Journal of Pharmaceutical Research International

33(37A): 302-310, 2021; Article no.JPRI.71138
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Impact of Physical Therapy in Patients Undergoing Modified Radical Mastectomy: A Case Report

Shivani Lalwani[1], Shruti Deshpande[2*], Tasneem Burhani[2]

[1]Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sciences, Sawangi Meghe, Wardha, India
[2]Department of Community Health Physiotherapy, Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sciences, Sawangi Meghe, Wardha, India.

Authors' contributions

This work was carried out in collaboration among all authors. Authors SL, SD and TB made best contribution for the concept, assessment and evaluation, data acquisition and analysis and interpretation of the data. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i37A32012
Editor(s):
(1) Dr. Dharmesh Chandra Sharma, G. R. Medical College & J. A. Hospital, India.
Reviewers:
(1) Prabhat Bhaskarrao Ichkaode, Dr. D. Y. Patil Medical College, India.
(2) Vikrant Rai, Western University of Health Sciences, USA.
Complete Peer review History: https://www.sdiarticle4.com/review-history/71138

Case Report

Received 05 May 2021
Accepted 11 July 2021
Published 15 July 2021

ABSTRACT

Introduction: Breast Cancer is responsible for 2.09 million cases and 6,27,000 deaths worldwide, as per WHO. In India, women have one of the most common cancer, accounting for 14 per cent of all women's cancers. Numerous risk factors are present, such as ethnicity, aging, hormones, family medical history, genetic abnormalities, and unhygienic lifestyles. Side effects of cancer treatment may be alleviated by exercise interventions. Physical- therapy has been shown to be effective in post-operative situations. It improves the functioning of the patient and the quality of life.

Presenting Symptoms and Diagnosis: Main symptoms from the patient were pain in the upper extremity, lack of control, power and range of motion. The main clinical results in this case have been a severe decrease in the range of shoulder joint motion. Reduced strength in the upper extremity muscles and swelling (lymphoedema) in the upper extremity. Diagnosis of the case was Infiltrative Ductal Carcinoma that was confirmed by Ultrasonography and Fine Needle Aspiration Cytology. In such cases, behavioural approaches have been shown to be effective.

**Corresponding author: E-mail: shruti.rnpc@dmimsu.edu.in;*

Therapeutic Intervention and Outcomes: Physical therapy intervention involves a variety of range of motion exercises, strengthening exercises, resistance conditioning, breathing exercises, lymphoedema treatment and scar management.
Conclusion: This intensive outpatient program is a successful way to enhance the mobility of the shoulder and ROM during the initial 6-week treatment cycle after surgery.

Keywords: Modified radical mastectomy; lymphoedema; rehabilitation; physiotherapy.

1. INTRODUCTION

The most commonly reported cancer for women is breast cancer [1]. A dynamic multi-step mechanism involving the spread of cancer cells from the breast to other parts of the body is metastatic breast cancer [2]. In the world, 1.38 million women with breast cancer are diagnosed every year [3]. It is the leading cause of cancer mortality in most countries [1]. Breast Cancer is responsible for 2.09 million cases and 6,27,000 deaths worldwide, as per WHO [4]. In India, women have the most common cancer, accounting for 14 per cent of all female cancers [4]. Numerous risk factors are present, such as ethnicity, aging, hormones, family medical history, genetic abnormalities, and unhygienic lifestyles [5]. Early menarche is a significant risk factor for breast cancer [6]. About 5–10 percent of all cases of breast cancer are Heritage [7]. The need for the hour is therefore the comprehension of breast cancer, breast sensitivity and self-breast testing [8]. The majority of people diagnosed with breast cancer had breast and axillary surgery [9]. A modified radical mastectomy (MRM) is an operation that extracts the whole breast by surgery [10]. 79% of those exposed to MRM and 83% treated with lumpectomy have one or more late signs, 1-4 years after surgery [11]. Muscles, nerves and lymphatic channels throughout the shoulder and upper body can be impaired by such procedures [9]. This may lead to complications with the Musculo skeleton such as reduced mobility capacity, fatigue, constant discomfort, distorted stimuli, and lymphoedema [9]. Late signs include discomfort in the scar and/or surgical area, pain in the neck, and reduced mobility in the arm or shoulder [11]. Secondary lymphedema is the most significant chronic complication after axillary lymph node dissection [12]. Disfigurement, physical pain, and functional disability may be caused (12). Anxiety, depression, and emotional disturbance are more common in patients with or without it (12). Side effects of cancer treatment may be alleviated by exercise interventions [9]. Several systematic literature reviews suggest they may be clinically efficient [9].The purpose of this study is therefore to gain insight into the effectiveness of physiotherapy with ALND (Axillary Lymph Node Dissection) after breast cancer [13]. Key measurements involved joint mobility, movement of the shoulder and arm, and pain, with quality of life also being assessed [14].

