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A study on physical therapy intervention for radical mastectomy in breast cancer women

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Abstract
Background: Breast cancer is cancer that develops from breast tissue. Signs of breast cancer may include a lump in the breast, a change in breast shape, dimpling of the skin, fluid coming from the nipple, or a red scaly patch of skin. In those with distant spread of the disease, there may be bone pain, swollen lymph nodes, shortness of breath, or yellow skin. Mastectomy is surgery to remove all breast tissue from a breast as a way to treat or prevent breast cancer. Therefore it has become the focus of physical therapy to optimize the quality of care and survival, as well as quality of living of women diagnosed with breast cancer.
Objective To determine the effectiveness of physiotherapy intervention in reducing pain and increase the range of motion after radical mastectomy.
Design: Experimental study.
Setting: Participants were admitted in Harshamitra cancer hospital, Trichirappalli (n=10, age range= 35 to 70 years of female)
Participants: Participants 10 women who had radical mastectomy surgery involving dissection of axillary lymph nodes between May 2015 and august 2015.
Intervention: The physical therapy group was treated by a physiotherapist with a physiotherapy programme including manual lymph drainage and progressive active and action assisted shoulder exercises. This group also received an educational strategy. The control group received the educational strategy only.
Measurements: Visual analog scale, Goniometer, arm circumference measurement.
Results: The data obtained was tabulated and statistically analyzed. Due to nature of outcome measures i.e. pain and range of motion, pre and post intervention, parametric statistical tests, dependent t sample test and un paired t test were used. The two-tailed P value is less than 0.0001 by conventional criteria; this difference is considered to be extremely statistically significant of experimental group.
Conclusion: Physical therapy could be an effective intervention in the prevention of reduction of pain, increase the range of motion and secondary lymph edema in women for at least one year after radical mastectomy surgery for breast cancer involving dissection of axillary lymph nodes.

Keywords: Physical therapy, radical mastectomy, breast cancer.

Introduction

Breast cancer is one of the most common types among women and can lead to high morbidity and mortality rates (lacey *et al* 2002). Breast cancer is ranked the top in types of cancer that affects Indian women. It affects up to 1-in-13 women during their lifetime. It may be undetectable and asymptomatic in the early stages; however, the most common initial sign of breast cancer is a palpable lump or nodule in the breast. The lump is either in the center of the breast behind the areola or outward in the direction of the armpit (upper, outer quadrant). The mass tends to be firm and irregular if it is malignant versus smooth and rubbery if it is benign. The lump, in most cases, will not be painful to the touch if it is cancerous. Other manifestations include a change in breast shape or texture, unusual nipple discharge, retraction or dimpling in of the nipple, local skin dimpling, redness, and/or a local rash or ulceration. Surgeries performed as part of breast cancer treatment include (radical and modified) mastectomies and conservative surgeries. Independently of what type of surgery is performed, these techniques can be accompanied by axillary lymph node drainage, which may cause upper limb lymphedema. As a part of treatment, physiotherapy plays a role in postoperative physical rehabilitation, preventing and treating complications are pain, lymphedema, decrease movement range of upper limb joints, correcting postural misalignment and sensitive alterations and, thus, promoting functional recovery and a better quality of life.

Objective

To determine the effectiveness of physiotherapy intervention in reducing pain, oedema and increase the range of motion after radical mastectomy surgery for breast cancer.

Methodology

A convenience sample of subjects was solicited from Harshamitra cancer hospital Trichirappalli. This study randomized, single blinded, clinical trial of women after unilateral breast cancer surgery with axillary lymph node dissection. Inclusion criteria included 35- 70 years women without axillary lymph node dissection or with bilateral breast cancer, systemic disease, loco regional recurrence, or any contraindication to physiotherapy. Eligible women gave written informed consent to participate in the study after breast cancer had been confirmed by biopsy. Each participant was assessed preoperatively and between days 3 and 5 after hospital discharge.

Procedure: Participants were admitted from Harshamitra cancer hospital n=10, age range 35-70 years. Subjects were then allocated into two groups, each group had one physiotherapist, who carried out all interventions. Before the study it was agreed that both groups would receive the same educational intervention. The physiotherapists had more than five years' experience in the treatment of vascular diseases using lymphatic drainage. They were the only study members aware of group allocation.

Group A (Control Group): were to give the educational strategy consisted of instruction with printed materials and just asked to take hot packs for 15-20 minutes at night and postural advice given.

Group B (Experimental Group): The intervention included the manual lymph drainage technique used for the treatment of postoperative oedema of thorax, breast, axilla, and upper arm of affected side, stretching exercises for levator scapulae, upper trapezius, pectoralis major, and medial and lateral rotators muscles of the shoulder and progressive active and action assisted shoulder exercises, started in conjunction with functional activities and Proprioceptive neuromuscular facilitation exercises without resistance rhythmic initiation progressing from passive to active-assistive to active movement in two diagonal symmetrical bilateral patterns and asymmetrical reciprocal patterns: D1 into flexion from hitch hike to swat fly, and into extension from swat fly to hitch hike, and D2 into flexion from hand in opposite pocket to carry tray, and into extension from carry tray to hand in opposite pocket).

