How to Cite:
Agarwal, N., & Agarwal, S. (2022). Assessment of risks and complications, associated with the breast cancer surgery with axillary dissection. *International Journal of Health Sciences*, *6*(S2), 3219–3227. https://doi.org/10.53730/ijhs.v6nS2.5801

Assessment of risks and complications, associated with the breast cancer surgery with axillary dissection

Neeti Agarwal
Assistant Professor, Department of Surgery, Shrimant Rajmata Vijayaraje Scindia Medical College and Hospital, Shivpuri, Madhya Pradesh, India

Shilpa Agarwal
Assistant Professor, Department of Anesthesia, Shrimant Rajmata Vijayaraje Scindia Medical College and Hospital, Shivpuri, Madhya Pradesh, India
Email: drshilpaagarwal17@gmail.com

***Abstract*---**Background: Need to dissect axillary nodes in patients with early breast cancer and clinically negative axilla remains controversial. To assess the role of axillary radiotherapy (RT) in reducing axillary metastases in patients with early breast cancer who did not receive axillary dissection. Management of breast cancer traditionally involves the axillary lymph node dissection. Axillary lymph node dissection has known complications like lymphoedema, pain, paraesthesia. The occurrence of complications varies across the care centres. The present study describes the complications of breast cancer surgery, along with axillary dissection at a tertiary care centre in India. Aim & Objective: To assess the risks and complications, associated with the breast cancer surgery with axillary dissection. Materials and Methods: This was a prospective observational hospital based study involving 72 patients who underwent breast cancer surgery with axillary lymph node dissection at the tertiary care centre. The patient data were collected during the follow up period regarding complications of breast surgery with axillary lymph node dissection described in relation to age group, diabetes status, early or locally advanced breast cancer, use of neoadjuvant chemotherapy (NACT) and type of surgery like Modified radical Mastectomy (MRM) or breast conservation surgery (BCS). Results: The complications observed in our study patients were Seroma (37.5%), chronic pain (11.1%), Paraesthesia (11.1%), Infection (8.3%), Gaping (5.5%), Arm oedema (5.5%), haematoma (2.7%) and Fever (2.7%). Conclusion: Seroma was the most common complication . The present study gives information regarding the complications of breast surgery with axillary lymph node dissection at our tertiary care centre.

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
***Corresponding author**: Agarwal, S.; Email: drshilpaagarwal17@gmail.com*
Manuscript submitted: 27 Feb 2022, Manuscript revised: 18 March 2022, Accepted for publication: 05 April 2022

Keywords---breast surgery, breast cancer surgery, seroma, paraesthesia, modified radical mastectomy(MRM), axillary dissection.

Introduction

Need to dissect axillary nodes in patients with early breast cancer and clinically negative axilla remains controversial. To assess the role of axillary radiotherapy (RT) in reducing axillary metastases in patients with early breast cancer who did not receive axillary dissection. Breast cancer is the most commonly diagnosed cancer in females, and it is the leading cause of cancer death in developing countries.[1] Management of breast cancer traditionally involves the axillary lymph node dissection. It helps in staging, the prognosis of the disease and also in the decision regarding adjuvant treatment. With the predictive genomic assays increasingly used for deciding adjuvant treatment of breast cancer and no significant survival benefit provided by axillary dissection in low volume axilla, there is a trend to avoid routine axillary dissection, especially in developed countries. However, in the Indian scenario, there is still a lack of system in place for early screening and detection of breast cancer which makes it increasingly difficult to use modern conservative approaches of treatment and hence axillary node dissection is often needed.[2] Axillary lymph node dissection has known complications like lymphoedema, pain, paraesthesia.[3] The occurrence of complications varies across the care centres. Pramod Pillai et al have stressed the need for epidemiological data regarding complications of breast cancer surgery in Indian population and highlighted the fact that majority of patients in Indian scenario still present with locally advance stage of disease requiring comprehensive dissection of the axilla[4] The present study describes the complications of breast cancer surgery, along with axillary dissection at a tertiary care centre in India.

Materials and Methods

This is a prospective observation study, our sample size was of 72 patients. And the study was conducted in the Department of surgery, Cancer Hospital & Research Institute, Gwalior Madhya Pradesh, India. 72 patients who underwent breast cancer surgery with axillary lymph node dissection at the tertiary care centre.. Informed consent was taken from all the participants of the study, and the ethical guidelines were followed. A detailed history was taken, clinical examination and relevant investigations were done. Follow up period was three months.

Inclusion Criteria

Women with histologically confirmed invasive breast carcinoma without distant metastases (M0) at diagnosis were included in this study. All patients underwent level 1 and 2 ALND associated with mastectomy or BCS.