2. CASE DESCRIPTION

Patient is a 60-year-old widow with a right-hand dominance; she was evidently well until she noticed a lump in her right breast that was painful on touch. With this complaint, she met a nearby doctor who had referred her for further care because she had not obtained adequate relief. Then Patient came to multispecialty hospital on 27 October 2020 with the similar complaint. There, after following a few investigations, Infiltrative Ductal Carcinoma of the Right Breast has been diagnosed. The diagnosed lump was 4x4cm present in the Right Upper Quadrant, insidious at onset and progressive in nature with no aggravating or relieving causes. As soon as the diagnosis was made, the patient attended 4 chemo treatments. Now the woman has pain in the lump for the last 2 months, along with Tingling Numbness in her right hand for 4 months. Patient presents a history of early menarche at the age of 11 years along with dysmenorrhoea in puberty and a history of miscarriage (G2P1L1A1).On 25 January 2021, Patient was admitted as advised for MRM (Modified Radical Mastectomy) of Right Breast. At present, the patient complains about Tingling Numbness and restricted movements of the shoulder along with the swelling of Right-hand Post Surgery. While conducting shoulder motions, the character of the pain was described as cramping, dull aching along with tingling numbness across the right hand (Pain on Visual Analogue Scale: 7/10).On examination and palpation, the non-tender lymph oedema pitting form was present in the right hand, which limited the movement of the shoulder, the elliptical incision mark and the excisional biopsy scar were present in the right breast region, which created a restriction in her breathing pattern.

Fig. 1. Modified radical mastectomy

Timeline:

FNAC was done on (Fine needle aspiration cytology)	19 October 2020
Diagnosis was done on	27 October 2020
USG was done on (Ultrasonography)	10 November 2020
Date of Admission	25 January 2021
Date of Surgery	27 January 2021
Date of Examination	29 January 2021

4 Chemo sessions were done.

Table 1. Chemo session

1st chemo session on	2 November 2020
2nd chemo session on	22 November 2020
3rd chemo session on	17 December 2020
4th chemo session on	7 January 2020

2.1 Diagnostic Assessments

- Diagnostic Methods:

1) CBC
2) KFT
3) LFT
4) RBS
5) Cytology: FNAC was done on 19 October 2020 from Right breast s/o suspected breast malignancy probably Intraductal Carcinoma.
6) USG: Was done on 10 November 2020 of Bilateral breast.
   - Impression on Right breast: Large irregular, mix echogenic mass lesion seen in upper quadrant position peripherally. Mass lesion has foci of calcification s/o mass lesion of suspicious nature Bi-rads category-4.
   - On Left Breast: No sonological detectable mass.
   - On Right Axilla: Solitary enlarged lymph node visualized. Hilum preserved.
   - On Left Axilla: No lymph node visualized.
   - Patient was advised for Physiotherapy Post-surgery to prevent lymphoedema and to regain shoulder ROM.

