

## COMPLICATIONS AFTER MODIFIED RADICAL MASTECTOMY IN EARLY BREAST CANCER

Bhatty I<sup>1</sup>, Shaharyar<sup>2</sup>, Ibrahim M<sup>3</sup> & Chaudhry ML<sup>4</sup>

### ABSTRACT

**Objective:** To study the frequency of complications, particularly the lymphedema of the arm, after modified radical mastectomy in early breast cancer patients who have not been given post-operative radiotherapy to axilla.

**Design:** Hospital based descriptive study.

**Setting:** This study was conducted at the Department of Clinical Oncology and School of Physiotherapy, Mayo Hospital Lahore.

**Main outcome measures:** Frequency of early & late complications after modified radical mastectomy.

**Results:** Median age of these patients was 47 years with a range of 25-58 years. Majority of these patients were stage II (84%) and infiltrating ductal carcinoma was the most frequent type of cancer (88%). Fifty-six percent of these patients had high grade tumors. None of the patients received radiotherapy to axilla after modified radical mastectomy. Early complications documented from history and medical record revealed that seroma formation was the most frequent early complication seen after modified radical mastectomy (20%). Frequent late complications included anterior chest tightness (56%), shoulder dysfunction (36%), lymphedema (26%) and sensory loss (22%). Shoulder dysfunction included limited range of movement in all 18 patients. Gross multiple restrictions were seen in 11 (61.11%) of these patients.

**Conclusion:** It is concluded from this study that lymphedema and shoulder dysfunction are the two major complications in patients of early breast cancer who have undergone modified radical mastectomy without post-operative axillary radiation.

**KEY WORDS:** Modified radical mastectomy, lymphedema, breast cancer.

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1. Ms. Irsala Bhatty B.Sc Physiotherapy
2. Prof. Shaharyar FCPS  
Professor of Radiotherapy,  
King Edward Medical College, Lahore
3. Mr. Mohammad Ibrahim M.Sc Statistics  
Assistant Professor of Statistics,  
Government Islamia College,  
Visiting Faculty Member,  
School of Physiotherapy, Mayo Hospital, Lahore
4. Mr. Mohammad Latif Chaudhry B.Sc Physiotherapy  
Chief Physiotherapist and Principal  
School of Physiotherapy, Mayo Hospital, Lahore

### Correspondence:

Prof. Shaharyar  
148-Y, Street 17, Phase III,  
DHA, Lahore, Pakistan  
Email: shaharyar55@hotmail.com

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## INTRODUCTION

Radical mastectomy was first described in 1894 by William Stewart Halsted and for a number of decades it remained the standard operation for early breast cancer. The procedure consisted of en-block dissection of the entire breast and skin overlying the tumor, together with the pectoralis major and minor muscles and the contents of the axilla<sup>1</sup>. Others extended the operation and resected internal mammary lymph nodes as well<sup>2</sup>. However, such operations were associated with lymphedema of the arm, deformities, disfigurement and problems with wound healing. Furthermore, it was also evident that these two procedures did not cure all the women<sup>1</sup>. Therefore these complications became all the more

unacceptable.

Patey and Dyson described in 1948, an operation that left behind the pectoralis major muscle intact but removed the breast, pectoralis minor and the axillary contents<sup>3</sup>. Since then this operation has been popularly known as 'Modified Radical Mastectomy' (MRM). Many variations of this procedure are practiced today. The pectoralis minor muscle is excised, or divided or left intact and there are variations in the extent of axillary lymph node resection as well<sup>4</sup>. A number of prospective randomized trials compared radical mastectomy with modified radical mastectomy and supported the view that comparable results are seen with both of these procedures in patients with early breast cancer<sup>5,6</sup>. Since then radical mastectomy has been used only rarely in early breast cancer and is performed mostly in patients who have more advanced disease with invasion of pectoralis major muscle.

