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RESEARCH ARTICLE

The effect of physiotherapy in patients with modified radical mastectomy

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ABSTRACT

Background: Through the years, breast cancer management evolved toward conservation surgery. It is obvious that the clinical management requires a multidisciplinary approach to restoration of activity if daily living and quality of life after modified radical mastectomy. **Aims and Objectives:** The objectives of the study were to measure pain after physiotherapy intervention, to measure chest expansion after physiotherapy intervention, and to measure and improve shoulder range of motion (ROM) after physiotherapy intervention. **Materials and Methods:** This was a cross-experimental study in which initial data were recorded from the medical records, and then, after assuming proper resting status of the patient, the patients were assessed first numeric pain rating scale (NRS) for pain, ROM of shoulder joint, and chest expansion before and after the physiotherapy treatment given till patient get discharged. **Results:** In the present study, a total of 7 participants were included who fulfilled inclusion criteria. All the participants underwent routine physiotherapy treatment started from the day 1 till discharged, and NRS for pain, ROM of shoulder joint, and chest expansion all parameters were statistically significant ($P < 0.005$). **Conclusion:** The present study concluded that physiotherapy is more effective in modified radical mastectomy.

KEY WORDS: Numeric Pain Rating Scale; Chest Expansion; Range of Motion; Modified Radical Mastectomy

INTRODUCTION

Cancer is a term used for diseases in which abnormal cells divide without control and are able to include other tissues. It is a type of cancer originating from breast tissue, most commonly from the inner lining of milk ducts or the lobules that supply the ducts with milk.[1] Cancers originating from ducts are known as ductal carcinomas, whereas those originating from lobules are known as lobular carcinomas.[2] Breast cancer is one of the most common malignancies in women in India and affects almost 80,000 women each year.[3] It can be a life-threatening disease for women worldwide.[4]

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Global breast cancer incidence increased from 6,41,000 cases in 1980 to 16,43,000 (14,21,000-17,82,000) cases in 2010, an annual rate of increase of 31%. It is the second most common cancer in women after cervical cancer.[5] Worldwide, breast cancer is the most common invasive cancer in women. Breast cancer comprises 22.9% of invasive cancers in women[6] and 16% of all female cancers.[7] Over 100,000 new breast cancer patients are estimated to be diagnosed annually in India.[8,9] As per the ICMR-PBCR data, breast cancer is the most common cancer among women in urban registries of Delhi, Mumbai, Ahmadabad, Calcutta, and Trivandrum where it constitutes >30% of all cancers in females.[10]

Breast cancer risk is low before age 30 and increases with age, leveling off at the age of 80.[11] It is the primary cause of death in women at the age over 45 years of age.[12] Through the years, breast cancer management evolved toward conservation surgery.[13] It is obvious that the clinical management requires an multidisciplinary approach encompassing the expertise of different medical professionals (oncologist, surgeon, plastic

surgeon, physiatrist, nurse, physiotherapist, radiotherapy, and psycho-oncologist) to ensure an optimal therapeutic outcome both in terms of survival and quality of life (QOL).[14,15]

Mastectomy

A surgical removal of partial or complete breast tissue, surrounding tissues, and nearby lymph nodes is called mastectomy.[16] There are 5 different types, namely, lumpectomy, simple mastectomy, radical mastectomy, extended radical mastectomy, and modified radical mastectomy.

Extent of Dissection

The extent of dissection was superiorly till clavicle, laterally till anterior margin of latissimus dorsi, medially to the sternal border, and inferiorly till the costal margin near the insertion of the rectus sheath.[17]

Modified Radical Mastectomy: In Modified radical mastectomy, there is removal of entire breast tissue and lymph nodes.[18] No pectoral muscles are removed from beneath the breast. Common incision is oblique elliptical incision angled toward axilla.