Table 2. Manual muscle testing

Range of Shoulder Motion on Post op Day 1 before physiotherapy treatment			
Joint	**Active**	**Passive**	**Limitation**
Shoulder Flexion:	0-40	0-60	3/10 (pain)
Extension:	0-20	0-35	3/10 (pain)
Abduction	0-30	0-60	3/10 (pain)
Adduction	0-20	0-30	2/10 (pain)
External Rotation	0-30	0-45	2/10 (pain)
Internal Rotation	0-40	0-60	2/10 (pain)

Table 3. The range of motion

Manual Muscle Testing (Strength) Assessment on Post op Day 1 before physiotherapy treatment		
Shoulder	Flexors:	3+
	Extensors:	3
Shoulder	Abductors:	3
	Adductors:	3+
Shoulder	Internal Rotators:	3
	External Rotators:	3

Volumetric Estimations: The volume of the arm was determined by the movement of water. The arm was placed on a water-filled tank and the flowing water was measured. Both arms were measured and the discrepancy was determined between the flowing water of the two arms. The sum of the swollen limb was 10% more than that of the unaffected limb.

Measure of the Circumference: The oedema of the arm was determined by circumference calculation. A standard one-inch, movable, fiberglass tape measure was used to measure the diameter. The measurements were taken from 10, 15, 20 cm above and below the olecranon process, to the wrist and to the metacarpophalangeal joints. The circumference of the swelling arm was higher than that of the unaffected arm.

Chest Expansion:

At Axillary level: 105-106cm = 1cm difference
At Nipple level: 103-104cm = 1cm difference
At Xiphisternum level: 100-101cm= 1cm difference

3. THERAPEUTIC INTERVENTION

Week 1

- Soft workouts can be undertaken from the first week of surgery.
- Start with Deep Breathing exercises like Pursed Lip breathing or Diaphragmatic Breathing, 4-5 times a day, 2 sets with 10 breaths per set.
- Range of motion exercises- Active-Assisted ROM shoulder exercises, ROM elbow exercises and active ROM-assisted wrist and forearm exercises, with active finger motions. 10 repetitions two times a day to avoid stiffness. Mobility Exercises: Arm mobilisations are implemented first or second-day post-op.
- Ball-squeezing exercise is recommended, the ball-squeezing exercise is undertaken when you are sitting. Although holding the patient's arm raised, ask them to grip the ball with their fingertips as firmly as they can. Keep the squeeze for about three seconds, then release it. Repeat the ball tightening exercise 10 times per set of 2 sets per day. This muscle action can help transfer excess lymph fluid back into circulation and help reduce swelling.
- Shoulder rolls, the shoulder roll is a nice movement to begin with because it softly stretches the muscles of your chest and shoulder. Turn the ways to make 10 forward rolls of the shoulder. Take your shoulders back, up, forward, and down. This has been achieved 10 times.
- Shoulder wings, the exercise of the shoulder wings will help to move the shoulder around. This has been achieved 10 times.

Week 2-4

- Continue Deep Breathing Exercises, Diaphragmatic and Segmental Breathing, 4-5 times a day, 2 sets with 10 breaths per set.
- Range of motion Activities were continued only with repetitions raised to 15 times, twice a day.
- Mobility Exercises
- Ball squeeze seated exercise- 10 to 15 times per set with 2 sets per day.
- Shoulder rolls and Shoulder wings, 10-15 times, twice a day.
- Arm Reach and Stick Exercise – This exercise aims to strengthen the forward mobility of the shoulder. Five to ten repetitions, two to three times a day.
- Ascending the wall - This exercise helps increase movement in shoulder. Five to ten repetitions, two to three times a day.

Week 4-6

- Deep Breathing Exercises will continue.
- Segmental breathing 3-4 times per day, 2 sets at a time, 10 breaths per set.
- Thoracic Expansion Breathing 2-3 times per day, 2 sets at a time, 10 breaths per set.
- Ball squeeze seated exercise- 10 to 15 times per set with 2 sets per day.
- Shoulder rolls and Shoulder wings, 10-15 times, twice a day.
- Arm Reach and Wand Exercise – This exercise helps to enhance the forward motion of the shoulder. Five to ten repetitions, two to three times a day.
- Wall Climbing- This exercise helps increase movement in shoulder. Five to ten repetitions, two to three times a day.
- Side wall stretch – Increases shoulder movement.
- Isometric strengthening exercises for shoulder, elbow with 10 sec hold and 10 repetitions were introduced. Start doing light Active assisted Strengthening exercises with elastic Resistance bands or free weights from 500gm to 1 kg within 4-6 weeks of surgery.