Complications of radical mastectomy have been well studied and are associated with obvious functional deficit due to removal of pectoralis major muscle. However, the complications associated with modified radical mastectomy have not been that well studied. Post mastectomy complications, particularly lymphedema of the arm have variously been related to the extent of surgical resection, radiation to axilla, older age, obesity, surgical technique, side of the dominant hand and quality of post operative care<sup>7-12</sup>. None of these have been established as the main determinant. It has also been argued that patients with modified radical mastectomy develop lymphedema of arm only when they are subjected to post operative axillary radiotherapy. The frequency of edema of the arm in patients undergoing modified radical mastectomy without having post-operative radiotherapy to axilla has not been studied. This study has been conducted with the objectives to document the frequency of complications, particularly the lymphedema of the arm, in patients who have undergone modified radical mastectomy and have not been given post-operative radiotherapy to axilla.

## PATIENTS AND METHODS

This study was conducted at the Department of Clinical Oncology, Mayo Hospital, Lahore. Fifty consecutive female breast cancer patients who presented between June 2003 and August 2003, and met the eligibility criteria were enrolled in the study. The eligibility criteria included modified radical mastectomy within past two years, histopathological confirmation of the diagnosis and stage I or II of breast cancer. Patients who were not given radiotherapy to axillary lymph nodes were included. Patients who received adjuvant chemotherapy and hormone therapy were also allowed. Exclusion criteria included pre-existing physical deformities, radiotherapy to axilla and concomitant second malignancies.

A complete history was obtained and a thorough physical examination was performed. Physical examination included a general physical examination, examination of neck, chest wall, mastectomy scar, axilla, supra clavicular fossa and examination of both arms in comparison to each other. The arms were examined for the general condition of the skin, presence of pitting or non-pitting edema, ulceration, mid arm circumference, sensory function and motor activity. Chest wall was examined for edema, scar hypertrophy, keloid formation, sensory loss and changes in skin. Supra clavicular fossa was examined for the presence of lymph nodes. Axilla was examined for the presence of lymph nodes, extension of mastectomy scar in axilla, edema and sensory loss. Shoulder joint was evaluated separately and range of movement in principal directions was documented. Early complications were defined as the ones occurring before the start of chest wall radiotherapy or within six weeks of modified radical mastectomy and were obtained from history and medical record. Level of axillary clearance was also documented from the surgical notes in the medical record. Complications occurring after six weeks of modified radical mastectomy were considered as late complications. All these findings were recorded in a proforma, which also included

identification code of the patient and basic clinical parameters of the disease. Histopathologic details, radiological findings, and other necessary information were obtained from the medical record of the patients.

Patients with lymphedema were instructed to use tight bandages, perform regular exercises, and to elevate their limbs while resting. They were given antibiotics, analgesics and anti-inflammatory drugs if lymphedema was accompanied by infection or cellulitis. A lymphedema grading system was devised to record the severity. Lymphedema was graded as Grade-I (mild) if the mid-arm circumference of the involved arm was more than 2 cm but not more than 4 cm greater than the uninvolved arm. Grade-II (Moderate) lymphedema included patients with mid-arm circumference of the involved arm more than 4 cm but not more than 8 cm greater than the uninvolved arm. Grade-III lymphedema (severe) included patients with mid-arm circumference of the involved arm more than 8 cm greater than the uninvolved arm (Table-I). Mid arm circumference difference of less than 2 cm between involved and uninvolved arm was disregarded.

**TABLE-I**  
Lymphedema Grading System

Grade I (mild):	Mid arm circumference of involved arm more than 2 cm but not more than 4 cm greater than the uninvolved arm. Patient asymptomatic
Grade II (moderate):	Mid arm circumference of involved arm more than 4 cm but not more than 8 cm greater than the uninvolved arm. Patient symptomatic*
Grade III (severe):	Mid arm circumference of involved arm more than 8 cm greater than the uninvolved arm or edema extending to lower arm or hand or edema of any grade accompanied by infection or cellulitis.

\* Symptoms include heaviness of arm, pain and limitation of movement.

