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ORIGINAL RESEARCH

Development of active myofascial trigger points in neck and shoulder musculature is similar after lumpectomy or mastectomy surgery for breast cancer

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Summary Our aim was to describe the differences in the presence of myofascial trigger points (TrPs) in neck and shoulder muscles after 2 surgery approaches for breast cancer: mastectomy or lumpectomy. Thirty-two women (mean age: 50 ± 7 years) who received lumpectomy, 16 women (mean age: 48 ± 10 years) who had received mastectomy after breast cancer, and 16 women (mean age: 49 ± 9 years) with breast cancer who had not received either surgical treatment, participated. Myofascial TrPs in the upper trapezius, sternocleidomastoid, levator scapulae, scalene, infraspinatus and pectoralis major muscles were bilaterally explored by an assessor blinded to the women's condition. TrPs were considered active when palpation reproduced local and referred pain symptoms recognized by the patient as familiar pain symptoms. The number of active TrPs within mastectomy (mean ± SD: 4.6 ± 1) and lumpectomy (mean ± SD: 4.5 ± 1) groups

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was significantly higher ($P < 0.001$) as compared to the control group (mean ± SD: 1.1 ± 1.3), but not significantly different between them ($P = 0.641$). Women who received either lumpectomy or mastectomy showed similar distribution of active TrPs and a higher prevalence of active TrPs as compared to the control group. Active TrPs in the pectoralis major muscle were the most prevalent in both surgery groups The number of active TrPs was weakly correlated with neck ($r_s = 0.385$; $P = 0.029$) and shoulder/axillary ($r_s = 0.397$; $P = 0.024$) pain intensity within the lumpectomy, but not the mastectomy group. This study found active TrPs in neck and shoulder musculature in women who had received lumpectomy or mastectomy. The induced local and referred pain pattern from active TrPs reproduced neck and shoulder/axillary symptoms and pain patterns in women after breast cancer surgery. Few active TrPs were found in a control group of women with breast cancer who had not received any surgical treatment.

Introduction

Breast cancer is the most common cancer among women (Ries et al., 2000), with an incidence of 2.9% (Pollán et al., 2009). Pain is the most frequent symptom after breast cancer treatment (Randal, 1998; Lauridsen et al., 2008). Persistent pain beyond the period of "normal" healing after breast cancer surgery is called "post-mastectomy pain" and it is usually attributed to the damage of peripheral nerves during the operative procedure (Cheville et al., 2007). In fact, Smith et al. (1999) reported that 43% of women who have received a mastectomy suffered from post-mastectomy neuropathic pain.

Although it is considered that post-mastectomy pain has a neuropathic origin (Wallace et al., 1996), there is evidence suggesting that other contributing factors, such as myofascial tissues, may be also implicated in the origin of pain (Kudel et al., 2007). In this context, Simons et al. (1999) suggested that myofascial trigger points (TrPs) could play a relevant role in pain perceived after breast cancer surgery. TrPs are defined as hypersensitive painful spots in a taut band of a skeletal muscle that elicit a referred pain distant from the spot (Simons et al., 1999). From a clinical viewpoint, active TrPs are those which local and referred pains reproduce patient's symptoms and are recognized as a familiar pain; whereas latent TrPs are those which local and referred pain does not reproduce patients' familiar symptoms (Simons et al., 1999). Clinical distinction between active and latent TrPs has been substantiated by histo-chemical findings with higher levels of chemical mediators (i.e., bradykinin, substance P, or serotonin) found in active TrPs as compared to latent TrPs and non-TrPs (Shah et al., 2005; 2008).

Current evidence analyzing the relationship between TrPs and breast cancer is scarce. An old study showed that myofascial interventions aimed at chest wall muscles provided pain relief after lumpectomy and radiation in breast cancer patients (Crawford et al., 1996). In a cohort of 163 breast cancer patients, Cheville et al. (2007) found that 21% of them had findings indicative of myofascial pain. A recent study conducted by Torres-Lacomba et al. (2010) found that 45% of women with breast cancer developed myofascial pain syndrome after surgery. In this study, TrPs within the pectoralis major, infraspinatus and upper trapezius muscles were highly prevalent (Torres-Lacomba et al., 2010).

Although it is suggested that muscle TrPs can be related to surgical procedures for breast cancer, no previous study has systematically explored TrPs depending on the surgical intervention. In fact there has been an increasing interest for improving surgical treatments for breast cancer, with 2 different surgical options: mastectomy (whole breast removed) or lumpectomy (tumor and surrounding tissue removed). Lumpectomy is preferred in younger patients since it is less mutilating (Hamdi et al., 2008). Further, the incidence of postoperative complications is higher with mastectomy (35%) than with lumpectomy (24%) (Acea-Nebril et al., 2005).

To the best of the authors' knowledge no studies investigating the presence of TrPs after different breast cancer surgeries (i.e., mastectomy, lumpectomy) have been conducted. The aim of this study was to investigate the differences in the presence of myofascial active TrPs after 2 surgeries for breast cancer: mastectomy or lumpectomy. We hypothesized that women receiving mastectomy will show a greater number of active TrPs than those women receiving lumpectomy.

Methods

Participants

Patients recruited from the Department of Breast Oncology at the University Hospital Virgen de las Nieves, Granada, Spain were eligible to participate in the study. To be eligible for the study, participants had to fulfil the following criteria:

1 first time with a primary diagnosis of breast cancer (grades I-IIIA);
2 women who had received a mastectomy with breast reconstruction or women who had received a lumpectomy;
3 women who had received surgery at least 6 months ago without recurrence of breast cancer;
4 women who had completed their adjuvant therapy (i.e. radiation, cytotoxic chemotherapy) at least 3 months before the study; and,
5 adults at least 18 years of age

Exclusion criteria were:

1 breast surgery for cosmetic reasons or prophylactic mastectomy;
2 other medical conditions (e.g. arthritis);