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Can postoperative massage therapy reduce pain and anxiety in cardiac surgery patients?

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Summary

A best evidence topic in cardiac surgery was written according to a structured protocol. The question addressed was, 'In patients undergoing cardiac surgery, is postoperative massage therapy effective in reducing pain, anxiety and physiological parameters?'. Altogether, 287 papers were found using the reported search, of which 7 papers represented the best evidence to answer the clinical question. The authors, journal, date and country of publication, patient group studied, study type, relevant outcomes and the results of these papers are tabulated. The specific therapy protocols widely varied between studies, with differences in frequency, specific timing in the postoperative period, techniques used and experience of therapy provider. These variations limit the generalization and transferability of the conclusions. The effect of massage therapy on anxiety levels was reported in 5 studies. All but one demonstrated a significant improvement in anxiety. Pain was also reported in 5 studies, with significant improvement demonstrated in 4 studies. Importantly, a number of these studies failed to report on analgesic requirements nor demonstrate a reduction in opioid requirements, thus limiting the validity of the drawn conclusions. There is significant heterogeneity in randomized trials reporting on the effects of massage therapy. Although there is evidence to suggest that massage therapy reduces pain and anxiety following cardiac surgery, there are often caveats to the conclusions drawn with other studies reporting no significant difference. Therefore, in light of this, it would not be logical to recommend massage therapy as an effective therapy. There is no current evidence to suggest that massage therapy improves physiological parameters, including the onset of atrial fibrillation postoperatively.

Keywords: Cardiac Surgery • Anxiety • Pain • Massage therapy

INTRODUCTION

A best evidence topic was constructed according to a structured protocol as fully described in the ICVTS [1].

THREE-PART QUESTION

In [patients undergoing cardiac surgery], is [postoperative massage therapy] effective in [reducing pain, anxiety and physiological parameters]?

CLINICAL SCENARIO

A new therapist has recently joined your surgical team and is keen to implement some additional non-pharmacological adjunctive therapies to support patients recovering from cardiac surgery. The therapist claims that postoperative massage in her experience has reduced anxiety, pain and even opioid requirements in patients recovering from major surgery. You are sceptical of these claims and decide to examine the literature and report back to your colleagues.

SEARCH STRATEGY

A literature search was performed in the MEDLINE database (1950–April 2018) through the PubMed interface using the terms [massage] AND [cardiac surgery OR cardiothoracic OR coronary artery bypass graft OR CABG OR valve replacement OR AVR OR aortic valve OR MVR OR mitral valve OR valve repair] AND [pain OR analgesia OR anxiety OR depression OR tension OR fatigue OR stress OR relaxation OR satisfaction OR mood].

SEARCH OUTCOME

A total of 287 publications were found using the reported search strategy. Of these, 7 papers represented the best available evidence to answer the clinical question. These are summarized in Table 1.

Table 1: Massage therapy following cardiac surgery: psychometric and psychological outcome measures