Exclusion Criteria

Male breast cancer patients and patients in whom axillary lymph node dissection was not done were excluded. Patients with other malignancies, fractures, or previous surgery in the upper limb ipsilateral to the ALND were excluded from this study.

All patients received prophylactic antibiotics, and suction drain was used. Shoulder physiotherapy was recommended postoperatively. The patient data were collected during the follow-up period regarding complications of breast surgery with axillary lymph node dissection described in relation to age group, diabetes status, early or locally advanced breast cancer, use of neoadjuvant chemotherapy (NACT) and type of surgery like Modified radical Mastectomy (MRM) or breast conservation surgery (BCS). Data were filled in Microsoft excel and described as frequency and percentages.

- Staging and treatment overview 1
- This is a schematic illustration of the staging and treatment in a patient with breast cancer.
- The patient with breast cancer is first clinically staged, which results in a cTNMstage. Treatment planning is then discussed in a multidisciplinary team.
- In many patients, surgery will be the next step. Increasingly, neoadjuvant chemotherapy is given in order to decrease the tumor burden prior to surgery.
- Following surgery, the surgical specimens (tumor, sentinel node or axillary nodes after dissection) are analyzed by the pathologist. This results in a pTNM-stage. After neoadjuvant therapy the letter y is added, and it is referred to as the ypTNMstage.
- Based on the pTNM- or ypTNM-stage, further treatment with adjuvant chemotherapy, radiotherapy and hormonal or HER-2 targeted therapy is discussed in the multidisciplinary team.
- c - clinical
- p - pathology
- y - post neoadjuvant therapy
- The excess sac excised, peritoneum closed with absorbable synthetic suture.
- Adequate preperitoneal plan prepared between the posterior rectus sheath and peritoneum, mesh placed and fixed with prolene no. 2-0 or 3-0 sutures.
- Suction drains were laid on the mesh and brought out through separate stab wounds. Muscular aponeurotic structures repaired with prolene no.1 suture. Skin closed after insertion of suction drain in subcutaneous plane.

cTNM	Neo-adjuv	Sentinel Node	BCT	Mastectomy
DCIS	No	When possible invasive component > 4cm < 55 years Solid component on mammogram DCIS grade II and III	Excision possible with good cosmetic result Unifocal lesion Multifocal within 5 cm DCIS < 4 cm	Good cosmetic result not possible Multicentric DCIS > 4 cm
Localized Cancer Tumor < 5 cm *and* < 4 axill nodes	Sometimes to make a BCT possible in large tumors	Always unless US-guided fine needle aspiration is positive	Excision possible with good cosmetic result Unifocal lesion Multifocal within 5 cm Invasive Ca < 5 cm	Good cosmetic result not possible with BCT Multicentric Invasive Ca > 5 cm
Loco- regionally Advanced Tumor > 5 cm *or* > 4 axill nodes	Yes to make surgery possible	No unreliable	Usually mastectomy is performed. Sometimes BCT is possible.	

Fig-1 Demonstrates the staging and treatment of breast cancer in a more schematic way

cTNM

Breast cancer is first clinically staged. As in Fig 1, The cTNM describes the local involvement of the breast (T), regional lymph nodes (N) and systemic disease, i.e. distant metastases (M). Systemic disease (or stage 4 disease) is not included in the table. This results in the possible diagnoses of DCIS, localized cancer, locoregionally advanced cancer and cancer with distant metastases. The term 'clinical' in clinical TNM-stage may be somewhat confusing. One might think that this staging is largely based on the findings of physical examination, but it is mostly based on the results of imaging and image-guided biopsy.

Neoadjuvant chemotherapy

Neoadjuvant chemotherapy (from neo: before and adjuvare: to aid) is given to patients with locoregionally advanced cancer to decrease the tumor burden prior to surgery as in Fig 2,3. In patients with localized cancer in whom there is an indication for adjuvant therapy (see table under adjuvant therapy), the therapy may be given before surgery (neo-adjuvant) or after surgery (adjuvant).

Sentinel Node

In patients who have no detectable axillary lymph node metastases with ultrasound-guided fine needle aspiration (FNA), a sentinel node procedure is performed in order to acquire information about the lymph node status of the axilla.

Breast Conserving Therapy or Mastectomy

BCT is performed when excision is possible with good cosmetic result. Surgery is always followed by radiotherapy. Good cosmetic result depends on the size of the tumor and the size of the breast. Nowadays it is possible to treat larger tumors with BCT by applying plastic- and reconstructive surgery with fat grafting and

flap-procedures. If BCT is not possible - or wanted by the patient - a mastectomy is performed.

