Massage Relieves Nausea in Women with Breast Cancer Who Are Undergoing Chemotherapy

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ABSTRACT

Objectives: The aim of the present study was to examine the effect of massage on nausea, anxiety, and depression in patients with breast cancer undergoing chemotherapy.

Design: This work was a single-center, prospective, randomized, controlled trial.

Settings/location: This study was conducted in an oncology clinic, in a hospital in southwestern Sweden.

Subjects: Thirty-nine (39) women (mean age = 51.8) with breast cancer undergoing chemotherapy were enrolled.

Interventions: The patients were randomly assigned to a massage therapy group (20 minutes of massage on five occasions) or a control group (five 20-minute visits).

Outcome measures: All patients recorded nausea and anxiety on the Visual Analogue Scale before and after each intervention. They also completed the Hospital Anxiety and Depression Scale.

Results: Massage treatment significantly reduced nausea compared with control treatment (p = 0.025) when improvement was measured as a percentage of the five treatment periods. Differences in anxiety and depression between the two treatment regimes could not be statistically demonstrated.

Conclusions: This study complements previous studies on the effect of massage and supports the conclusion that massage reduces nausea in these patients.

INTRODUCTION

Breast cancer is a common disease of women, with approximately 150/100,000 new cases yearly in Sweden.1 Treatment options consist of surgery, chemotherapy, radiation, and hormone therapy. All of these treatments have side effects such as numbness, pain, nausea, fatigue, and weakness.2 They can sometimes be treated pharmaceutically, but patients still continue to suffer side effects. Chemotherapy-induced nausea is one of the most common problems, despite pharmacologic treatment options.2–5 Furthermore, a recent study showed that younger patients (<65 years of age) experienced nausea and emesis more intensely than older patients do.6 Nonpharmacologic interventions such as self-hypnosis, relaxation, biofeedback, distraction, and acupuncture have been shown to relieve chemotherapy-induced nausea.7–9

Massage is another nonpharmacologic treatment that has been shown to relieve pain and nausea and relax hospitalized patients with cancer.10–12 Furthermore, a qualitative study showed that a 20-minute massage of the foot/lower leg or hand/lower arm gave relief from suffering in women with cancer.13 Other studies showed that massage reduces not only experienced pain but also anxiety and induces a sense of relaxation.14–16

Common physiologic effects of massage are decreased blood pressure, heart rate, and increased skin temperature.14,17,18 The exact physiologic mechanism of the effect

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of massage is unknown. However, the gate control theory offers an explanation of the pain-relieving effect of massage. Central endocrine and neuroendocrine effects such as increased release of oxytocin and decreased blood pressure can also account for the positive effects of massage. Furthermore, higher serotonin concentrations may also explain the pain-relieving effect of massage.

Massage has been used for many years. It originated in China more than 3000 years ago and can be administered in various ways, such as petrissage, kneading, and effleurage. Previous studies of massage usually include petrissage or kneading. However, prior to this study, massage techniques such as effleurage, petrissage, and kneeling were voluntarily tested on patients with cancer. Many patients experienced petrissage and kneeling as uncomfortable and heavy-handed. Thus, effleurage seems to be the method best suited to patients with cancer.

The aim of the present study was to examine the effect of skin massage (effleurage) on nausea, anxiety, and depression in women with breast cancer undergoing chemotherapy.

**MATERIALS AND METHODS**

The study was a prospective, randomized, controlled clinical trial.

**Patients**

Thirty-nine (39) women with breast cancer were recruited consecutively from an oncology clinic at a hospital in the southwest of Sweden. All were scheduled to undergo chemotherapy: epirubicin 75 mg/m² (Pharmalink AB, Upplands Väsby, Sweden), fluorouracil 600 mg/m² (Mayne Pharma Plc, Warwickshire, United Kingdom), and cyclophosphamide 600 mg/m² (Baxter Medical AB, Kista, Sweden) every third week for a total of seven sessions. Inclusion criteria were (1) diagnosis of breast cancer; (2) female gender; (3) scheduled to receive chemotherapy; and (4) oncologist’s approval to participate in the study. All patients were given an antiemetic (5-HT3 receptor antagonist) tropisetron 5 mg (Novartis, Täby, Sweden) and corticosteroid, betamethasone 8 mg (Defuante Farmaceutica, Ida, Funchal, Madeira, Portugal) on the day of treatment, day 2 (betamethasone 4 mg), day 3 (betamethasone 3 mg), day 4 (betamethasone 2 mg), and day 5 (betamethasone 1 mg).

The patients received a letter of information on the study the day of the second chemotherapy session. A week after the second session, they received a call by the study staff asking if they would participate in the study. If consenting, they were randomized to receive either (1) massage (massage group, n = 19) or (2) a visit by the hospital staff (control group, n = 20). Randomization was prior to the third chemotherapy session using sealed opaque envelopes. Two patients rejected inclusion prior to randomization (Fig. 1).