## RESULTS

Characteristics of all fifty patients are given in Table-II. Median age of these patients was 47 years with a range of 25-58 years. The median time elapsed after modified radical mastectomy at the time of examination was 14 months with a range of 03-22 months. Stage II was the commonest presentation and was seen in 42 (84%) patients and infiltrating ductal carcinoma was the most frequent type of cancer and was seen in 44 (88%) patients. High grade tumors were seen in 28 (56%) patients. None of the patients received radiotherapy to axilla after modified radical mastectomy. All patients had level 2 axillary clearance.

Early complications documented from history and medical record revealed that seroma formation was the most frequent early

**TABLE-II**  
Patient Characteristics (n=50)

Median Age	47 years
Range	25-58 years
Median Time after MRM	14 months
Range	3-22 months
Stage I	08 patients (16%)
Stage II	42 Patients (84%)
Histopathology	
- Infiltrating Ductal Carcinoma	44 (88%)
- Infiltrating Lobular Carcinoma	04 (08%)
- Medullary Carcinoma	02 (04%)
Grade II	12 patients (24%)
Grade III	28 patients (56%)
Grade Unknown	10 patients (20%)
Radiotherapy	
- No radiotherapy	16 (32%)
- Chest wall and supraclavicular fossa	24 (48%)
- Chest wall alone	10 (20%)
- Axilla	00 (00%)

NB: All patients received adjuvant chemotherapy either 4 cycles of Adriamycin and Cyclophosphomide, or six cycles of cyclophosphomide, methotrexate, and 5-flourouracil.

**TABLE III**  
Early complications of Modified Radical Mastectomy (n=50)\*

<i>Complications</i>	<i>No. (Percentage)</i>	
Wound infection	09	(18)
Seroma formation	10	(20)
Skin necrosis	01	(02)

\* Early complications were defined as the ones occurring before the start of chest wall radiotherapy or within six weeks after modified radical mastectomy and were obtained from history and medical record.

**TABLE-IV**  
Late complications of modified radical mastectomy  
Documented on physical examination (n=50)

<i>Complications</i>	<i>No. (Percentage)</i>	
Lymphedema	13	(26)
Shoulder dysfunction	18	(36)
Sensory loss	11	(22)
Scar hypertrophy	12	(24)
Symptomatic keloid	02	(04)
Anterior chest tightness	28	(56)
Phantom breast	02	(04)

complication seen after modified radical mastectomy (Table III).

Late complications are listed in Table IV. Frequent late complications included anterior chest tightness in 28 (56%), shoulder dysfunction in 18 (36%), lymphedema in 13 (26%) and sensory loss in 11 (22%). Sensory loss was mild and was distributed around the scar and on the medial side of the upper arm.

Shoulder dysfunction included limited range of movement in all 18 patients (Table V). Gross multiple restrictions were seen in 61.11% of these patients. External rotation was restricted in 33.33%. Limitation of abduction was also seen in 33.33% patients. Lymphedema of grade III, grade II, was seen in 38.5% each and Grade I was seen in 23.07% only (Table VI).

**TABLE-V**  
Shoulder Dysfunction (n=18)

<i>Restricted movement *</i>	<i>No (Percentage)</i>	
Limited flexion	03	16.67
Limited extension	04	22.22
Limited abduction	06	33.33
Limited external rotation	06	33.33
Gross multiple restrictions	11	61.11

\* All patients had more than one restricted movement. The table shows patients according to the predominant restriction.