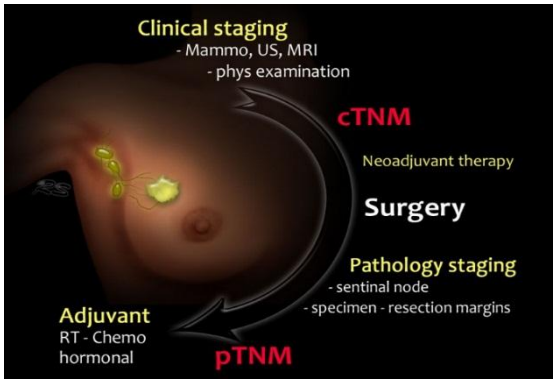

Fig-2 Schematic illustration of the staging and treatment in a patient with breast cancer

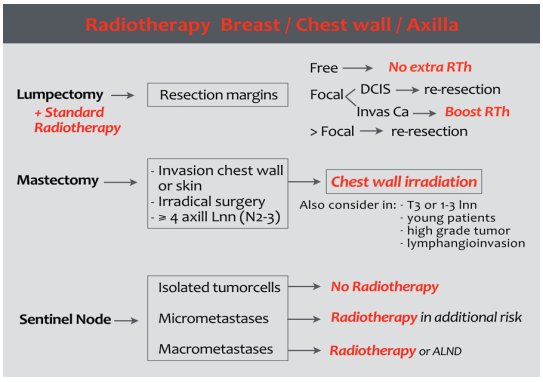

Fig-3 Treatment is planned on the final stage and tumor characteristics

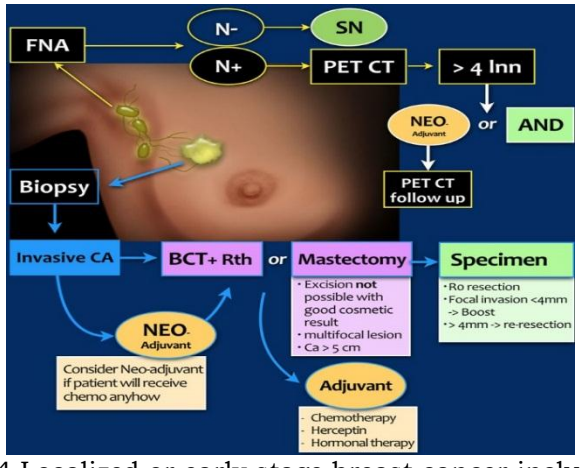

Fig-4 Localized or early stage breast cancer includes:

- T1-2: tumors < 5 cm
- N0-1 : no nodes or involvement of <4 axillary nodes

Axilla

The axilla is initially examined with ultrasound. When pathologic lymph nodes are detected, the next step is FNA. If the results are positive (N+), usually a PET-CT is performed to exclude more advanced disease. When no suspicious lymph nodes are found with ultrasound (N), the next step is a sentinel node procedure.

BCT in Localized breast cancer as in Fig 4,
When breast conserving surgery is performed, there is always a risk of leaving small areas of tumor behind - even when the resection margins are tumor-free. This is the main reason why in BCT, surgery is always combined with radiotherapy. The risk of local recurrence is greater in tumors surrounded by an extensive DCIS component.

Observations and Results

Table 1: Complications after Breast Surgery with Axillary Lymph Node Dissection in Study Patients

Complications	Frequency	Percentage(%)
Chronic pain	08	11.1
Fever	02	2.7
Infections	06	8.3
Seroma	27	37.5
Gaping	04	5.5
Arm Oedema	04	5.5
Haematoma	02	2.7
Paraesthesia	08	11.1
Marginal Necrosis	08	11.1

In our study chronic pain, marginal necrosis, paraesthesia occurred in 8 cases each, out of 72, which is 11.1% each, and Seroma in 37.5% which was highest complication found in the listed cases as like as in many studies, Gaping, Arm oedema 5.5% each, haematoma and fever found in 8.3% each and infection are found in 6cases which is 8.3% of total cases listed .

