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Effect of massage therapy on pain, anxiety, and tension after cardiac surgery: A randomized study

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A B S T R A C T

Integrative therapies such as massage have gained support as interventions that improve the overall patient experience during hospitalization. Cardiac surgery patients undergo long procedures and commonly have postoperative back and shoulder pain, anxiety, and tension. Given the promising effects of massage therapy for alleviation of pain, tension, and anxiety, we studied the efficacy and feasibility of massage therapy delivered in the postoperative cardiovascular surgery setting. Patients were randomized to receive a massage or to have quiet relaxation time (control). In total, 113 patients completed the study (massage, $n = 62$; control, $n = 51$). Patients receiving massage therapy had significantly decreased pain, anxiety, and tension. Patients were highly satisfied with the intervention, and no major barriers to implementing massage therapy were identified. Massage therapy may be an important component of the healing experience for patients after cardiovascular surgery.

1. Introduction

Hundreds of thousands of patients undergo cardiovascular surgery every year in the United States. Despite technical success for most patients, clinically significant morbidities such as physical pain, emotional pain, and anxiety are common. Indeed, among the most difficult challenges in restoring patients to full physical and emotional health is musculoskeletal pain, which is often not fully alleviated pharmacologically. Periprocedural anxiety is another considerable challenge that can delay wound healing and decrease immune function. The associated costs can be numerous; they include lost productivity, need for postoperative physical therapy, and prolongation of the recovery period. Thus, novel approaches clearly are needed to help patients recover from cardiovascular surgery and to help them manage in the face of new challenges.

Complementary and alternative medicine (CAM) therapies have become a common part of healthcare for a number of Americans.[1,2] Many CAM therapies specifically target pain and anxiety, and it is thus reasonable to question whether such therapies might help address postoperative needs that are not fully accommodated by conventional approaches. Massage therapy in particular appears to be a reasonable CAM choice in the postoperative setting.

Extensive evaluation of massage therapy has shown that it can effectively improve a number of outcomes.[3] These improved outcomes include reduced pain[4–12]; reduced anxiety[4,5,13–19]; reduced lymphedema[20]; increased plasma β-endorphins[21]; decreased muscle tension, heart rate,[22] blood pressure,[23] and galvanic skin response[24]; and increased skin temperature[25] and blood flow.[26] Other reported findings include improved sleep,[27] improved patient-physician communication,[28] and reduced fatigue, nausea, and depression.[5] For neonates in intensive care units, massage therapy has improved weight gain, alertness, and activity.[15]

Massage therapy efficacy has been studied in various patient populations, including patients requiring hospitalization,[5,29] patients in intensive care units,[30–33] and hospice patients.[34] Other research has focused on massage in the context of specific illnesses

Abbreviations: CABG, coronary artery bypass graft; CAM, complementary and alternative medicine.

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or procedures, including patients with cancer,[19,35–39] hospitalization after acute myocardial infection,[40] patients with dementia,[41] preterm neonates,[15,42] men positive for human immunodeficiency virus,[43] patients undergoing abdominal surgery[44] or bone marrow transplantation,[4] and patients recovering after cardiac surgery.[45]

The literature suggests that massage therapy can be provided safely in the hospital setting and potentially has substantial clinical benefit. However, many studies examining the efficacy of massage therapy have attempted to demonstrate a benefit by using nonexperimental designs, anecdotal outcome measures, poor measurement tools, small sample sizes, no control groups, and nonstandardized interventions. Dose level and frequency of massage often are inconsistent. This lack of scientific rigor is a common theme in critical reviews of the clinical effectiveness of massage therapy.[46,47]

We designed the current study to overcome many of the challenges identified in prior investigations. The primary objective was to evaluate the effect of two, 20-min massage therapy sessions on patient-reported pain, anxiety, and tension after cardiac surgery. The secondary objective was to evaluate the feasibility of integrating massage therapy into acute and postacute cardiovascular surgical practices.