**TABLE-VI**  
(Grading of lymphedema (n=13))

<i>Grade</i>	<i>No. (Percentage)</i>	
Grade I	03	(23.07%)
Grade II	05	(38.46%)
Grade III	05	(38.46%)

## DISCUSSION

Amongst the post-mastectomy complications, lymphedema is the most dreaded complication of breast cancer treatment. Approximately 15-20% of breast cancer patients develop lymph edema after breast cancer treatment<sup>13</sup>. In this small series of patients, 26% patients were seen to have developed lymphedema within first two years of modified radical mastectomy. Development of lymphedema has been variously attributed to the number of risk factors which principally include the extent of axillary surgery and post operative axillary radiotherapy<sup>7,8</sup>. Our patients did not receive post-operative axillary radiotherapy as in this institution such radiation is not given to patients who have undergone surgical axillary clearance. Modified radical mastectomy entails removal of the breast tissue and surgical clearance of the axilla. Therefore the need for post mastectomy axillary radiation is obviated in these patients. However, the extent of axillary clearance may vary but generally, majority of

surgeons perform level 1 and level 2 axillary clearance. Level 1 clearance includes removal of lymph nodes lateral to the lateral border of pectoralis minor muscle and level 2 clearance includes removal of lymph nodes between the medial and lateral borders of pectoralis minor muscle and the inter-pectoral lymph nodes. Removal of level 3 nodes including apical lymph nodes and those medial to the medial margin of pectoralis minor muscle is fraught with the increased danger of lymphedema and injury to the axillary vein and is not carried out in routine<sup>14</sup>. None of our patients had level 3 axillary clearance. In the absence of post-operative axillary radiotherapy lymphedema in our patients can be attributed to the surgical axillary clearance if there is no recurrent disease in the axilla.

Lymphedema in our patients was graded according to the grading system developed by the author. Five patients each developed grade II and III lymphedema. Grade III in our system indicates severe disability in which either the edema is gross or is associated with infection or cellulitis. No definite treatment exists for lymphedema. Complete Decongestive Physiotherapy ( CDP ) program is widely practiced in Europe. It includes skin care, gentle specific massage, called manual lymph drainage, low stretch, multi-layer, compression bandaging and exercises with the garment or bandage in place. This program is to be performed by trained therapists with daily one or two session continued over 1-4 weeks. The patients and family are trained to continue & maintain a specific program at home. Then these patients are followed up every six months. This subject has now extensively been reviewed in the American Cancer Society Monographs<sup>15-17</sup>. Other methods include limb elevation, elastic garments and pneumatic pumps. Diuretics are not effective in lymph edema and should not be used. Benzopyrones have the potential of improving chronic lymph edema and are being tested widely<sup>18</sup>.

Shoulder dysfunction of some degree was seen in 36% patients in our series and is attributable to lack of adequate exercises. Ideally

these patients are to be taught shoulder movements to establish the full range of movement prior to the surgical procedure. These patients are also to be encouraged to start exercises to restore the range of movement at the earliest after modified radical mastectomy. Physiotherapists and patients equally share the responsibility of preventing this complication.

Sensory loss seen in 22% of patients was in the area of distribution of intercostobrachial nerves which generally come in the line of incision of modified radical mastectomy. This was not associated with a functional deficit or hyperesthesia. Some degree of subjective tightness around the scar area and the anterior chest was the most frequent complication and was seen in 56% of patients. This cannot be solely attributed to the modified radical mastectomy rather it is more likely to be the sequel of radiation to chest wall which leads to some degree of sub-cutaneous fibrosis.

Early complications as noted from history and medical records included seroma formation, wound infection and skin necrosis in 20%, 18% and 02% respectively. Others have reported seroma formation in 100%<sup>19</sup>, incidence rate of wound infection ranging from 6-14%<sup>20</sup> and necrosis in 8-60%<sup>21</sup> of cases. These complications are of little clinical significance and patients recover completely with use of antibiotics, drainage, and proper use of flaps.

It is concluded from this study that lymphedema and shoulder dysfunction are the two major complications in patients of early breast cancer who have undergone modified radical mastectomy without post-operative axillary radiation.

