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Lymphedema and quality of life in Chinese women after treatment for breast cancer

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A B S T R A C T

Aims: To determine the magnitude of arm symptom-associated distress and quality of life in patients suffering from lymphedema after axillary dissection for breast cancer.

Design and methods: Two hundred and two breast cancer patients were interviewed, including 101 lymphedema cases and 101 controls who were matched in terms of surgery date, axillary radiotherapy and cancer stage. The FACT-B + 4 quality-of-life instrument was used to assess breast, emotional, functional, physical, and social well-being. A self-devised Arm Symptom Distress scale was used to collect information about arm morbidities including swelling, pain, numbness or tingling, limitation of movement, infection; and their interference on daily life. Arm circumference at different levels was measured to determine the presence and severity of lymphedema. The association between lymphedema and quality of life was evaluated, controlling for patient demographics and clinical factors.

Results: Compared with controls, individuals with lymphedema had a significantly worse score on FACT-B + 4 and the Arm Symptom Distress scale. The score was significantly lower in five of the six domains of FACT-B + 4, and significantly higher in both subscales of the Arm Symptom Distress scale. Patients with severe lymphedema had a significantly worse Symptom Severity sub-score on the Arm Symptom Distress scale than those with mild lymphedema.

Conclusions: Among women who have undergone axillary dissection for breast cancer, lymphedema was associated with an inferior quality of life and a higher level of arm symptom-associated distress. Patients with severe lymphedema had more arm symptom-associated distress than those with mild lymphedema.

Introduction

Upper limb lymphedema is a serious long-term complication of breast cancer surgery and radiation therapy (Velanovich and Szymanski, 1999; Keramopoulos et al., 1993). Western series have shown that lymphedema causes a wide range of discomfort and disabilities, and can affect patients in physical, functional, occupational, psychosocial, cognitive, lifestyle, and financial dimensions (Velanovich and Szymanski, 1999; Carter, 1997; Hull, 1998; Maunsell et al., 1993; Passik and McDonald, 1998; Tobin et al., 1993; Beaulac et al., 2002; Voogd et al., 2003). Measurement of arm symptoms and quality of life (QOL) has emerged as important complementary approach to evaluate the burden of lymphedema on breast cancer survivors (Carter, 1997; Maunsell et al., 1993; Passik and McDonald, 1998; Tobin et al., 1993; Kwan et al., 2002; Tasmuth et al., 1996).

The incidence of female breast cancer is rising rapidly in Hong Kong. The overall age-adjusted incidence has increased from 27.7 per 100,000 in 1973–1975 to 37.9 per 100,000 in 1997–1999 (Leung et al., 2002). With the increasing number of breast cancer survivors, their QOL will be a constant concern for patients and clinicians alike. To our knowledge, there have been no studies on lymphedema-associated QOL in Chinese breast cancer patients. This highlights the importance of collecting local data on this group of patients.

We conducted a case–control study from May 2004 to December 2005 to examine the risk factors associated with lymphedema in Chinese women with breast cancer (Mak et al., 2007). As part of this study, the influence of upper limb lymphedema on QOL was evaluated. Arm symptom-associated distress and QOL

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in patients suffering from lymphedema after axillary dissection were assessed and compared with controls. The study was approved by the Clinical Research Ethics Committee of the Faculty of Medicine, Chinese University of Hong Kong.

Materials and methods

Study design

A matched-pair case–control design was used to compare breast cancer patients suffering from upper limb lymphedema after axillary dissection with a control group without lymphedema. The two groups were matched in terms of surgery date, axillary radiation and cancer stage. The impact of breast cancer treatment on QOL with or without the burden of lymphedema was evaluated. Arm symptom-associated distress and QOL in patients with different degrees of lymphedema were assessed and compared with controls.

Patient selection

Study subjects were Chinese women under care of the Department of Clinical Oncology at the Prince of Wales Hospital who had undergone axillary dissection for breast cancer, who could speak Chinese, and were able and willing to give consent. Patients with impaired cognitive function or coexisting arm morbidities due to previous fracture or surgery were not eligible. Individuals who were diagnosed to have lymphedema more than 5 years ago were also excluded to minimize recall bias when completing the questionnaires.

