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ORIGINAL ARTICLE

Effects of a physical therapy program combined with manual lymphatic drainage on shoulder function, quality of life, lymphedema incidence, and pain in breast cancer patients with axillary web syndrome following axillary dissection

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Abstract
Purpose The aim of this study was to evaluate the effects of physical therapy (PT) combined with manual lymphatic drainage (MLD) on shoulder function, pain, lymphedema, visible cords, and quality of life (QOL) in breast cancer patients with axillary web syndrome (AWS).
Methods In this prospective, randomized trial, 41 breast cancer patients with visible and palpable cords on the arm and axilla and a numeric rating scale (NRS) pain score of >3 were randomly assigned to PT (3 times/week for 4 weeks; n=20) and PT combined with MLD (5 times/week for 4 weeks; PTMLD; n=21) groups. MLD was performed by a physical therapist and the patients themselves during week 1 and weeks 2–4, respectively. Arm volume, shoulder function (muscular strength; active range of motion; and disabilities of the arm, shoulder, and hand [DASH]); QOL (European Organization for Research and Treatment of Cancer Core and Breast Cancer-Specific QOL questionnaires), and pain (NRS) were assessed at baseline and after 4 weeks of treatment.
Results QOL including functional and symptom aspects, shoulder flexor strength, DASH, and NRS scores were significantly improved in both groups after the 4-week intervention (P<0.05). NRS score and arm volume were significantly lower in the PTMLD group than in the PT group (P<0.05). Lymphedema was observed in the PT (n=6), but not PTMLD, group (P<0.05).
Conclusions PT improves shoulder function, pain, and QOL in breast cancer patients with AWS and combined with MLD decreases arm lymphedema.

Keywords Axillary web syndrome · Breast neoplasms · Physical therapy modalities · Quality of life

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Introduction

Axillary web syndrome (AWS) is a common postoperative complication in breast cancer patients. AWS usually occurs 5–8 weeks after surgery and is characterized by visible or palpable cords of subcutaneous tissue in the breast, medial arm, antecubital space, forearm, hand, or chest wall. This syndrome often limits shoulder and elbow range of motion (ROM), causing pain and tightness [1–4]. Previous studies have demonstrated that AWS incidence varies according to the type of axillary surgery (sentinel node lymph node dissection [SLND] or axillary lymph node dissection [ALND]). AWS incidence rates of 20 and 38–72 % have been reported following SLND and ALND in breast cancer patients, respectively [2, 5, 6]. Bergmann et al. [7] reported that the incidence of AWS after breast cancer surgery was 28.1 % and was related to ALND and numbness in the arm after intercostobrachial nerve injury. The pathophysiology of

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