Materials: Universal Goniometer, Visual analog scale, arm circumference measurement.

Outcome measurements

Arm measurements: whatever the criteria used for diagnosing lymphoedema they are all based on changes in size or volume of the arms. Arm circumferences were measured at each visit and always following the same procedure, using a standard 1 cm wide, retractable, inch tape measure With the patient in an upright sitting position with both arms on a table, shoulders in neutral rotation and flexion of 45°, and forearms at maximum supination, and measured the circumference at 5 cm intervals along both arms, using the elbow fold as the reference starting point. Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. It was to capture this idea of an underlying continuum that the VAS was devised. Operationally a VAS is usually a horizontal line, 100 mm in length, anchored. Goniometer is a measurement of shoulder range of motion, patient is sitting or comfortable position and measure the shoulder abduction and flexion ranges.

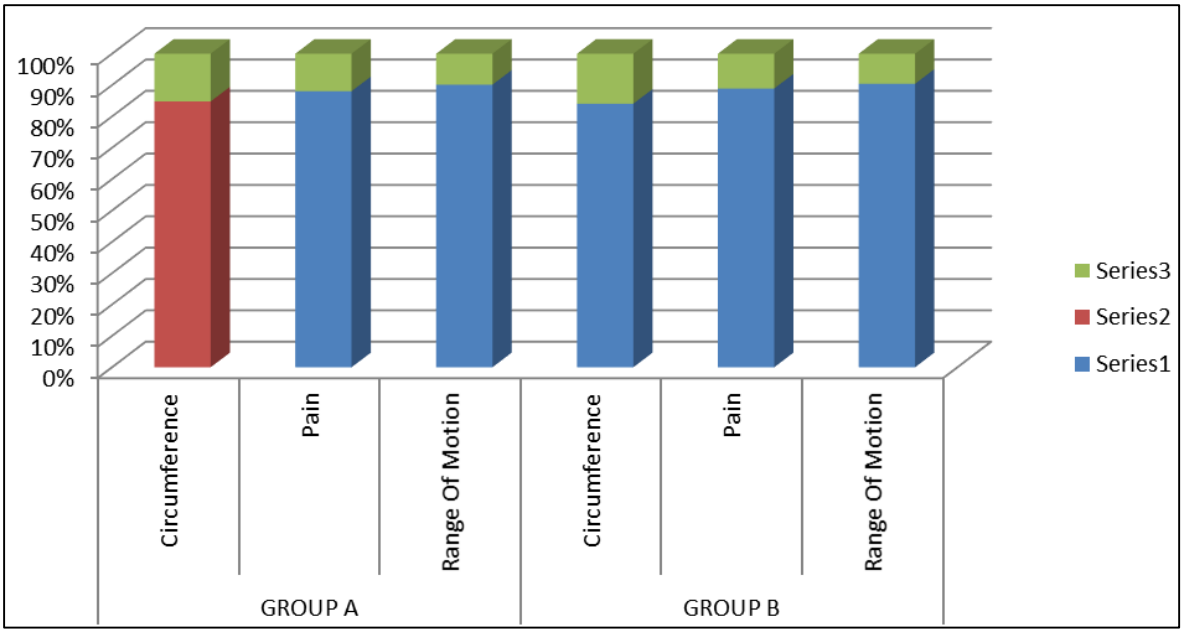
These all measurement should be done at pre and post operatively. These are recorded by the on the day of operation to the one month follow up.

Results and Discussion

The data obtained was tabulated and statistically analyzed using SPSS 14.0 package. Due to nature of outcome measures are arm circumference, pain and disability, parametric statistical tests, dependent t sample test and un paired t test were used. Subjects showed marked reduction in pain intensity when compared to baseline value. The improvement is almost whereas disability scores were recorded on day 0 and day 31.The clinical criterion was chose to determine lymphoedema (binary variable) was based on changes in circumference along the arm (continuous variable). The raw data are therefore measures of circumference. To obtain the binary outcome several intermediate variables need to be computed from these measurements. The important variable here would be the maximum difference in arm circumference between any two adjacent points. A patient would have a diagnosis of secondary lymphoedema if the maximum difference between any two adjacent points was 2 cm or greater. Lymphoedema can also be determined from the increase in volume ratio of both arms (volume of affected arm divided by volume of unaffected arm).. This variable can be easily interpreted as an increase or decrease of the proportional difference of the volumes of both arms (affected minus unaffected, Total arm volume was calculated by adding up all the partial volumes between every two adjacent measurements.