If it is not treated adequately, then it can cause complication after surgery. Breast cancer treatment may lead to chronic pain, decrease in muscle strength, reduced cardio respiratory fitness, shoulder function, weight gain, and health-related problems.[19,20]

Breivik et al. studies on "assessment of post-operative acute pain" concluded that the numeric pain rating scale (NRS) is a valid and reliable tool for acute pain measurement. NRS has good validity and high reliability (0.989-0.992).[21] McNeely et al. studies on "exercise intervention for upper limb dysfunction due to breast cancer treatment" concluded that early rehabilitation improves shoulder mobility and reduces chest pain.[22] Brennan studied the effect of early versus delayed implementation of post-operative exercise. Implementing early exercise was more effective than delayed exercise in the short-term recovery of the shoulder range of motion (ROM).[23] A systematic review examining upper limb symptoms following surgery and radiation therapy found a wide variation among studies in the reported prevalence of impaired shoulder ROM, arm weakness, shoulder arm pain, and lymph edema. Despite the reported variability, it is clear from the literature that many breast cancer survivors present with upper limb dysfunction that may persist for many years following treatment.[24]

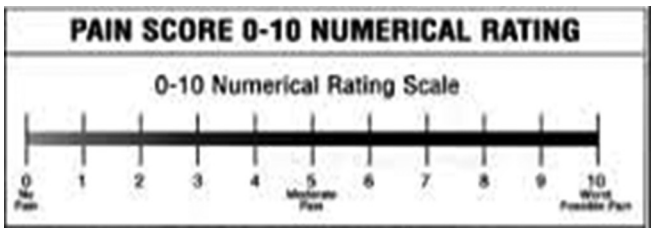
The aim of the present study was to assess the effectiveness of physiotherapy in modified radical mastectomy patients. The objectives of the study were to measure pain after physiotherapy intervention, to measure chest expansion after physiotherapy intervention, and to measure and improve shoulder ROM after physiotherapy intervention.

MATERIALS AND METHODS

This was a cross-experimental study in which every patient admitted to surgery ward for modified radical mastectomy with above the age of 18 years of female in Shree Krishna Hospital, Karamsad, were included in the study. Any surgery to arm or shoulder recently, hemodynamically unstable patients, drainage of fluid is >50 ml, pathology of shoulder, patient is not cooperative or having psychological problems, and subject will not be a part of other ongoing departmental research project were excluded from this study.

The subjects were selected as per recruitment procedure mentioned above, and written informed consent was obtained from patients or relative. The medical records were reviewed and all the data as in attached form were recorded from medical file and/or examined as applicable, and also the important drugs and clinical investigations whatever are related to the study were noted. Following the above initial data, after assuming proper resting status of the patient, the patients were assessed first (NRS, ROM, and chest expansion), and then, physiotherapy treatment was given. After that, again patient was assessed (NRS, ROM, and chest expansion) and recorded, and this was done pre-operative as well as post-operative till the patient gets discharged. Physiotherapy intervention was education and counseling, chest physiotherapy, ROM exercise, and edema prophylaxis were given till the patient gets discharge.[25] Exercises were initiated even when the drainage tubes and sutures were still in place. The treatment/intervention were performed once in a day. Along with the standard care in the form of routine nursing care, pharmacological therapy, anesthesia for pain relief inhalation therapy as advised by the concerned physician, surgeon, and anesthetist were strictly implemented throughout the study and recorded.

The well-known NRS for the assessment of pain intensity agrees well and is sensitive in assessing acute pain after surgery. They function best for the patient's subjective feeling of present pain intensity. The power of detect a difference in pain intensity was shown to be higher with a large difference. More accurate pain intensity assessment should rely on an NRS, even in routine clinical assessment.[26] The 0-10 NRS was used in this study.



In this study, shoulder ROM measured using universal goniometer, in appropriate position of patients.[22] Moreover, for measuring chest expansion, patient in supine or in sitting position whatever the comfortable position for the patient then ask the patient to slowly inspired air fully and then measured the chest expansion with measure tap then ask the patient to expired air slowly. Normal value is Nipple level: 3-5 cm. In this study, outcome measures are pain, shoulder ROM, chest expansion was recorded, and then, statistical analysis was done.