Potential lymphedema cases were identified by screening patients during follow-up visits, and by reviewing the computerized patient records to look for documented lymphedema. The presence of lymphedema was confirmed by the physician based on history and physical examination. The control group was selected using the computerized patient records, and was matched with cases in terms of surgery date (within 2 months), having received axillary radiotherapy or not, and stage of cancer.

Potential cases and controls were approached at the clinic for explanation and invitation to participate in the study. After obtaining written consent, patients were interviewed in a quiet room by research assistants who had undergone training in arm circumference measurement and interview techniques.

Two hundred and thirty patients consented for the study. Twenty cases could not be matched with any controls. Seven patients (three cases and four controls) had inadequate documentation of treatment details, and one control did not complete the questionnaires. One hundred and one cases and 101 controls fulfilled the recruitment criteria and had been successfully interviewed. They formed the patient sample used in the analysis.

Questionnaire assessment

Information including patient demographics, medical history, arm symptom-associated distress and QOL was collected using questionnaires designed for the study and by reviewing the patient records. The questionnaires were completed by the patients themselves if possible, and if not by face-to-face interviews.

QOL was assessed using the Functional Assessment of Cancer Therapy–Breast Cancer subscale (FACT-B + 4) questionnaire (Coster et al., 2001). This was developed by adding a four-item Arm subscale to the well-validated FACT-B (Functional Assessment of Cancer Therapy–Breast) (Brady et al., 1997), and had been translated and field-tested in Chinese subjects (Appendix 2). The 40 items in FACT-B + 4 evaluated patients' physical, social, emotional and functional well-being; specific breast cancer concerns; arms symtpoms; as well as their overall QOL.

The self-devised Arm Symptom Distress scale was designed to collect information on arm symptoms over the past 2 weeks. Five arm symptoms were evaluated, including swelling, pain, numbness or tingling, limitations on movement, and infection. The severity of each symptom was rated on a 5-point scale from "no" to "very severe", which corresponded to a score of 1–5. The summed score of the five symptoms constituted the Symptom Severity sub-score. Similarly, the degree of interference of each symptom on daily activities was rated from "not at all" to "very much", and the summed score constituted the Symptom-associated Interference sub-score. Face validity of the questionnaires has been established by sending them to a group of oncology nurses, lymphedema therapists and doctors for review.

Lymphedema measurement

After completing the questionnaires, patients were examined to determine their arm circumference. Measurements were made at 10 cm intervals along the entire length of the arm; at the wrist; and at mid-palm level (Latchford and Casley-Smith, 1997). The contralateral arm circumference at corresponding levels was used as a reference to determine if lymphedema was present. Lymphedema was defined as an increase in arm circumference at any level by 1.5 cm or more compared to the contralateral side (Piller and O'Connor, 2002; Piller, 2000). A difference of less than 3 cm, 3–5 cm and more than 5 cm were classified as mild, moderate and severe lymphedema, respectively. Arm circumference was used to define lymphedema, as opposed to limb submersion and volume of water displacement, because it was more practical in the clinical setting (Segerstrom et al., 1992; Gerber, 1998; Hoe et al., 1992).

Upon completion, the questionnaires were sent to a central office for processing, and all data were double-entered by two independent workers and cross-checked by principal investigator or research nurse for quality assurance.

Statistical methods

Data were analyzed using the SAS statistical software (version 8.2; SAS Institute Inc., Cary, NC). Categorical data were tabulated and continuous data were expressed as means and standard deviations. Inferential comparison of categorical data was performed using logistic regression analysis and the difference between groups expressed as odds ratios with 95% confidence intervals. Arm circumference of cases and controls are compared using the *T*-test. The Chi-square test was used to compare the frequency, severity, and impact on daily activities of each symptom.

Pearson correlation was used to assess the correlation between FACT-B + 4 and the Arm Symptom Distress scale. Internal consistency of the questionnaires was assessed using Cronbach's α coefficients.

Analysis of variance was used to compare the QOL scores between cases and controls, as well as between cases with different severities of lymphedema. When comparing the difference in arm circumference, a multiple comparison procedure was used only when the overall *F*-test was significant at 0.01.

All statistical tests were two sided. *P*-values less than 0.05 were considered statistically significant.

Results

Patient characteristics

Patients' characteristics are shown in Table 1. The age of patients included in the study ranged from 34 to 80 years (mean 51.2 and