RESEARCH PAPER

Outcomes of Upfront Surgery Versus Neoadjuvant Therapy-Preceded Surgery in Patients of Luminal A Breast Cancer with Axillary Nodal Involvement, A Prospective Comparative Study

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ABSTRACT

Background: Luminal A is the most common molecular subtype of breast cancer (BC), in which the neoadjuvant chemotherapy (NAC) is less effective compared to other subtypes. we studied the surgical outcomes of upfront surgery versus the NAC preceded surgery in patients of luminal A early breast cancer (EBC) with axillary nodal involvement.

Patients and Methods: It is a prospective comparative randomized study conducted in EL Demerdash Hospital that extended for about two years starting from January 2023. forty female patients with nodal positive early luminal A BC were randomly divided into two equal groups, one of which received NAC before surgery and the other proceeded directly to surgery with a follow up period of about 6 months. Data was analyzed to evaluate short-term outcomes following both strategies.

Results: Post NAC clinical nodal conversion was 30% (p = 0.007), of which four patients (20%) achieved a nodal pathological complete response (NpCR). Reduction in tumor size after NAC was non-significant (p = 0.081) together with the rate of conversion to breast conservative surgery (BCS), p = 0.308. Post-operative complications were comparable between both groups, with overall morbidity of (35 %) in upfront surgery group compared to (25%) in the NAC one, p = 0.490.

Conclusion: Neoadjuvant chemotherapy has a beneficial effect on nodal status of luminal A EBC patients; constituting for skipping the formal axillary lymph node dissection (ALND). Its effect on the breast mass is limited, and it doesn't reduce the breast and axillary post-operative complications to significant values.

Keywords: Luminal A breast cancer, Neo-adjuvant Chemotherapy, upfront Surgery.

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INTRODUCTION

With over 2 million new cases in 2020, breast cancer (BC) is the most common cancer diagnosed in women globally. Over the past three decades, its incidence and mortality rates have gone up as a result of improved diagnosis utilities, better screening programs and enhanced cancer registration. [1]

According to the National Cancer Institute, BC is the most frequent cancer in women in Egypt, accounting for around 38.8% of all cancers in Egyptian women and being a major cause of death for them. [2]

In terms of clinical presentation, morphology, genetic characteristics, biological behavior, and response to treatment, BC represents a diverse collection of tumors. [3]

The expression of the hormone receptors estrogen (ER), progesterone (PR), human epidermal growth factor (HER2), and Ki-67 antigen is the basis for the most popular and generally recognized immunohistochemical categorization of BC. [4]

Luminal A, the most prevalent subtype of breast cancer is ER and/or PR positive, HER2 negative, accounting for around 58.5 percent of all molecular subtypes. It has a good prognosis and modest proliferative activity. [5,6]

Early breast cancer (EBC) is defined by the National Cancer Institute (NCI) of America as breast cancer that has not progressed beyond the breast and the axillary lymph nodes. This covers stage I, stage IIA, stage IIB, and stage IIIA breast cancers as well as ductal carcinoma in situ.

Both local and systemic protocols for management of BC have changed dramatically over time. It is necessary to carefully integrate the new techniques of

reconstructive breast surgery with the mixed modality approach for treating patients with BC, which consists of primary surgical intervention, radiotherapy, and chemotherapy. [7]

For patients with EBC of Luminal A subtype, surgical intervention is usually customized individually according to tumor staging in light of the multi-disciplinary team (MDT) recommendations, ranging from lumpectomy up to modified radical mastectomy (MRM). Pathologically free margin is mandatory for invasive cancer with no tumor at the inked margin; for in situ disease, ≥2 mm is ideal. [8]

With the goal of providing the best oncological care and enhancing women's quality of life, axillary surgery has developed. Sentinel lymph-node biopsy (SLNB) has replaced the traditional axillary lymph-node dissection (ALND) in women with clinically node-negative EBC. SLNB provides adequate axillary nodal staging information with less arm morbidities compared to ALND, and it is now a favorable choice in managing axilla of selected BC patients. [9]