2. Methods

2.1. Inclusion and exclusion criteria

This study was approved by our institutional review board. Eligible participants were scheduled to undergo coronary artery bypass graft (CABG) surgery, valve repairs or replacements, or both through a median sternotomy. Patients were approached preoperatively for participation in the study from November 3, 2006, through February 14, 2008. We included only those who gave consent and were medically able to participate in massage therapy on postoperative days 2 and 4. Patients who had undergone previous cardiac surgery, patients with chronic pain syndromes, and patients with a history of psychosis were excluded from the study. In addition, patients with prolonged bleeding or intubation greater than 24 h also were excluded.

2.2. Randomization

Patients were randomly assigned to 1 of 2 treatment arms: massage therapy or standard care with quiet relaxation (control). To assure balanced allocation throughout the course of the study, we used a randomized block design with 55 blocks of 4 and 55 blocks of 2; these 110 blocks also were permuted into a random order to ensure that patients were distributed evenly among treatment arms (the difference in patient numbers for each arm was always ≤ 2). Randomizing with mixed blocks and using cards in sealed envelopes masked the administrators who enrolled patients. To account for potentially nonrandom withdrawal from the study, the randomization scheme was determined in advance for 300 patients, and enrollment continued until at least 50 patients in each study arm had completed day 4 of treatment. The large number of randomizations was determined in advance because we anticipated a high proportion of patients remaining intubated on day 2 or withdrawing from the study because of high pain levels before the first intervention.

2.3. Intervention

2.3.1. Massage therapy

Integrative massage was provided on postoperative day 2 (the day after surgery) and day 4. The massage was given by a Certified Massage Therapist with an occupational therapy background and knowledge of the care of patients after cardiac surgery. Each integrative massage session consisted of the assessment (1–5 min), which included comfortable positioning of the patient, and massage with the hands (20 min) that focused on the areas of primary concern as indicated by the patient.

A sign on the door alerted other healthcare providers or visitors that a massage session was in progress. Music was offered and played in the patient's room, if desired. Patients sat at the edge of the bed or in a chair or lay in bed supine or on one side. Positioning depended on the patient's preference, mobility, and tube and equipment placement. Patients were clothed in hospital gowns, and areas not massaged were covered with a sheet and blankets.

The therapist focused on using and adjusting massage techniques to help the patient release tension, promote scapular glides, and regain normal movement. Massage techniques were selected by the therapist and individualized on the basis of the patient's medical status, positioning tolerance, symptoms, and symptom location. The massage incorporated techniques such as deep tissue massage, neuromuscular techniques, trigger point therapy, myofascial release, manual lymphatic drainage, reflexology, acupressure, and some Swedish massage techniques. The therapist modified massage techniques to avoid a bruising pace or pressure, to avoid a negative impact on low or high blood pressure and heart rate, to not pull on the incision site, and to not push the patient against something solid because of the sternotomy. Angle of the massage stroke, pace, and amount of pressure were articulated carefully. Massage was provided to the head, neck, shoulders, arms, hands, back, legs, or feet, depending on the patient's primary concern.

2.3.2. Control therapy

For patients in the control arm, relaxation sessions occurred on postoperative days 2 and 4. They continued receiving standard care (eg, medication was administered) and were instructed to relax for 20 min while lying in bed or sitting in a chair. A sign was posted on the door indicating a relaxation session was in progress. The patient was offered dimmed lights.

2.4. Evaluation

Patients reported measures of pain, anxiety, tension, relaxation, and overall satisfaction before and after interventions on days 2 and 4 and also on day 3 (a day without an intervention) to identify any potential carryover effects from day 2 to day 3. Visual analog scales, where 0 indicated none and 10 indicated most, were used for outcome evaluation. For pain, anxiety, and tension, negative changes indicated improvement, whereas for relaxation and satisfaction, positive changes indicated improvement. Vital signs of heart rate, blood pressure, and breaths per minute also were collected by a study coordinator before and after each 20-min session and on day 3. The amount of sleep and length of hospital stay were recorded.

2.5. Sample size

Results of the pilot study indicated that a minimum of 50 patients in each group would have 80% power to detect a difference of 1.6 points or more between the massage and standard care groups. It also would be powered sufficiently to detect a difference of 1.3 points or more within a group when comparing measures before and after therapy. These calculations assumed a significance level of $\alpha = 0.05$ and 2-sided statistical tests. Calculations were performed using nQuery version 6.0 (Statistical Solutions, Saugus, Massachusetts).