Author, date, journal and country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
Albert *et al.* (2009), Heart Lung, USA [2] Randomized trial (level 1b)	252 adult patients undergoing open cardiac surgery (valve procedures, CABG) *n* = 126 (usual postoperative care only) (the control group) *n* = 126 (usual postoperative care and massage therapy) Massage details: Duration: 30 min Frequency: once per day Sessions: 2 Timing: day 2/3 and day 3/4 post-surgery Location: arms, legs and back Specific techniques: basic techniques including effleurage, petrissage and friction		The mean difference between pre- and postoperative scores (±SD)	The authors speculate that the intervention dose, frequency, timing and anatomical location may affect outcomes. The authors acknowledge the need for future work to determine the predictors of therapeutic benefit
		Anxiety levels (the Beck Anxiety Index)	Control: -0.97 ± 9.0 Intervention: -2.89 ± 8.9 *P* = 0.2	
		Pain (the VAS)	Control: 1.2 ± 2.3 Intervention: 0.76 ± 2.0 *P* = 0.2	
		Blood pressure	No difference in systolic (*P* = 0.5) or diastolic (*P* = 0.6) blood pressure	
		Heart rate	No difference in heart rate (*P* = 0.2)	
		Respiratory rate	No difference in respiratory rate (*P* = 0.4)	
		Occurrence of atrial fibrillation	Control: 42% Intervention: 39% *P* = 0.6	
Babaee *et al.* (2012), Iran J Nurs Midwifery Res, Iran [3] Randomized trial (level 1b)	72 adult patients undergoing open-heart surgery (CABG) *n* = 36 (usual postoperative care only) (the control group) *n* = 36 (usual postoperative care and massage therapy) Massage details: Duration: 20 min Frequency: once per day Sessions: 4 Timing: days 3–6 post-surgery Location: arms, hands, legs and upper back Specific techniques: Swedish massage stroke level	Profiles of mood states:	The mean difference between pre- and postintervention scores	The authors speculate the improvement in mood states as time elapses may be due to increased confidence, the removal of chest tubes, communication with family, increasing independence, reduced levels of pain and improved sleep quality Improvement in all mood states was found in both the control and intervention groups following intervention. Significance was demonstrated between the control and intervention groups
		Anxiety	Control: -5.4 ± 3.1 Intervention: -16.7 ± 3.8 *P* < 0.001	
		Depression	Control: -7.2 ± 5.5 Intervention: -27.4 ± 7.2 *P* < 0.001	
		Anger	Control: -5.0 ± 4.5 Intervention: -15.8 ± 8.3 *P* < 0.001	
		Ability	Control: 4.2 ± 2.9 Intervention: 16.0 ± 3.3 *P* < 0.001	
		Fatigue	Control: -3.0 ± 0.5 Intervention: -12.7 ± 3.4 *P* < 0.001	
		Confusion	Control: -2.4 ± 0.3 Intervention: -11.5 ± 4.0 *P* < 0.001	
Bagheri-Nesami *et al.* (2014), Complement Ther Clin Pract, Iran [4] Randomized trial (level 1b)	80 adult patients undergoing open-heart surgery (CABG) *n* = 40 (usual postoperative care and a gentle foot rub for 1 min with oil) (the control group) *n* = 40 (usual postoperative care and massage therapy)	Anxiety (Spielberger STAI and VAS: STAI and VAS-A)	The mean difference in anxiety before and after the intervention Day 1 Control: 0.12 Intervention: -0.75 *P* = 0.001 Day 2 Control: 0.00	It is noted that both experimental and control groups experienced an increased level of anxiety on postoperative day 3 (preintervention). It is speculated that this is because patients are worried about leaving the care of the hospital as they near hospital discharge. This is unlikely to have

Continued

Table 1: Continued

Author, date, journal and country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
	Massage details: Duration: 20 min Frequency: once per day Sessions: 4 Timing: days 1–4 post-surgery Location: feet Specific techniques: foot reflexology		Intervention: -0.80 *P* = 0.001 Day 3 Control: 0.00 Intervention: -0.80 *P* = 0.001 Day 4 Control: -0.10 Intervention: -0.80 *P* = 0.001	impacted on the validity of the results
Bauer *et al.* (2010), Complement Ther Clin Pract, USA [5] Randomized trial (level 1b)	113 adult patients undergoing CABG ± valve surgery *n* = 51 (usual postoperative care only) [control] *n* = 62 (usual postoperative care and massage therapy) Massage details: Duration: 20 min Frequency: once per day Sessions: 2 Timing: days 2 and 4 post-surgery Location: hands, arms, shoulders, neck, head, legs, feet and patient preference Specific techniques: deep tissue massage, neuromuscular techniques, trigger point therapy, myofascial release, manual lymphatic drainage, reflexology, acupuncture and Swedish massage therapy	Pain (VAS 0–10) Pain Anxiety Tension Relaxation Opioid requirements	Change in variable after each intervention Day 2 Control: -0.8 ± 1.8 Intervention: -1.5 ± 2.0 *P* = 0.10 Day 4 Control: -0.4 ± 1.4 Intervention: -1.5 ± 1.7 *P* < 0.001 Day 2 Control: -0.6 ± 2.1 Intervention: -1.4 ± 2.4 *P* = 0.09 Day 4 Control: -0.2 ± 1.8 Intervention: -1.7 ± 2.2 *P* < 0.001 Day 2 Control: -1.0 ± 3.0 Intervention: -2.4 ± 2.0 *P* = 0.01 Day 4 Control: -0.3 ± 2.0 Intervention: -2.2 ± 2.2 *P* < 0.001 Day 2 Control: 1.2 ± 3.5 Intervention: 2.1 ± 3.2 *P* = 0.27 Day 4 Control: 0.4 ± 2.1 Intervention: 1.8 ± 2.2 *P* < 0.001 Day 2 Control: 47 Intervention: 54 *P* = 0.38 Day 3 Control: 19 Intervention: 24 *P* = 0.03	While a significant reduction in patient-reported pain was noted in the massage group, there was not a corresponding reduction in the use of opioid analgesia The authors recognize that lack of follow-up focusing on wound healing, infection rate and time to full recovery is a limitation of the study