Preoperative NAC is increasingly being utilized in individuals with operable disease and has become the standard of care for patients with locally advanced breast cancer. From the perspective of surgical therapy, its primary clinical benefits include the possibility of converting patients who need mastectomy to candidates for breast conservation, the possibility of improving the cosmetic result after lumpectomy by reducing the size of the primary breast tumor, even if the patient is a candidate for lumpectomy at presentation, and the possibility of converting patients who present with positive axillary nodes and would initially require ALND to candidates for SLNB alone. Patients who achieve a complete pathological response to NAC have better overall survival and long-term disease-free survival. [10]

For EBC patients with nodal involvement of the Luminal A subtype, the selection criteria for NAC remain uncertain. Because luminal A tumors may not react well to NAC, even at a locally advanced stage, some surgeons prefer to proceed directly for upfront surgery. [6] The purpose of this prospective trial was to confirm if NAC is linked to better surgical outcomes than upfront surgery and whether it might offer a possible advantage in the treatment approach of EBC patients of luminal A subtype with nodal involvement.

AIM OF THE WORK

To compare outcomes of upfront surgery and neoadjuvant chemotherapy preceded surgery in luminal A EBC patients with axillary nodal involvement focusing on postoperative breast and axillary complications, with a comprehensive overview of post NAC nodal status, size reduction of the initial breast mass and their effect on the proposed surgery.

PATIENTS AND METHODS

Type of Study: A comparative prospective randomized study.

Study Setting: The study was conducted at Ain Shams University Hospitals, Al-Demerdash, Department of General surgery and Clinical Oncology Department. Approval of the research ethics Committee and written informed consents were obtained from all participants**.**

Study Period: the study was conducted over about two years**,** starting from January 2023 to January 2025.

Study Population

Inclusion Criteria:

Luminal A breast cancer female patients with breast lump not exceeding 5 cm in its greatest dimension (cT1 or cT2), associated with axillary nodal involvement (cN1). All Patients had a ECOG performance status from 0-2, accepted liver and renal function tests and normal bone marrow functions.

Exclusion Criteria:

1. Patients with occult breast cancer (T0) or carcinoma in-situ (T_{is}).
2. Patients with matted or fixed axillary nodes or those with extra-axillary nodal involvement (N2 or N3)
3. Distant metastasis (M1).
4. Inflammatory breast cancer (IBC).
5. History of breast radiotherapy.
6. Pregnancy

Sample Size: 40 patients divided into two equal groups, 20 patients each.

Randomization: Patients who met the study criteria were randomly allocated using a computer-based program (Random Allocation Software) in one of the two groups, group A (20 patients) included patients underwent upfront surgery and group B (20 patients) for those who received NAC prior to surgery.

Ethical Considerations:

- ***Informed consent*****:** Informed consent from patients who were invited to participate in the research**.**
- ***Confidentiality*****:** All patient's data are confidential, and they weren't mentioned by name at any published paper.

Right to refuse or withdraw**:** allowed for all patients before or during the study.

Assessment, Management and follow-up:

I. Assessment:

All patients included in the study were subjected to the traditional triple assessment.

Careful history taking was done including detailed medical, surgical, menstrual, and family history. Collecting drug history regarding hormonal contraceptives or hormone replacement therapy was mandatory. Proper general assessment was followed by accurate breast and axillary examination.

Investigations for confirming diagnosis and categorizing the tumor precisely- were done including bilateral breast sono-mammography, with Contrast enhanced sono-mammography (CESM) or MRI if needed, and finally histopathological examination for the suspicious breast mass and enlarged axillary lymph nodes by Ultrasound guided core needle biopsy with additional immunohistochemical testing.

Ultra-sound guided clipping of the breast mass and the largest axillary suspicious node was done initially before commencing the NAC protocol.

Exclusion of distant metastasis was achieved via contrast enhanced CT scan of the chest, abdomen and pelvis together with bone scan.