Week 6-8

- Deep Breathing Exercises will continue.
- Thoracic Expansion Breathing 2-3 times per day, 2 sets at a time, 10 breaths per set.
- Arm Reach and Wand Exercise-Five to ten repetitions, two to three times a day.
- Wall Climbing- Five to ten repetitions, two to three times a day.
- Side wall stretch
- Incremental resistance training was introduced for the shoulder and elbow with 1⁄2 kg to 1 kg of weight cuffs, 10 repetitions 2 times a day and progress in resistance as well as repetitions. Static stretching of the shoulder flexors and successful range of motion is performed. Functional task-oriented exercise has begun to reduce the complexity of everyday tasks.
- Scar Massage- Once healing of the scar was done massage was started to prevent Contractures and tightness. Ringing, Rolling, and Kneading was done. Massage once a day for 5-10 minutes.

4. OUTCOME MEASURES

A) DASH: Arm, Shoulder and Hand Disabilities (DASH) checklist is a 30-item questionnaire that measures the patient's capacity to perform certain upper extremity tasks. This checklist is a self-report questionnaire that helps patients to rate everyday life challenges and intervention on a 5-point Likert scale.

Prescore- moderate difficulty
Post score- mild difficulty

B) FIM: Functional Independence Measure (FIM) is an 18-item measuring instrument that investigates the physical, psychological and social role of a person.

Pre score- 2 maximal assistance
Post score- 7 complete independence

5. DISCUSSION

Many studies have suggested the complication post-MRM where physiotherapy can be helpful in improving shoulder ROM, post-operative pain, and chest expansion [14]. There is statistically significant improvement in ROM, chest expansion, and reduction in pain with physiotherapy postmastectomy [14]. There is a reduction in chest expansion because of incisional pain and decrease shoulder girdle

movement [14]. In modified radical mastectomy, as there was preservation of pectoral muscle, they are muscle of respiration [14]. The pain reduces gradually as well as the tightness of pectoral muscles reduces with exercises which help in improving chest expansion [14]. There is a significant difference in pre- and post-shoulder ROM value [14]. Impaired ROM of shoulder joint is due to incisional pain that causes the muscle guarding and tenderness of shoulder joint [14]. Fibrosis of soft tissues in the axillary region in which adherence between muscles, subcutaneous [14]. The attachment between the muscles, the subcutaneous tissue, and the skin in the axillary and pectoral regions mechanically prevents the rotation of the shoulder, and the adjuvant chemotherapy and radiation therapy contribute to the firm fibrous link between the structures [14]. The fascia overlying the main pectoral muscle is separated as part of the breast ablation [14]. The subcutaneous tissue on the skin flaps expands to the raw muscle and adheres closely to prevent the rotation of the shoulder [14]. In addition, there is a reduction in the use of the hand and arm for everyday experiments [14].

Fig. 2. Operative morphology

Table 4. Range of motion post physiotherapy

Shoulder	Flexors:	4+
	Extensors:	4+
Shoulder	Abductors:	4+
	Adductors:	4+
Shoulder	Internal Rotators:	4+
	External Rotators:	4+

Table 5. Manual muscle testing post physiotherapy

Range of Motion of Shoulder Joint after physiotherapy treatment			
Joint:	**Active:**	**Passive:**	**Limitation:**
Shoulder Flexion:	0-150	0-180	2/10 (pain)
Extension:	0-40	0-50	3/10 (pain)
Abduction	0-150	0-160	3/10 (pain)
Adduction	0-40	0-50	2/10 (pain)
External Rotation	0-70	0-80	2/10 (pain)
Internal Rotation	0-60	0-70	2/10 (pain)