The study was reviewed and approved by the ethical committee of Göteborg University, no. Ö 667-01.

**Treatment**

The hospital staff was educated and trained for a day in the theoretic and practical knowledge of the massage technique to be used, by the first author. In addition, they had considerable previous experience in massaging patients with cancer. The massage was given to the patients by five hospital staffers (nurses and nurse’s aids). The patients were included in the study during chemotherapy sessions 3 to 7 (massage/visit 1 to 5). The massage took place at the chemotherapy ward during chemotherapy infusion. In total, five massage treatment sessions were given. The massage consisted of soft strokes—effleurage—lasting for 20 minutes. The patients were able to choose between foot/lower leg or hand/lower arm massage. The duration was the same for the two massage options. A cold-pressed vegetable oil was used, and the limb was wrapped in a towel immediately after the massage. In contrast to the massage group, the control group did not receive massage. They were visited by a member of the hospital staff for 20 minutes. The visit consisted primarily of unstructured conversation about any subject. All other treatments and procedures were the same for both groups.

**Measurable variables**

Outcome measures included a Visual Analogue Scale (VAS) for nausea and anxiety. The VAS was chosen because it is designed to gather information about internal, subjective feelings such as nausea and anxiety. The patients...
reported nausea and anxiety on a 100-mm scale with the verbal anchors: “no nausea/anxiety at all,” 0, and “worst possible nausea/anxiety,” 100.

The Hospital Anxiety and Depression Scale (HAD), a 14-item instrument comprising 7 items for anxiety and 7 items for depression, was used. The sum scores for anxiety and depression are presented separately. Item levels ranged from 0 to 3 on the scale, 3 being more anxious/depressed. Maximum sum score for anxiety or depression, respectively, was 21.

Assessments

Before and immediately after each of the five interventions, the patients scored nausea and anxiety on the VAS. This was done equally for both the massage and the visit group. In total, each individual was assessed by five repeated measurements. In addition, they answered the HAD before the first and the last intervention.

Statistics

Analysis was by intention to treat. The changes in the VAS ratings before and after each intervention were classified as positive if the rating indicated improvement and negative if not. Furthermore, the proportion of an individual’s total positive VAS-changes was calculated. Thus, if a patient improved in three out of five interventions, the patient received a score of 60%. The changes in the HAD score were calculated for anxiety and depression.

Differences between groups were analyzed with Student’s t-test for continuous, normally distributed data with equal variances between groups. Bartlett’s test for inequality of population variances was used to determine whether variances differed between groups. In ordinal or continuous data with skewed distribution, or with unequal variances between groups, the Mann–Whitney test was used.

All statistical tests were two-sided and a p value of less than 0.05 was considered significant.

To investigate whether VAS anxiety and HAD anxiety sum score measured similar phenomena, nonparametric rank correlation was done with ranks for HAD anxiety sum score at baseline as dependent variable and rank for median of VAS anxiety before treatment as independent variable.

Data were analyzed using EpI-Info version 3.3.2 (Center for Disease Control, Atlanta, Georgia).

RESULTS

The patients’ mean age was 51.8 years (massage group = 50.5 years, control group = 53.1 years), ranging from 33 to 69 years. Three women received hand/lower arm massage, whereas the others chose foot/lower leg massage. There were no statistically significant differences between groups in demographics or baseline values (Table 1).

Visual Analogue Scale

Massage treatment significantly reduced nausea compared with the control treatment (p = 0.025, Mann–Whitney test) when measured as percentage improved occasions. Mean improvement was 73.2% (SD 32.3) in the massage group (median/interquartile range 80%/40–100), compared to mean 49.5% (SD 32.2) (median/interquartile range 60%/30–80).

Table 1. Demographic Characteristics of Study Participants and Baseline Values by Treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Massage group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) mean (SD)</td>
<td>50.5 (10.1)</td>
<td>53.1 (8.4)</td>
</tr>
<tr>
<td>Type of surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumpectomy/sentinel node⁹</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Lumpectomy/axillary node dissection⁹</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Mastectomy/axillary node dissection⁹</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I⁹</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>II A⁹</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>II B⁹</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>III⁹</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mean time since diagnosis (months)</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>VAS (mm) nausea⁹</td>
<td>15.4/15</td>
<td>11.1/4</td>
</tr>
<tr>
<td>(12.3/3–24)</td>
<td>(20.3/2–13)</td>
<td></td>
</tr>
<tr>
<td>VAS (mm) anxiety⁹</td>
<td>17.9/21</td>
<td>13.2/10.5</td>
</tr>
<tr>
<td>(11.8/7–23)</td>
<td>(11.1/4–21.5)</td>
<td></td>
</tr>
<tr>
<td>HAD (score value: 0–21) anxiety⁹</td>
<td>5.9/5</td>
<td>3.8/4</td>
</tr>
<tr>
<td>(3.8/3–9)</td>
<td>(2.9/1–5.5)</td>
<td></td>
</tr>
<tr>
<td>HAD (score value: 0–21) depression⁹</td>
<td>3.5/3</td>
<td>2.4/2</td>
</tr>
<tr>
<td>(3.3/1–5)</td>
<td>(1.9/1–3)</td>
<td></td>
</tr>
</tbody>
</table>

⁹Number.