Table 2: Complications after Breast Surgery with Axillary Lymph Node Dissection in Study Patients

Groups	Chronic pain	Fever	Infection	Seroma	Gaping	Arm Oedema	Haematoma	paraesthesia	Marginal Necrosis
Age(years)									
<50, n=28	4(14.3%)	0	2(7.14%)	8(28.6%)	1(3.6%)	2(7.14%)	2(7.14%)	2(7.14%)	2(7.14%)
>50, n=44	4(9%)	2(4.5%)	4(9%)	17(38.6%)	3(6.8%)	2(4.5%)	0	6(13.6%)	6(13.6%)
Diabetic, n=18	4(22.2%)	1(5.5%)	2(11.1%)	8(44.4%)	2(11.1%)	1(5.5%)	0	4(22.2%)	2(11.1%)
Nondiabetic,n=54	4(7.4%)	1(1.9%)	4(7.4%)	17(31.5%)	2(3.7%)	3(5.6%)	2(3.7%)	4(7.4%)	6(11.1%)
NACT, n=14	4(2.9%)	0	0	6(42.9%)	1(7.1%)	1(7.1%)	0	2(14.3%)	2(14.3%)
Non NACT, n=58	4(6.9%)	2(3.4%)	6(10.3%)	19(32.8%)	3(5.2%)	3(5.2%)	2(3.4%)	6(10.3%)	6(10.3%)

Stage1n=11	1(9%)	0	1(9%)	4(36.4%)	1(9%)	1(9%)	0	0	2(18.2%)
Stage2n=46	2(4.3%)	1(2.2%)	4(8.7%)	15(32.6%)	1(2.2%)	1(2.2%)	2(2.2%)	6(13%)	4(8.7%)
Stage3n=15	5(33.3%)	1(6.7%)	1(6.7%)	6(40%)	2(13.3%)	2(13.3%)	0	2(13.3%)	2(13.3%)
MRM,n=63	8(12.7%)	2(3.2%)	6(9.5%)	24(38%)	4(6.3%)	3(4.8%)	2(3.2%)	7(11.1%)	8(12.7%)
BCS,n=9	0	0	0	1(11.1%)	0	1(11.1)	0	1(11.1%)	0

As in Table 1,2,In the present study, we encountered 36.66% of cases with postoperative complications of which 10% of cases had postoperative wound infection and 6.7% had seroma formation. There was no postoperative complication in 63.33% of cases. There is No recurrence was seen in a 6 months follow up period.

Discussion

The axilla is filled with a rich lymphatic network that requires careful dissection to identify all channels. Traditionally, ALND has been performed using titanium clips and suture ligation along with bovie electrocautery. Inadequate sealing of lymphatics can result in lymphatic leaks, infection, lymphedema and seromas. The frequency of these complications can vary from 3-85% for seroma formation and 5-49% for lymphedema. In the present study complications observed in study patients were Seroma (37.5%), chronic pain (11.1%), Paraesthesia (11.1%), Infection (8.3%), Gaping (5.5%), Arm oedema (5.5%), haematoma (2.7%) and Fever (2.7%). Seroma was the most common complication. Even though suction drain was used, seroma was the most frequently seen complication in the study patients. Roses et al. reported a very high complication rate of seroma at 59.5% after removal of drain [5] . Kumar et al. study after Halsted mastectomy reported 28% seroma complication rate in postoperative period.[6] Abass et al. study in Sudan reported the seroma frequency after breast surgery with axillary dissection as 15.6%.[7] Other common complications observed in our study were chronic pain (11.4%) and Paraesthesia (11.4%). Abass et al. study [7] reported Paraesthesia as the most common complication and it was found to be 20%. Warmuth et al. [8] study reported paraesthesia complication in 35% patients and Veronesi et al. [9] study reported it higher at 68% patientsPreetinder Brar et al. [10] studied complications of modified radical mastectomy surgery and wide local excision with axillary clearance surgery for breast cancer at a hospital in Ludhiana, India and reported seroma in 6% patients, flap necrosis in 1%, numbness and pain in 39% patients, Arm swelling was seen in 25% patients, restriction of arm movement was reported in 16% cases. They concluded that mild symptoms of axillary lymph node dissection are common but severe complications are not that frequent. In our study out of 30 patients, 4 patients had intraoperatively bleeding due to injury to vessesls while creating pre peritoneal space. The bleeding was controlled immediately and no further incidence of bleeding was encountered postoperatively.

There was breach in the peritoneum during creation of pre peritoneal space in 5 patients. The breach was repaired with poly galactin suture and the surgery was proceeded in regular manner after that. In rest of the patients no significant intra operative complications was encountered. Average time taken for operation was

81.7 minutes in our study of 30 patients. Maximum operating time was 120 minutes, minimum operating time was 60 minutes. The operating time increased in patients where the intra op complications like bleeding and peritoneal breach was encountered. In present study, all the patients were followed up after discharge for 15 days, 1 month, 3 months and few cases upto 24 months of duration.