Full labs -including complete blood count (CBC) with differential, coagulation profile, liver function tests (LFTs) and kidney function tests (KFTs)- and a baseline echocardiography was done for all patients before their enrolment in the study. Repetition of CBC, LFTs and KFTs is essential before each cycle of the NAC.

All data collected was presented to the breast cancer MDT committee to confirm eligibility of patients to participate in the study and to determine the surgery needed for each.

II. Management:

➢ Neoadjuvant Chemotherapy (NAC):

The NAC was started as early as possible (within 2 to 4 weeks of diagnosis and staging), for patients of group B. They received NAC regimen consists of 4 cycles of Adriamycin and Cyclophosphamide (AC), one cycle every 21 days, followed by another 4 consecutive cycles -21 days apart- of Doxatel (Taxotere), started 21 days after the final cycle of AC.

The patients were followed up closely to assess the responsiveness to the neoadjuvant treatment to determine continuation or termination of the course with subsequent shifting to surgery.

Follow up during receiving the neoadjuvant course was done at 1st, 3rd and 6th months; both clinically and radiologically using breast U/S.

NAC course was terminated in patients with progression in tumor size. They were prepared, shifted to surgery and continued the remaining chemotherapy cycles as an adjuvant therapy.

➢ Surgical Management:

The surgery was carried out as a primary step for patients of group A, while it followed the last chemotherapy session by approximately 3-4 weeks for those of group B. After finishing the NAC protocol or in case it was terminated before completion of the whole course, reassessment of the breast and axillary lesion was done with subsequent re-presentation at the breast cancer MDT committee for the final surgical decision.

Before surgery, non-palpable breast lump was marked by wire localization under ultrasound guidance for candidates of breast conserving surgery (BCS).

All patients were operated in supine position under general anesthesia by the same general surgery team; a prophylactic dose of third-generation cephalosporin was administrated 1 hr. prior to surgery.

❖ *Management of the breast lump*

Surgical intervention for all patients of both groups was customized individually according to tumor staging in light of the MDT recommendations, ranged from BCS up to MRM.

Breast specimens from all patients of both groups were sent for histo-pathological examination using intraoperative frozen section technique to ensure achievement of cancer free margins. Drain was placed in patients underwent mastectomy and it was removed when it drains less than 50 cc of serous fluid/ day.

❖ *Management of the axilla*

Patients of group A proceeded directly to ALND together with patients of group B with clinically persistent axillary nodal involvement following the NAC, and a separate incision was performed to approach the axilla in all patients of both groups

Patients of group B showing clinically negative axilla (cN0) after NAC underwent SLNB using patent blue injected subdermally in the same quadrant of the tumor. If SLNB was negative, no further ANLD was done. However, if the sentinel node was positive, ALND was carried out. Closed suction drain was placed in patients underwent ALND and it was removed when it drains around 50 cc of clear fluid daily.

Patients were allowed to resume oral feeding 2 hours after being discharged from the recovery sector. Prophylactic gram-positive antibiotics (Amoxicillin/clavulanic), potent analgesics and proton pump inhibitors were given. Narcotics were tailored according to each patient's condition.

Patients were discharged on the same day of operation -except for one patient who was kept admitted for one more day due to hypertensive episode- and the same post-operative hospital medication regimen was prescribed excluding narcotics, with regular day after day wound dressing advised.

➢ Postoperative adjuvant therapy

All patients of both groups received adjuvant radiotherapy, which was started after surgical wound healing except for those who had a post-operative chemotherapy course; where radiotherapy sessions were postponed till completion of their chemotherapy regimen. External beam 3D radiation therapy (EBRT) was given as a whole breast radiation (WBR) or a chest wall radiation for those underwent BCS or MRM respectively. Radiotherapy sessions were given with hypofractionation every day, 5 days a week for 3 weeks with a total dose of 4,005 cGy/15 fractions with axillary radiotherapy given concomitantly at the same time of WBR or the chest wall radiation. A tumour bed boost was given to patients who underwent BCS with a dose of 1000 cGy/5 fractions

Adjuvant endocrinal therapy (ET) was scheduled for at least 5-10 years in form of tamoxifen (Nolvadex) plus ovarian function suppression (Zoladex) for 5 years in premenopausal patients, while in postmenopausal candidates; aromatase inhibitors was planned to for at least 5-10 years.