RESULTS

In the present study, a total of 7 participants were included who fulfilled inclusion criteria. All the participants underwent routine physiotherapy treatment started from the day 1 till discharge. 3 outcome measures were taken such as NRS for pain, chest expansion, and shoulder ROM. Outcome measures were taken before and after the intervention, and the results were analyzed. Data were analyzed using MS Excel. Paired *t*-test was used to compare the difference between pre- and post-intervention outcomes. For all the statistical test, significance level was fixed at 5 %, i.e. the results were considered statistically significant when $P < 0.005$.

DISCUSSION

Many studies have suggested the complication post-MRM where physiotherapy can be helpful in improving shoulder ROM, post-operative pain, and chest expansion. There is statistically significant improvement in ROM, chest expansion, and reduction in pain with physiotherapy postmastectomy. In this study, there were 7 females with mean age of 53 years. According to Table 1, there is a significant difference in pre- and pos- NRS value for which $P < 0.005$ which is highly significant. Post-operative pain was mainly at a site of incision. Movement of the arm pulls on the incision and is uncomfortable for patient.[23] There is reduction in pain as gradually healing takes place post-operatively and with exercise the pectoral muscles loosens along with mobilization of scar leads to reduction in NRS score.[27] According to Table 2, there is significant difference in pre- and post-chest expansion value for which $P < 0.005$ which is highly significant.

There is a reduction in chest expansion because of incisional pain and decrease shoulder girdle movement. In modified radical mastectomy, as there was preservation of pectoral muscle, they are muscle of respiration. The pain reduces gradually as well as the tightness of pectoral muscles reduces with exercises which help in improving chest expansion. During vigorous or prolonged exercise, it is apparent that the speed and depth of respiration are increased.[28] According to Table 3, there is a significant difference in pre- and post-shoulder ROM value for which $P < 0.005$ which is highly significant. Impaired ROM of shoulder joint is due to incisional pain that causes the muscle guarding and tenderness of shoulder joint.[29] Fibrosis of soft tissues in the axillary region in which adherence between muscles, subcutaneous.

Table 1: NRS pre- and post-treatment assessment

NRS (*n*=7)	Mean±SD	*P*
NRS_PRE	7.71±0.76	0.0001
NRS_POST	0.71±0.76	

NRS: Numeric pain rating scale

Table 2: Chest expansion pre- and post-treatment assessment

Chest expansion (*n*=7)	Mean±SD	*P*
Chest_Pre	1.04±0.41	0.0001
Chest_Post	3.74±0.42	

SD: Standard deviation

Table 3: Shoulder ROM pre- and post-treatment assessment

Shoulder ROM (*n*=7)	Mean±SD	*P*
SH_FLEX_Pre	30±5.77	0.0001
SH_FLEX_Post	160±6.45	
SH_EXT_Pre	12.57±3.36	0.0001
SH_EXT_Post	58.29±2.21	
SH_ABD_Pre	24.29±4.49	0.0001
SH_ABD_Post	165.71±5.34	
SH_IR_Pre	13.71±4.49	0.0001
SH_IR_Post	67.86±2.67	
SH_ER_Pre	15.71±4.49	0.0001
SH_ER_Post	84.29±5.34	

SD: Standard deviation, ROM: Range of motion

The adherence between muscles, subcutaneous tissue, and the skin in the axilla and the pectoral area mechanically inhibits shoulder movement, and adjuvant radiation and chemotherapy add to the firm fibrous attachment among the structures. As part of the breast ablation, the fascia overlying the major pectoral muscle is removed. The subcutaneous tissue on the skin flaps grows to the raw muscle and adheres firmly which inhibits shoulder movement.[30] Moreover, there by decrease use of the hand and arm for functional activities.[31]

Assisted exercises help in rhythmical movement in which muscular contraction and assistance combine at the limit of free range against the resistance of limiting structure is often successful in increasing the range.[32] Uniformity of given analgesic drug dosage should be maintain, and small sample size was the limitation of the study. Compare with the other type of mastectomy with large number of sample size, QOL of patient's will be measured for the further study.

CONCLUSION

The present study concluded that physiotherapy treatment is more effective in modified radical mastectomy to reduced pain, improving chest expansion, and shoulder ROM.

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