§Mean/median (standard deviation/interquartile range).
45%/20–77.5) in the control group. Differences in anxiety between the two treatment regimes were not statistically significant.

**Hospital Anxiety Depression Scale**

Mean change for HAD anxiety was −0.1 sum score (SD 2.9) in the massage group (median/interquartile range ± 0/-1-2), compared to mean 1.3 sum score (SD 2.6) (median/interquartile range 1/0–3) in the control group. Mean change for HAD depression was −0.7 sum score (SD 2.8) in the massage group (median/interquartile range ± 0/-3-1), compared to mean 0.6 sum score (SD 1.22) (median/interquartile range ± 0/0-1) in the control group.

There were no differences between groups in changed sum score for HAD anxiety (p = 0.21) and HAD depression (p = 0.10).

**Correlation between HAD anxiety and VAS anxiety**

The HAD anxiety and the VAS anxiety were positively correlated (p = 0.003, r² = 0.24, nonparametric rank correlation).

**DISCUSSION**

The main finding of the present study was that massage lowered nausea in women with breast cancer undergoing chemotherapy. This is of high clinical value, because nausea is one of the most common side effects of chemotherapy.2–5

**Methodologic aspects**

VAS is an instrument designed to measure internal feelings such as sensations, experiences, and perceptions.27 The VAS was used in this study because it was considered the best method to measure experienced nausea and anxiety. Criterion-related validity was determined by exploring how VAS anxiety correlated with HAD anxiety. VAS anxiety was then found to be valid. The VAS nausea was not tested for validity. It has, however, been used in previous studies to measure nausea.10 HAD was administered before the first and last treatment only, based on the estimate that HAD would not change during the course of one treatment.

Younger (<65 years of age) patients experience a high degree of nausea and emesis during chemotherapy.6 The mean age of the patients in the present study was 50 for the massage group and 53 for the control group, indicating that this study included those in need of an effective antiemetic.

We did not document the use of any other complementary treatment other than massage in this study. It is possible that some of the patients have used other treatments such as herbal remedies during the course of chemotherapy treatment.

**Massage lowers nausea**

The finding that effleurage lowers nausea is consistent with another investigation of foot massage on patients with cancer.10 A relatively short foot massage (10 minutes) had a significant immediate effect on the perceptions of pain, nausea, and relaxation measured with a VAS.

**Massage and anxiety**

Ferrell-Torry et al.14 studied hospitalized patients with cancer and found a decrease in anxiety immediately after massage. In this study, massage did not affect anxiety. A possible explanation for the different findings may be that in the study by Ferrell-Torry et al., baseline anxiety was high, but in this study baseline values for HAD anxiety sum scores were low, leaving little room for improvement.

**Massage and depression**

This study did not find any effect of massage on depression. This is contrary to the results of another study investigating the effect of massage on depression in patients with cancer.29 Depression decreased significantly after 30 minutes of back massage weekly for 4 weeks as measured with HAD.

**Possible explanations for the effect of massage**

The exact physiologic mechanisms of massage are unknown. However, the release of hormones and neurotransmitters such as oxytocin may be involved.20–22 Oxytocin seems to have an anxiolytic effect, resulting in relaxation, which in turn decreases nausea. Thus, relaxation may explain the effect of massage on nausea. Benson et al.30 described this phenomenon as a decrease in activity of the sympathetic nervous system in relaxed states. Morrow31 studied the effect of relaxation on chemotherapy-induced nausea in 92 patients with cancer and reported a significant decrease in duration and severity of post-treatment nausea in the relaxation group.

**CONCLUSIONS**

New ways to limit the side effects of chemotherapy are crucial because breast cancer, and consequently, the use of chemotherapy, is increasing. Complementary therapies are needed when traditional pharmacologic agents do not adequately provide symptom control. Massage is an interesting alternative that may be administered by family members, thus allowing treatment at home.

Although this study indicates that massage can be useful by lowering nausea in patients with breast cancer undergoing chemotherapy, it needs to be confirmed in studies with larger samples.
ACKNOWLEDGMENTS

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