas et al.**[8]who reported that the lymph nodes (N0) were (73.21%) and involved lymph node (N1) were (26.7%).

Regarding pathological finding in the our study, all the patients had Invasive ductal carcinoma. Supporting our results **Foissac et al.** [4]reported all cases had ductal carcinoma with a majority of grade I (50%) and II (26.6%) infiltrating ductal carcinoma. Furthermore **Chen et al.**[14]reported the Histological types of breast cancer in study participants were 14 out of 16 had invasive ductal carcinoma (87.5%) and one case mucinous breast cancer and one case ductal carcinoma in situ. and this goes with the fact that Ductal Carcinoma is more prevalent than other variants.

In our study, estrogen receptor was expressed among patients (72.2%) and Progesterone receptor was positive in (66.7%) patients, while Human epidermal growth factor receptor/2 was expressed among (16.7%) patients in agreement with **Chen et al.** [14] who reported that estrogen receptor was Positive in (62.5%) and Progesterone receptor was Positive in (62.5%) while Human epidermal growth factor receptor/2 was expressed only in (12.5%). **Bordoni et al.** [6]also reported 64.8% were positive for estrogen and progesterone receptors and 16% were positive for Human epidermal growth factor receptor/2.

In our study the mean duration of operation (per minutes) was 86.94±10.45 minute and the mean Blood loss (per milliliter) was 286±12.34. None of patients had Intraoperative complication. but in the study of **Acea-Nebril et al.**[13]the mean surgical time was 51.67± 14.62 minutes which is considerable shorter than ours

In our study, all patients had tumor-free surgical margins, and no further oncological operations were required. This came in agreement with**Barnea et al.** [15]who investigated oncoplastic breast reduction technique using a vertical scar superior-medial pedicle pattern for immediate partial breast reconstruction.He reported that all patients had tumor-free surgical margins, and no further oncological operations were required.

In this study, seroma was developed in four (22.2%) patients and was treated by frequent aspiration.**Abdelhamid et al.** [16]who reported (11.1%). **Elnahas et al.** [8]investigated multiple surgical techniques in

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a study included 56 patients of early-stage breast cancer. They were divided into 4 groups according to the surgical technique; Group IV vertical mammoplasty technique had slightly higher complications but without statistical significance2cases complained of wound dehiscence, two cases complained of seroma formation and one case had wound infection.

In **Hyatham et al.** [(7)] study conducted on 122 female patients with breast cancer who were suitable for BCS to assess the lateral mammary sulcus incision as an oncoplastic approach for laterally located breast cancer reported Surgical site infection was the most frequently encountered complication 9.8% and treated medically without the need for surgical intervention. Fat necrosis occurred in 4.9%, diagnosed by radiological study (either ultrasonography or mammography) and confirmed by core needle biopsy. Seroma encountered in 9% and treated by frequent aspiration. Complications were statistically significant with increased body mass index

In our work, post-operative limitation in shoulder mobility was not detected in any cases.

In the current study both the surgeons and the patients reported a high degree of satisfaction with the surgical outcome.Cosmetic outcome as reported by patients revealed that, 83.3% of patients reported excellent outcome, 16.7%, of patients reported good outcome, and cosmetic outcome as reported by surgeons revealed that, 100% of surgeon reported excellent outcome.

In agreement with **Foissac et al.** [(4)]who reported (86.6%) of patients considered the quality of their scar as excellent with(3.4%)judged their result to be average due to a significant scar enlargement, and (10%) good with considerable satisfaction. None of the patients asked for another surgery for aesthetic reasons. Likewise, no deformation inareolar complex or sequelae of the breast was noted by the examiner throughout the follow-up of patients. The surgeons who made this incision were satisfied with the surgical approach authorized by the incision and the uniqueness of the incision.

In agreement with**Abdelhamidet al.** [(16)]who reported (66.6%) of patients showed excellent results, (27.7%) of patients showed good results. One (5.5%) patient showed satisfactory result.

**CONCLUSION:**

The vertical axillary incision is a safe and effective approach for the management of tumors of the outer quadrant of the breast; and cosmetically appropriate maneuver for these tumors.

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