Continued

Table 1: Continued

Author, date, journal and country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
			Day 4 Control: 5 Intervention: 8 *P* = 0.39	
Boitor *et al.* (2015), Pain Manag Nurs, Canada [7] Randomized trail (level 1b)	40 adult patients undergoing CABG ± valve surgery *n* = 19 (usual postoperative care and 15-min hand holding) (the control group) *n* = 21 (usual postoperative care and massage therapy) Massage details: Duration: 15 min Frequency: 2–3 per day Sessions: 2–3 within 24 h Timing: the same day as surgery Location: hand Specific techniques: nil	Pain intensity (faces pain thermometer 0 = no pain, 10 = worst possible pain) Global experience of pain (Brief Pain Index 0–10. 10 items included: 3 focusing on pain intensity and 7 evaluating pain interference)	No statistically significant results found after the first intervention and second intervention (no values provided) For the third intervention, a statistically significant result was found in favour of the experimental group (no values provided; *P* = 0.008) Average pain in last 24 h (after transfer from the ICU) Control: 3.6 ± 2.1 Intervention: 4.8 ± 2.4 *P* = 0.10	The results following the third intervention need to be interpreted with caution as most patients did not receive this third intervention due to transfer from the ICU (14/19 patients did not receive in the control group and 14/21 patients did not receive in the intervention group), leading to a small sample size for this intervention. No difference between the intervention and control groups relating to early ITU exit. Anxiety levels were not measured which could have influenced postoperative pain intensity
Braun *et al.* (2012), J Thorac Cardiovasc Surg, Australia [6] Randomized trial (level 1b)	146 adult patients undergoing CABG ± valve surgery *n* = 71 (usual postoperative care) (the control group) *n* = 75 (usual postoperative care and massage therapy) Massage details: Duration: 20 min Frequency: 1 per day Sessions: 2 Timing: day 3/4 and day 5/6 Location: shoulder, back, neck, scalp, hands, feet or legs Specific techniques: Swedish massage techniques applied with moderate pressure and using gliding and kneading movements	Pain (VAS) Anxiety (VAS) Blood pressure, heart rate and respirations	Control: 0.32 ± 0.18 Intervention: 1.19 ± 0.17 *P* = 0.001 Control: 0.41 ± 0.24 Intervention: 1.72 ± 0.23 *P* < 0.0001 No significant between-group differences (no *P*-value expressed)	The authors recognize the failure to evaluate analgesia usage as a major limitation. The authors state that the decision to provide the intervention on day 3 or 4 following surgery may be responsible for the significant results, as intravenous lines and tubes had been removed, thus allowing patients to experience the full benefits of the therapy
Najafi *et al.* (2014), Int J Community Based Nurs Midwifery, Iran [8] Randomized trial (level 1b)	70 adult patients undergoing CABG *n* = 35 (receiving standard postoperative care) (the control group) *n* = 35 (receiving standard postoperative care massage therapy) Massage details: Duration: 30 min Frequency: 1 per day Sessions: 1 Timing: day 3 Location: back, lumbar, shoulders, arms, forearms,	Pain (VAS)	The mean difference in pain intensity at 5 time points (±SD) Before intervention Massage: 6.56 ± 1.74 Control: 7.11 ± 1.82 Immediately after intervention Massage: 3.41 ± 1.77 Control: 7.07 ± 1.81 *P* = 0.001 30 min after intervention Massage: 3.01 ± 1.78 Control: 7.09 ± 1.81 *P* = 0.001	The authors recognize the effect of interpersonal relationships as a contributing factor to the benefits of massage