Adjuvant chemotherapy was given to patients of group A in the same course given pre-operatively to those of group B. Patients of group B who didn't receive their full NAC course due to progression in tumor size, continued the remaining cycles post-operatively as an adjuvant therapy.

In all conditions, the adjuvant chemotherapy course was administrated before starting the adjuvant ET regimen.

III. Follow-up:

Follow-up included two weekly visits, three monthly visits, and one more visit after 6 months of the surgery during which a routine breast ultrasound was done.

In each visit; both breasts, axilla, the surgical site and the ipsilateral upper limb were examined thoroughly.

Any evidence of seroma, hematoma, wound infection, lymphedema or a suspicious lump was carefully assessed, further investigated and promptly managed if confirmed, together with accurate documentation.

Statistical Analysis

Data were collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). The quantitative data were presented as mean, standard deviations and ranges when parametric. Also qualitative variables were presented as number and percentages.

The comparison between groups regarding qualitative data was done by using Chi-square test and/or Fisher exact test when the expected count in any cell found less than 5.

The comparison between two independent groups with quantitative data and parametric distribution was done by using Independent t-test.

The comparison between two paired groups regarding quantitative data and parametric distribution was done by using Paired t-test.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

P-value > 0.05: Non-significant (NS)

P-value < 0.05: Significant (S)

P-value < 0.01: Highly significant (HS).

RESULTS

Forty female patients underwent breast/axillary surgery for nodal positive luminal A EBC. They were assigned into two equal groups, 20 patients each, the first group (group A) were operated an upfront surgery, while the second group (group B) had a NAC course prior to the surgical intervention.

The mean age between patients of both group revealed non-significant difference, $p = 0.717$, **(Table 1)**.

Pre-operative relevant data was comparable between patients of both groups with *p*-value of 0.749, 0.519 and 0.677 for patient's menstrual status, history of receiving hormonal contraceptives and family history of breast cancer, respectively. Mean tumor size was larger in patients of group B (2.55 ± 0.93 cm) compared to that of group A (2.46 ± 0.99 cm), yet with non-significant value $p = 0.756$, **(Table 1).**

While two patients (10%) of group B carried out modified radical mastectomy (MRM) compared to four patients (20%) of group A, with a non-significant *p-value* of 0.376, four patients (20%) of group B had skipped the formal axillary clearance due to negative SLNB, rising to a significant *p-value* of 0.035 **(Table 2).**

Operative time was slightly longer in group B compared to group A, (2.78 ± 0.44 h) and (2.63 ±0.48 h) respectively, $p = 0.313$, and all patients of both groups were discharged within one day of operation, except for one patient in group A who was kept admitted for one more day to follow up her blood pressure after a post-operative hypertensive episode, $p = 0.311$, causing a non-significant difference between the two group regarding the operative time and the length of post-operative hospital stay (**Table 2).**

Reduction in tumor size in patients of group B after receiving the NAC course ($p = 0.081$) was non-significant, together with the rate of conversion from MRM to BCS, $p = 0.308$ **(Table 3,4).**

Among patients of group B, post NAC conversion of clinically positive nodes to negative ones was highly significant (30%, $p = 0.007$), resulting in a marked reduction in patients with an axillary clearance decision to only 14 patients (70%). From the 6 patients (30%) with a SLNB decision, only four patients (20%) achieved a nodal pathological complete response (NpCR) with a negative SLNB and skipped the formal clearance, giving rise to a highly significant *p-value* of 0.000 **(Table 3,4).**