Post operative pain was assessed on Post Op Day 1, 2 and 7 using Visual Analog scale/(VAS). Pain was graded in to mild(0-3), moderate(4-6) and severe(>7). On 1st post operative day 19 patients had moderate pain and 11 had severe pain. On day 2 post op 3 patients had mild and 27 patients had moderate pain. Day on 7th post op day 28 patients had mild pain and 2 patients had moderate pain. No comparable study was found related to post op pain by VAS score in the literature.

36.66% patients in our study had post op complications, which was in the form of post op wound infection 3 cases(10%), 2 cases(6.66%) seroma formation, 1 patients(3.33%) post op ileus and 5 patients(16.66%) had induration of stitch line. No post operative complication was recorded in 19 patients(63.33%). No recurrence was seen in a 6 months follow up period. which were comparable to the other mesh repairs studies done by Leber *et al.* (38%) [11], Antonie hamy *et al.* (8%) [12], Manohar *et al.* [13] which was 14%.

Conclusion

They found no statistical difference in rate of complications in patients undergoing modified radical mastectomy surgery or wide local excision with axillary clearance surgery for breast cancer. It was suggested that serious complications may not be a major factor in treatment decision regarding axillary dissection, however, selected sentinel lymph node biopsy may help to reduce the rate of complications in patients wherever it is feasible. The study has its limitations due to the observational and descriptive study design. The sample size is relatively small. Further research needs to be done to evaluate the complication rate in breast surgery patients with axillary lymph node dissection related to various comorbid and disease status parameters. Experimental studies comparing breast surgery with axillary lymph node dissection with the more conservative options using recent advancements will help in better evaluating the need and utility of such options.

Conflicts of interest: Nil

Sources of funding: Nil

References

1. Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. CA Cancer J Clin. 2015;65(2):87–108. doi:10.3322/caac.21262
2. Vijaykumar DK, Arunlal M. Management of Axilla in 2015 in Indian Scenario. Indian J Surg Oncol. 2015;6(4):435–439. doi:10.1007/s13193-015-0466-0

3. Soares EW, Nagai HM, Bredt LC, da Cunha AD Jr, Andrade RJ, Soares GV. Morbidity after conventional dissection of axillary lymph nodes in breast cancer patients. World J Surg Oncol. 2014;12:67. Published 2014 Mar 27. doi:10.1186/1477-7819-12-67.
4. Pillai PR, Sharma S, Ahmed SZ, Vijaykumar DK. Study of incidence of lymphedema in Indian patients undergoing axillary dissection for breast cancer. Indian J Surg Oncol. 2010;1(3):263–269. doi:10.1007/s13193- 011-0046-x
5. Roses DF, Brooks AD, Harris MN, Shapiro RL, Mitnick J. Complications of level I and II axillary dissection in the treatment of carcinoma of the breast. Ann Surg. 1999;230(2):194–201. doi:10.1097/00000658- 199908000-00009
6. Kumar S, Lal B, Misra MC. Post-mastectomy seroma: a new look into the aetiology of an old problem. J R Coll Surg Edinb. 1995;40(5):292–294.
7. Abass MO, Gismalla MDA, Alsheikh AA, Elhassan MMA. Axillary Lymph Node Dissection for Breast Cancer: Efficacy and Complication in Developing Countries. J Glob Oncol. 2018;4:1–8. doi:10.1200/JGO.18.00080.
8. Warmuth MA, Bowen G, Prosnitz LR, et al. Complications of axillary lymph node dissection for carcinoma of the breast: A report based on a patient survey. Cancer. 1998;83:1362–1368.
9. Veronesi U, Paganelli G, Viale G, et al. A randomized comparison of sentinel-node biopsy with routine axillary dissection in breast cancer. N Engl J Med. 2003;349:546-553
10. Brar P, Jain S, Singh I. Complications of Axillary Lymph Node Dissection in Treatment of Early Breast Cancer: A Comparison of MRM and BCS. Indian J Surg Oncol. 2011;2(2):126–132. doi:10.1007/s13193-011-0078-2.
11. Leber GE, Garb JL, Alexander AI, et al. Long-term complications associated with prosthetic repair of incisional hernias. *Arch Surg.* 1998;133:378–382.
12. Antoine Hamy, Patrick Pessaux, Tephanie S, Serge Radriamananjo et al. Surgical treatment of large incisional hernia by an intraperitoneal Dacron mesh and an aponeurotic graft. J Am Coll Surg 2003 Apr; 196 (4): 531-534.
13. Manohar C S, Ramdev K. Management of Incisional Hernia by Peritoneal Mesh Repair.International Journal Of Basic Medical Sciences;Volume 1 issue 3 June2010