The use of physiotherapy during the first post - operative week is necessary in order to ensure patients that they are able to use the arm [15]. Immediate postoperative sequelae, though, hinders the entire spectrum of workouts and, throughout the first postoperative months, the adverse effects of radiation therapy and axillary strings reduce recovery [15]. They accept movement limits and attempt to compensate by using the other arm or by modifying work procedures [15]. The utilization of supplementary physiotherapy before or immediately after radiotherapy allows patients to take full-scale use of the shoulder [15]. Extension of scar tissue and muscles decreases the firm connection of the skin to the underlying tissue and reduces muscle shortening [15]. Therefore, the mobility of the shoulder is enhanced [15]. Few of the related studies on carcinoma breast [16] and associated physiotherapy interventions [17-19] were reviewed. Beneficial effects of Ghrelin in cancer cachexia were reflected through a series of studies [20-22].

Strengths: Strength, in this case was that the patient had a strong family support and she performed all the given interventions perfectly in the given amount of time [23-26].

6. CONCLUSION

The case study concluded that there is a significant effect of the given therapeutic intervention on the muscle strength, shoulder range of motion, reducing pain, improving chest expansion and ADLs of the patient after 8 weeks of intensive physiotherapeutic intervention.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline patients consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dorri S, Olfatbakhsh A, Asadi F. Informational needs in patients with breast cancer with Lymphedema: Is It Important? Breast Cancer Basic Clin Res [Internet]. 2020;14. [Cited 2021 Feb 10]. Available:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7092654/
2. Akhtar K, Sherwani R, Kahkhashan E. Carcinoma breast metastasis to the suprarenal gland: an unusual presentation. Pol J Pathol. 2012;4:284–5.
3. Omidi Z, Kheirkhah M, Abolghasemi J, Haghighat S. Effect of lymphedema self-management group-based education compared with social network-based education on quality of life and fear of cancer recurrence in women with breast cancer: A randomized controlled clinical trial. Qual Life Res Int J Qual Life Asp Treat Care Rehabil. 2020;29(7):1789–800.
4. Breast Cancer Awareness Month, National Health Portal of India [Internet]; 2019. [Cited 2021 Feb 13]. Available:https://www.nhp.gov.in/breast-cancer-awareness-month2019_pg
5. Sun YS, Zhao Z, Yang ZN, Xu F, Lu HJ, Zhu ZY, et al. Risk Factors and Preventions of Breast Cancer. Int J Biol Sci. 2017;13(11):1387–97.
6. Apter D, Vihko R. Early Menarche, a Risk Factor for Breast Cancer, Indicates Early Onset of Ovulatory Cycles. J Clin Endocrinol Metab. 1983;57(1):82–6.
7. Kumar S, Jena L, Sahoo M, Mohod K, Daf S, Varma AK. Effect of single amino acid mutations on C-terminal domain of breast