No mortality happened in either group, and post-operative complications were comparable between both of them, with overall morbidity of 7 patients (35 %) in group A compared to 5 patients (25%) in group B, $p = 0.490$, with non-significant difference documented **(Table 5).**

The most common post-operative complication in both groups was breast and axillary seroma; where breast seroma occurred in two patients (10%) in each group, $p = 1.000$ compared to 4 (20%) and 3 (15%) patients who developed axillary seroma in group A and B respectively, $p = 0.677$ **(Table 5).**

Breast/Axillary hematoma occurred less commonly in patients of group B, and while two patients (10%) of group A developed breast hematoma, it wasn't documented in any patient of group B, $p = 0.147$. Axillary hematoma affected one patient (5%) of group B compared to two patients (10%) of group A, $p = 0.548$ **(Table 5).**

Arm lymphedema affected only one patient (5%) of group B compared to 3 patients (15%) of group A ($p = 0.292$), and while shoulder stiffness was totally missed in patients of group B it was documented in only one patient (5%) of group A, $p = 0.311$**(Table 5).**

Unlike other post-operative complications surgical site infection (SSI) affected patients of group B in a higher rate; where breast and axillary SSI occurred in the same ratio between patients of both groups (20%:10% for patients of group B: group A either for the breast or the axillary SSI), $p = 0.548$ **(Table 5).**

Table (1): Comparison of age and relevant preoperative data between patients of the two groups

Table (2): Comparison of operative data between patients of the two groups

Table (3): Tumor size and axillary nodal status pre and post NAC among patients of group B

Table (4): Surgery decision pre, post NAC and the final surgery performed among patients of group B

Table (5): Postoperative breast/axillary complications between patients of the two groups

DISCUSSION

Luminal A BC is the most-prevailing molecular subtype and represents 50%-60% of all BCs. [11] Despite that NAC is considered to be a corner stone in both pillars of managing breast cancer, locally and systemically, its role in management strategies for Luminal A BC is debatable due to its humble pathological effect on it.

This prospective study compared patients underwent upfront surgery with those who received a NAC course prior to surgery for early luminal A BC with nodal involvement. Despite that comparable short-term post-operative results was documented, breast and axillary complications occurred more frequently in patients underwent upfront surgery, except for SSI; which was encountered in a higher rate in those who received NAC; yet it caused non-significant difference between the two groups outcome. On the other hand, NAC achieved a good nodal conversion rate allowing some patients to carry out SLNB and skip the hazardous formal ALND.

In our study, the overall post-operative morbidity was (35% & 25%) for upfront and NAC groups respectively, with no morality detected. Complications after cancer breast procedures have ranged from 2.5% to 45% according to de Boniface and his colleagues. [12]

Woodworth et al., reported that seroma affect 15.5% of patients underwent breast cancer surgery. [13] In this study post-operative breast and axillary seroma was the most frequent complication encountered in patients of the upfront group (10%: 20 % for breast: axilla) and those of the NAC group (10%: 15 % for breast: axilla).

In a previous study carried out by Srivastava and his colleagues in 2015, it was mentioned that seroma occurs with a percentage of 3% to 85% following breast/axillary surgeries; representing the most common postoperative complication. [14]

In 2024 Yang et al., stated that hematoma occurrence following breast cancer surgery ranged from 2.17% to 45.24%. [15] In our study breast/Axillary hematoma was detected less commonly in patients of the NAC group; breast hematoma was totally absent in those patients and only (5%) developed axillary hematoma, while for the upfront group the incidence of breast and axillary hematoma was (10%) for each.