## REFERENCES

1. Harris JR, Canellos GP, Hellman S, Fisher B. Cancer of breast. In: Devita Jr VT, Hellman S, Rosenberg SA, editors *Cancer: Principles and Practice of Oncology*. 2<sup>nd</sup> edition Philadelphia, JB Lippincott Co 1985; 1133.
2. Caceres E. An evaluation of radical mastectomy and extended radical mastectomy for cancer of the breast. *Surg Gynecol Obstet* 1968; 125: 337-41.
3. Patey DH, Dryson WH. The prognosis of carcinoma of the breast in relation to the type of operation performed. *Br J Cancer* 1948; 7-13.

4. Henderson C, Harris JR, Kinne DW, Hellman S. Cancer of breast. In: Devita Jr VT, Hellman S, Rosenberg SA, editors *Cancer: Principles and Practice of Oncology*. 3<sup>rd</sup> edition Philadelphia, JB Lippincott Co 1989; 1217.
5. Turner L, Swindell R, Bell WGT, et al. Radical versus modified radical mastectomy for breast cancer. *Ann R Coll Surg* 1981; 63: 239-43.
6. Maddox WA, Carpenter JT, Laws HL, et al. A randomized prospective trial of radical mastectomy versus modified radical mastectomy in 311 breast cancer patients. *Ann Surg* 1983; 198: 207-12.
7. Delouche G, Bachelot F, Premont M, et al. Conservation treatment of early breast cancer. Long term results and complications. *Int J Radiat Oncol Biol Phys* 1987; 13: 29.
8. Pazner RD, Patterson MP, Hill LR et al. Arm lymphedema in patients treated conservatively for breast cancer; relationship to patient, age and axillary node dissection technique. *Int J Radiat Oncol Biol Phys* 1986; 12: 2079.
9. Kissin MW, Querci della roveri G, Easton D, et al. Risk of lymphedema following the treatment of breast cancer. *Br J Cancer* 1992; 66: 136.
10. Larson D, Weinstein M, Goldberg I, et al. Edema of the arm, as a function of the extent of axillary surgery in patients with stage I-II carcinoma of the breast treated with primary radiotherapy. *Int J Radiat Oncol Biol Phys* 1986; 12: 1517.
11. Tadych K, Donegan WL, Post mastectomy seromas and wound drainage. *Surg Gynecol Obstet* 1987;165: 483.
12. West JP, Ellison JB. A study of the causes and prevention of edema of the arm, following radical mastectomy. *Surg Gynecol Oncol* 1959; 109: 359.
13. Patrek JA, Heelan MC, Incidence of breast carcinoma related lymph edema. *Cancer* 1998; 83: 2776.
14. Winer EP, Morrow M, Osborne CK, Harris JR. Cancer of breast. In: Devita Jr VT, Hellman S, Rosenberg SA, editors *Cancer: Principles and Practice of Oncology*. 6<sup>th</sup> edition Philadelphia, JB Lippincott Williams & Wilkins 2001; 1723.
15. Kasseroller G. The Vodder school; the Voder method. *Cancer* 1998; 83: 2840.
16. Leduc O, Leduc A, Bourgeois P, Belgrado JP. The physical treatment of upper limb edema. *Cancer* 1998; 83: 2835.
17. Foldie E. The treatment of lymphedema. *Cancer* 1988; 83: 2833
18. Winer EP, Morrow M, Osborne CK, Harris JR. Cancer of breast. In: Devita Jr VT, Hellman S, Rosenberg SA, editors *Cancer: Principles and Practice of Oncology*. 6<sup>th</sup> edition Philadelphia, JB Lippincott Williams & Wilkins 2001; 1724-25.
19. Petrek JA, Peters M, Nore S, et al. Axillary lymph adenopathy: A prospective randomized trial of 13 factors influencing drainage including early or delayed arm mobilization. *Arch Surg* 1991;125: 378.
20. Say C, Donegan W. A biostatistical evaluation of complications from mastectomy. *Surg Gynecol Obstet* 1974;138: 370.
21. Bud D, Cochran R, Sturts O, Fout Y, WJ Jr. Surgical Morbidity after Mastectomy operation. *Am J Surg* 1978; 135: 218.