Case-Control Study to Evaluate Predictors of Lymphedema After Breast Cancer Surgery

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Purpose/Objectives: To identify risk factors for lymphedema after breast cancer surgery.

Design: Multisite case-control study.

Setting: Lymphedema clinics in the upper midwestern region of the United States.

Sample: 94 patients with lymphedema and 94 controls without lymphedema, matched on type of axillary surgery and surgery date.

Methods: The Measure of Arm Symptom Survey, a patient-completed tool, assessed potential risk factors for lymphedema. Severity of lymphedema was measured by arm circumference, and disease and treatment factors were collected via chart review.

Main Research Variables: Risk factors for lymphedema after breast cancer surgery.

Findings: On univariate analysis, patients with lymphedema were more likely than controls to be overweight (body mass index ≥ 25) ($p = 0.009$). They also were more likely to have had axillary radiation ($p = 0.011$), mastectomy ($p = 0.008$), chemotherapy ($p = 0.033$), more positive nodes ($p = 0.009$), fluid aspirations after surgery ($p = 0.005$), and active cancer status ($p = 0.008$). Strength training ($p = 0.014$) and air travel ($p = 0.0005$) were associated with less lymphedema occurrence. On multivariate analysis, the only factor significantly associated with lymphedema was being overweight ($p = 0.022$).

Conclusions: Being overweight is an important modifiable risk factor for lymphedema. Axillary radiation, more extensive surgery, chemotherapy, and active cancer status also were predictive of lymphedema.

Implications for Nursing: This study provides evidence that excess weight contributes to lymphedema; strength training and airline travel did not contribute to lymphedema.

In 2008, more than 182,000 women were diagnosed with breast cancer, and 88% of those women will survive at least five years (Jemal et al., 2008). Lymphedema is a common problem for patients diagnosed with breast cancer, with an estimated 6%–35% developing it sometime after breast cancer treatment (Goffman, Laronga, Wilson, & Elkins, 2004; Hinrichs et al., 2004; Kwan et al., 2002; Lee, Kilbreath, Refshauge, Herbert, & Beith, 2007; Paskett, Naughton, McCoy, Case, & Abbott, 2007; Schrenk, Rieger, Shamiyeh, & Wayand, 2000; Thomas-MacLean et al., 2008).

The reported prevalence of lymphedema varies with the length of follow-up, measurement techniques, and other patient- and treatment-related factors (Armer & Stewart, 2005; Brown, 2004; Hayes, Cornish, & Newman, 2005). Lymphedema can range from mild to severe and can be a chronic condition that affects patients' quality of life for years after cancer surgery (Carter, 1997; Maunsell, Brisson, & Deschênes, 1993; Passik & McDonald, 1998; Thomas-MacLean, Miedema, & Tatemichi, 2005; Tobin, Lacey, Meyer, & Mortimer, 1993; Velanovich & Szymanski, 1999). Patients are concerned about how to prevent lymphedema because it is a common side effect associated with breast cancer treatment (Muscari, 2004).

Axillary lymph node dissection (ALND) for breast cancer causes disruption in the lymphatic vessels in the axilla. Radiation therapy to the axillary bed can cause further edema and fibrosis. The treatments may lead to accumulation of protein-rich fluid in the soft tissues of the hand, arm, breast tissue, and chest wall on the affected side. Oncotic pressure increases, causing progression of lymphedema (Petrek, Pressman, & Smith, 2000).

Sentinel lymph node biopsy (SLNB), a less invasive procedure than ALND, has been associated with lower rates of lymphedema and other arm symptoms (Baron et al., 2002; Burak et al., 2002; Golshan, Martin, & Dowlatshahi, 2003; Lucci et al., 2007; Mansel et al., 2006;