cancer susceptible protein 1. Int J Bioinforma Res Appl. 2019;15(4):305–23.
8. N GG, Abhishek I, Abhay M, Prajapati K. Perceptions of Women about Breast Cancer in Rural Area of Wardha District. Int J Clin Biomed Res. 2019;25–8.
9. Khan KA, Mazuquin B, Canaway A, Petrou S, Bruce J. Systematic review of economic evaluations of exercise and physiotherapy for patients treated for breast cancer. Breast Cancer Res Treat. 2019;176(1):37–52.
10. Buran T, Sanem Gökçe Merve Kılınç, Elmas Kasap. Prevalence of Extraintestinal Manifestations of Ulcerative Colitis Patients in Turkey: Community-Based Monocentric Observational Study. Clinical Medicine and Medical Research. 2020;1(2):39-46.
Available:https://doi.org/10.52845/CMMR/2020v1i2a8
11. Modified radical mastectomy: What is it, what to expect, and recovery [Internet]; 2019.
[Cited 2021 Feb 14].
Available:https://www.medicalnewstoday.com/articles/325570
12. Lauridsen MC, Tørsleff KR, Husted H, Erichsen C. Physiotherapy treatment of late symptoms following surgical treatment of breast cancer. The Breast. 2000;9(1): 45–51.
13. Torres Lacomba M, Yuste Sanchez MJ, ZapicoGoni A, Prieto Merino D, Mayoral del Moral O, Cerezo Tellez E, et al. Effectiveness of early physiotherapy to prevent lymphoedema after surgery for breast cancer: randomised, single blinded, clinical trial. BMJ. 2010;340(121):b5396–b5396.
14. Daniel V, Daniel K. Perception of Nurses' Work in Psychiatric Clinic. Clinical Medicine Insights. 2020;1(1):27-33.
Available:https://doi.org/10.52845/CMI/2020v1i1a5
15. Beurskens CH, van Uden CJ, Strobbe LJ, Oostendorp RA, Wobbes T. The efficacy of physiotherapy upon shoulder function following axillary dissection in breast cancer, a randomized controlled study. BMC Cancer. 2007;7(1):166.
16. Mehta J, Vaghela D, Patel H. The effect of physiotherapy in patients with modified radical mastectomy. Natl J Physiol Pharm Pharmacol. 2017;8:1.
17. Daniel V, Daniel K. Diabetic neuropathy: New perspectives on early diagnosis and treatments. Journal of Current Diabetes Reports. 2020;1(1):12–14.
Available:https://doi.org/10.52845/JCDR/2020v1i1a3
18. Lauridsen MC, Christiansen P, Hessov I. The effect of physiotherapy on shoulder function in patients surgically treated for breast cancer: A randomized study. Acta Oncol. 2005;44(5):449–57.
19. Domkunti R, Lamture YR, Rinait A, Gode D. Breast carcinoma in axillary tail of spence: A rare case report. International Journal of Current Research and Review, Special. 2020;12(14):92–95.
Available:https://doi.org/10.31782/IJCRR.2020.9295
20. Sathe S, Khurana SK, Damke U, Agrawal PV. To Compare the Effects of Maitland Mobilization with Conventional Physiotherapy in Adhesive Capsulitis. International Journal of Current Research and Review. 2020;12(14):99–102.
Available:https://doi.org/10.31782/IJCRR.2020.99102
21. Daniel V, Daniel K. Exercises training program: It's Effect on Muscle strength and Activity of daily living among elderly people. Nursing and Midwifery. 2020;1(01):19-23.
Available:https://doi.org/10.52845/NM/2020v1i1a5
22. Deshpande A, Desai P, Deshpande M, Choudhary S, Narkhede AR. The study protocol of comparative study on efficacy of marma chikitsa, agnikarma and physiotherapy in Avabahuka (Frozen Shoulder). International Journal of Current Research and Review. 2020;12(22):43–47.
Available:https://doi.org/10.31782/IJCRR.2020.SP95
23. Panchbudhe SA, Praveen Kumar Y, Choudhary S, Chiwhane A. Role of physiotherapist to promote physical activity in physical therapy settings: Questionnaire study. International Journal of Current Research and Review. 2020;12(14):50–55.
Available:https://doi.org/10.31782/IJCRR.2020.5055
24. Khatib MN, Gode D, Simkhada P, Agho K, Gaidhane S, Saxena D, Unnikrishnan B, et al. Somatotropic and cardio-protective effects of ghrelin in experimental models of heart failure: A Systematic review. Annals of Tropical Medicine and Public Health. 2014;7(1):30–42.
Available:https://doi.org/10.4103/1755-6783.145008

25. Khatib MN, Khatib M, Gaidhane S, Gaidhane A, Zahiruddin QS. Ghrelin for regulating appetite and energy balance: A systematic review. National Journal of Physiology, Pharmacy and Pharmacology. 2014;4(2):101–5. Available:https://doi.org/10.5455/njppp.2014.4.230420141

26. Khatib MN, Shankar AH, Kirubakaran R, Gaidhane A, Gaidhane S, Simkhada P, et al. Ghrelin for the Management of Cachexia Associated with Cancer. Cochrane Database of Systematic Reviews. 2018;2. Available:https://doi.org/10.1002/14651858.CD012229.pub2

© 2021 Lalwani et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/71138