Surgical site infection (SSI) was the only post-operative complication which was encountered more frequently among patients of the NAC group; it occurred at the same rate (10%: 5% for patients of NAC: upfront group) for either the breast or the axillary incision site. In a systematic review by O'Connor and his colleagues, the average incidence for SSI after BC surgeries was 13.1%. [16]

Arm lymphedema affected more patients of the upfront group compared to those of the NAC group, (15%) and (5%) respectively. Previous reports stated that patients who underwent ALND have four times higher rates of arm lymphedema compared to those who receive SLNB (19.9%) and (5.6%) respectively, while the overall estimated incidence of chronic arm edema after breast cancer surgeries was found to be 21.4%. [17]

Shoulder stiffness was reported in (5%) of patients of the upfront group while it was totally missed in those of the NAC group. In 2020, Cho and his colleagues reported that the incidence of shoulder stiffness after breast cancer surgery was 3.8%. [18]

Non- significant reduction in tumor size (~8%) was documented in patients of the NAC group after receiving the course; leading to a humble rate of conversion from MRM to BCS. This can be understood as previous studies reported the lowest percentage of pathological complete response (pCR) after NAC among patients of Luminal A subtype (7.5%) together with non-significant rates of breast-conserving conversion in those patients (11.4%). [19,20]

Post NAC clinical and pathological nodal conversion was 30% and 20% respectively; those 20% of patients skipped the formal ALND with its subsequent morbidities. In previous reports, pCR in axilla of nodal positive luminal A patients was 22.8%. [20]

Although there are many preferences for NAC preceded surgery compared to upfront surgery as regards post-operative comparing parameters in our study; yet the differences still insignificant; and this could be explained by the limited sample size or/and follow up period. Post NAC reduction in tumor size and rate of conversion to BCS was limited. The evident privilege for NAC preceded surgery reported by this study was the probability of achieving a clinical and a pathological nodal conversion; giving patients better chance to avoid the hazards of the formal ALND.

Limitations and Future Directions

The small sample size and the short follow-up period limited the results of this study; proposing a need for further evaluation in larger series and for extended follow up periods.

CONCLUSION

Neoadjuvant chemotherapy has a significant beneficial effect on nodal status of luminal A early breast cancer patients; with a nodal pathological complete response rate (NpCR) of 20% constituting for skipping the formal axillary lymph node dissection (ALND) with its subsequent morbidities. Its effect on the breast mass is limited, without a notable rate of conversion to more conservative breast surgery options. Finally, it doesn't reduce the operative time, post-operative hospital stay and the breast and axillary post-operative complications to significant values. The small sample size and the short follow-up period limited the results of this study; proposing a need for further evaluation in larger series and for extended follow up periods.

Declarations

Ethics approval and consent to participate

This prospective randomized controlled trial was approved by the Ethics Committee of General Surgery Department, Faculty of Medicine, Ain Shams University (Approval No.: IRB 00006379). The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to inclusion in the study.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Mennat Allah Abo Elqassem is the main author and contributed to data collection and analysis, study design, image evaluation and manuscript drafting. the co-authors contributed to data analysis and manuscript review. All authors approved the final version of the manuscript.

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Table (6): Comparison of age and relevant preoperative data between patients of the two groups

Age / Relevant Preoperative Data		Group A No. = 20	Group B No. = 20	Test value	P-value	Sig.
Age (year)	Mean ± SD	54.10 ± 9.31	55.15 ± 8.89	-0.365•	0.717	NS
	Range	39 – 74	38 – 72			
Menstrual Status	Pre	8 (40.0%)	9 (45.0%)	0.102*	0.749	NS
	Post	12 (60.0%)	11 (55.0%)			
History of Hormonal Contraceptives	Negative	7 (35.0%)	9 (45.0%)	0.417*	0.519	NS
	Positive	13 (65.0%)	11 (55.0%)			
Family History	Negative	17 (85.0%)	16 (80.0%)	0.173*	0.677	NS
	Positive	3 (15.0%)	4 (20.0%)			
Initial Tumor Size (u/s measured) 'cm'	Mean ± SD	2.46 ± 0.99	2.55 ± 0.93	-0.313•	0.756	NS
	Range	1.2 – 4.5	1.5 – 4.5			