Continued

Table 1: Continued

Author, date, journal and country Study type (level of evidence)	Patient group	Outcomes	Key results	Comments
	hands, thigh, foreleg, soles, abdomen and neck Specific techniques: trained relative provided massage using the Thailand classic method		60 min after intervention Massage: 2.82 ± 1.83 Control: 7.13 ± 1.71 $P = 0.001$ 120 min after intervention Massage: 3.25 ± 1.91 Control: 7.17 ± 1.71 $P = 0.001$	

CABG: coronary artery bypass grafting; ICU: intensive care unit; ITU: intensive theraputic unit; SD: standard deviation; STAI: state-trait anxiety index; VAS: visual analogue scale.

RESULTS

Within the 7 papers representing the best available evidence, there is a significant level of heterogeneity in relation to the massage protocols utilized. The authors describe a wide variation in the duration of each massage session, the frequency of therapy, the specific timing of each massage within the postoperative period, the specific massage techniques used and the experience of the therapy provider. These variations limit generalization of the drawn conclusions, especially in studies with a small sample size.

The effect of massage therapy on anxiety levels was reported in 5 studies. The largest trial as reported by Albert *et al.* [2] is the only study to report that massage does not yield a statistically significant improvement in anxiety. Of the remaining 4 studies reporting on anxiety, all demonstrate a statistically significant improvement in anxiety following massage therapy [3–6]. Babaee *et al.* [3] speculate that therapy is most efficacious from an anxiety perspective when initiated on day 3 post-surgery, as this is the time by which intravenous lines and chest tubing have been removed, sleep quality is improving and patients are communicating more freely with family and the clinical team. Bagheri-Nesami *et al.* [4] were only able to demonstrate a significant improvement on the third day of a 4-day protocol, starting the day following surgery. Additionally, in this study, an increased level of anxiety in both the control and experimental groups were noted before massage on the third day; it is speculated that the reason for this is that patients were worried about leaving the care of the hospital and, thus, increasing the anxiety associated with discharge from the care providers.

Pain in relation to massage therapy is reported in 5 studies. The work by Albert *et al.* [2] failed to demonstrate any improvements following massage therapy over a 3-day period, whereas Boitor *et al.* [7] demonstrated significance after the third session only. Importantly, they recognized the importance of interpreting this result with caution, as the majority of the 19 participants did not receive the third massage as they were transferred from the intensive care unit. Bauer *et al.* [5] despite demonstrating a significant reduction in pain following massage were unable to demonstrate a reduction in the requirement of opioid analgesia. It was also found that on the third day following surgery, the requirements for opioid analgesia were maximal, which led the authors to question whether massage on the second day post-surgery should be moved to the third day. Although both Braun *et al.* [6] and Najafi *et al.* [8] demonstrated significantly improved levels of pain following massage, the validity of these conclusions needs to be considered, as the requirement for analgesia was not evaluated. Additionally, Najafi *et al.* [8] recognized that the positive results relating to pain control following massage need to be contextualized as the masseuse was a family member, which may represent a confounding factor.

In addition to evaluating levels of anxiety and pain, the included studies provide a number of other outcomes with clinical utility. Of the 3 studies reporting on physiological changes following massage therapy, only Bauer *et al.* [5] demonstrated any significant difference noted in the respiratory rate on day 2 and day 4. No study demonstrated any physiological benefit relating to blood pressure or heart rate. Furthermore, Albert *et al.* [2] found that massage therapy was not associated with a reduction in the development rate of atrial fibrillation.

CLINICAL BOTTOM LINE

There is significant heterogeneity in randomized trials reporting on the effects of massage therapy. Although there is evidence to suggest that massage therapy reduces pain and anxiety following cardiac surgery, there are often caveats to the conclusions drawn with other studies reporting no significant difference. Therefore, in light of this, it would be inappropriate to recommend massage therapy as an effective therapy. There is no current evidence to suggest that massage therapy improves physiological parameters, including the onset of atrial fibrillation.

Conflict of interest: none declared.

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