Restriction of the range of arm elevation exercises for one week after surgery for breast cancer can reduce the incidence of lymphoedema

Synopsis


Question: Does restriction of full shoulder mobilisation for one week reduce the incidence and severity of lymphoedema in women after axillary lymph node dissection (ALND) for breast cancer? Design: Randomised, controlled trial with concealed allocation and blinded assessment of some outcomes. Setting: Two hospitals in the United Kingdom. Participants: Adult women with early breast cancer admitted for surgery that included axillary lymph node dissection. Previous breast cancer, axillary surgery and local radiotherapy were exclusion criteria. Randomisation of 116 participants allotted 58 to a standard exercise regimen and 58 to the same regimen with restricted arm and shoulder movement for the first week. Interventions: All participants were prescribed four 10-minute exercise sessions per day, in which individual exercises were repeated slowly and rhythmically 3 to 4 times. The exercises included unresisted shoulder and elbow range-of-motion exercises while upright. The early mobilisation group commenced full shoulder mobilisation within two days after surgery. The exercises were modified for the delayed mobilisation group so that the arm was not elevated above horizontal for the first 7 days after surgery. Exercises encouraging full range of shoulder movement were introduced in the second week. The exercises were supervised during the hospital admission and were prescribed to continue for one year at home. Outcome measures: The primary outcome was the incidence of lymphoedema, defined as a 200 ml or greater difference in arm volume compared to the unoperated arm. Secondary outcome measures were the severity of lymphoedema again determined by volume, wound drainage volumes, range of shoulder motion, grip strength, and quality of life scores related to shoulder disability and breast cancer therapy. Results: 109 participants completed the study. After one year, 16 women in the early mobilisation group but only 6 women in the delayed mobilisation group had developed lymphoedema. Thus one case of lymphoedema was prevented for every 6 women managed with the exercise regimen that delayed shoulder mobilisation (95% CI 3 to 35). Lymphoedema severity and wound drainage were both significantly greater in the early mobilisation group. The groups did not differ significantly on the remaining secondary outcomes. Conclusion: The incidence of lymphoedema can be reduced by restricting exercises so that the arm is not elevated above horizontal for one week after ALND.

Commentary

Lymphoedema and shoulder dysfunction are sequelae following breast cancer management. Postoperative exercise following ALND has traditionally focussed on early shoulder movement recovery despite growing evidence that delaying shoulder movement to < 90° in the early postoperative period may reduce the incidence and severity of lymphoedema (Karki et al 2001, Box et al 2002a, 2002b, 2003, McNeely 2007).

This study has demonstrated a significant reduction in the incidence of lymphoedema at one year postoperatively, further supporting this approach to physiotherapy following ALND. The small NNT is consistent with previous authors, indicating that this is a very cost-effective approach to reducing lymphoedema when compared to the cost of treating one patient with lymphoedema. Longer term follow-up is required as lymphoedema remains a lifetime risk following ALND.

Volume difference of > 200 ml was used to exclude ‘pre-existing lymphoedema’ preoperatively and diagnose lymphoedema at one year. The severity of change from preoperative baseline volume measurements was significantly greater in the early movement group at one year. It is not clear why this was not used as the primary outcome measure. Preoperative measurement of arm size is gaining international preference to facilitate the early detection and management of lymphoedema following ALND.

The clinical protocol (www.lymphoedemaleeds.co.uk) is limited in the progression of shoulder exercises and stretches following the introduction of > 90° shoulder movements for both groups and may account for the shoulder dysfunction reported. Previous studies with follow-up and exercise progression by clinicians rather than phone contact as used in this study demonstrate less shoulder dysfunction. Physiotherapy interventions following ALND that delay proximal regional movement must be balanced with exercise progression to optimise movement and function while reducing Lymphoedema as either may compromise quality of life.

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References

Box RC, Reul-Hirche HM (2003) 14th WCPT Congress (abstract SI-PL-0385)