*: Chi-square test; •: Independent t-test

Table (7): Comparison of operative data between patients of the two groups

Operative Data		Group A No. = 20	Group B No. = 20	Test value	P-value	Sig.
Type of Breast Surgery	BCS	16 (80.0%)	18 (90.0%)	0.784*	0.376	NS
	MRM	4 (20.0%)	2 (10.0%)			
Type of axillary surgery	Clearance	20 (100.0%)	16 (80.0%)	4.444*	0.035	S
	N. SLN B	0 (0.0%)	4 (20.0%)			
Operative Time (hour)	Mean ± SD	2.63 ± 0.48	2.78 ± 0.44	-1.023•	0.313	NS
	Range	2 – 3.5	2 – 3.5			
Post-Operative Hospital Stay (day)	One day	19 (95.0%)	20 (100.0%)	1.026*	0.311	NS
	Two days	1 (5.0%)	0 (0.0%)			

*: Chi-square test; •: Independent t-test

Table (8): Tumor size and axillary nodal status pre and post NAC among patients of group B

Group B		Pre No. = 20	Post No. = 20	Test value	P-value	Sig.
Tumor Size (u/s measured) 'cm'	Mean ± SD	2.55 ± 0.93	2.24 ± 0.73	1.844	0.081	NS
	Range	1.5 – 4.5	0.7 – 4			
Nodal status	Negative	0 (0.0%)	6 (30.0%)	7.059*	0.007	HS
	Positive	20 (100.0%)	14 (70.0%)			

*: Chi-square test; •: Paired t-test;

Table (9): Surgery decision pre, post NAC and the final surgery performed among patients of group B

Group B		Initial No. = 20	Post-Neoadjuvant No. = 20	Final No. = 20	Test value	P-value	Sig.
Breast Surgery Decision	BCS	15 (75.0%)	18 (90.0%)	18 (90.0%)	2.353*	0.308	NS
	MRM	5 (25.0%)	2 (10.0%)	2 (10.0%)			
Axillary surgery decision	Clearance	20 (100.0%)	14 (70.0%)	16 (80.0%)	21.120*	0.000	HS
	SLN B	0 (0.0%)	6 (30.0%)	0 (0.0%)			
	N. SLN B	0 (0.0%)	0 (0.0%)	4 (20.0%)			

*: Chi-square test

Table (10): Postoperative breast/axillary complications between patients of the two groups

	Group A No. = 20	Group B No. = 20	Test value	P-value	Sig.

Breast Seroma	Negative	18 (90.0%)	18 (90.0%)	0.000*	1.000	NS
	Positive	2 (10.0%)	2 (10.0%)			
Breast Hematoma	Negative	18 (90.0%)	20 (100.0%)	2.105*	0.147	NS
	Positive	2 (10.0%)	0 (0.0%)			
Breast Surgical Site Infection	Negative	19 (95.0%)	18 (90.0%)	0.360*	0.548	NS
	Positive	1 (5.0%)	2 (10.0%)			
Axillary Seroma	Negative	16 (80.0%)	17 (85.0%)	0.173*	0.677	NS
	Positive	4 (20.0%)	3 (15.0%)			
Axillary Hematoma	Negative	18 (90.0%)	19 (95.0%)	0.360*	0.548	NS
	Positive	2 (10.0%)	1 (5.0%)			
Axillary Surgical Site Infection	Negative	19 (95.0%)	18 (90.0%)	0.360*	0.548	NS
	Positive	1 (5.0%)	2 (10.0%)			
Arm Lymphedema	Negative	17 (85.0%)	19 (95.0%)	1.111*	0.292	NS
	Positive	3 (15.0%)	1 (5.0%)			
Shoulder stiffness	Negative	19 (95.0%)	20 (100.0%)	1.026*	0.311	NS
	Positive	1 (5.0%)	0 (0.0%)			
Overall morbidity	Negative	13 (65.0%)	15 (75.0%)	0.476	0.490	NS
	Positive	7 (35.0%)	5 (25.0%)			

*: Chi-square test