Pre Score Analysis

		Control Group A			Experimental Group B		
No	**Statistical**	**Circumference**	**Pain**	**Range Of Motion**	**Circumference**	**Pain**	**Range Of Motion**
1	Mean	4.1	6	72	4.6	5.9	66
2	Standard deviation	0.737	0.816	7.88	0.873	0.737	6.99

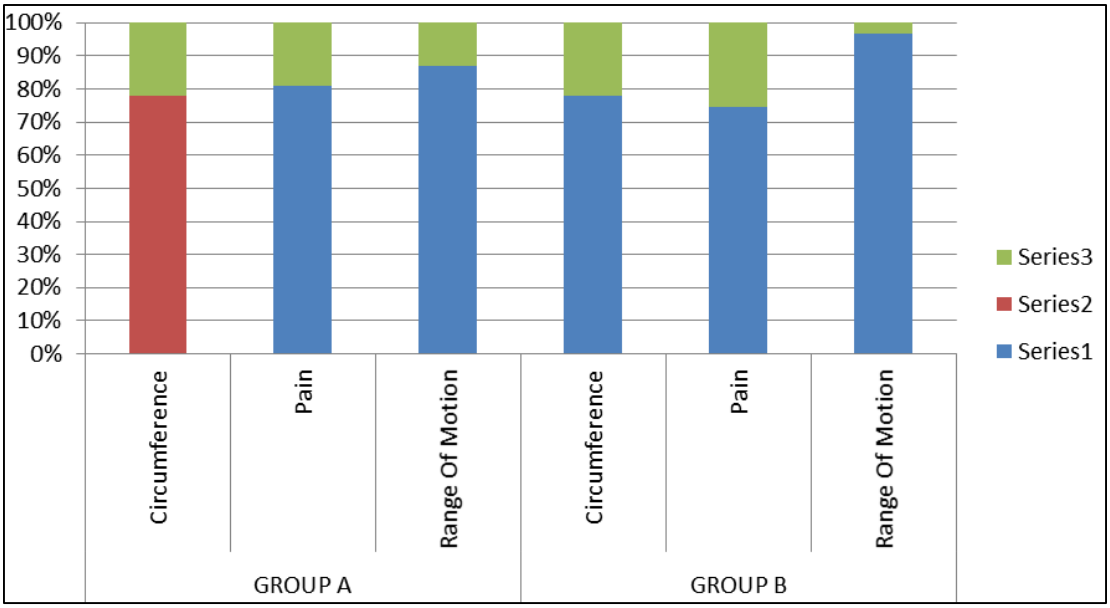


Post Score Analysis

		Experimental Group A			Control Group B		
No	**Statistical**	**Circumference**	**Pain**	**Range Of Motion**	**Circumference**	**Pain**	**Range Of Motion**
1	Mean	3.1	5.1	68	1.1	0.9	89
2	Standard deviation	0.87	1.19	10.3	0.31	0.31	3.01

In the measurement of circumference analyzed that the P value and statistical significance states that the two-tailed P value equals 0.4769 by the conventional criteria, this difference is statistically significant. 95% confidence interval of this difference Intermediate values used in calculations t = 0.7265 df = 18 standard error of difference = 2.753.

Post score analysis



The analysis of the pain measurement which leads to the 95% confidence interval of this difference from 3.3830 to 5.0170. the value of t = 10.8005 df = 18 standard error of difference is 0.389 and p value is less than 0.0001 and by conventional criteria, this difference is considered to be extremely statistically significant. The shoulder range of motion assessed pre and post score analyzed, 95% confidence interval of this difference and the t value 10.8005, df=18 standard error of difference = 0.389 the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. The results may be focused with the variables of the study compared with both groups experimental group will be extremely statistically significant. Thus the physical therapy intervention more effective treatment for post-operative breast cancer patients.

Sugessions and Limitations

This study shows evidence of the positive effect of early physiotherapy in the prevention of secondary lymphoedema, reducing pain and increase the range of motion but the study is limited by the duration of follow-up (one year after surgery) and recruitment in just one hospital. Although we have no reason to suspect systematic differences in care provided by this hospital and other regional hospitals or hospitals in other developed countries, this may limit the external validity of the results. Furthermore, that the physiotherapy was provided by trained physiotherapists may limit the generalisability of this intervention to other settings.

A further limitation is the possibility of measurement errors. Thus the study have no reason to believe, however, that this will have a differential effect on both experimental and control groups. The physiotherapist who took the measurements was blinded to the patient's treatment allocation. Both groups were reasonably balanced for baseline characteristics.

Conclusion

Cancer is an umbrella term used to describe more than 100 different diseases with the common characteristic of uncontrolled malignant cell growth. It is a leading and growing cause of death worldwide, with the total number of cases globally increasing, as the world population grows and ages. The growing global population with cancer faces unique challenges – from their disease and from the treatments they receive. Physical therapists can make a unique contribution to helping them achieve health and a good quality of life. The prescribed exercises and lifestyle advice that physical therapists provide can also help people reduce their risk of getting cancer. Physical therapists are prescribing exercise as part of a structured, safe and effective programme. Early physiotherapy could be an Early physiotherapy could be an effective intervention in the prevention of secondary lymphoedema, reducing pain and increase the range of motion in women for at least one year after surgery for breast cancer involving dissection of axillary lymph nodes.

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