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A study on the impact of foot and hand massage on postoperative pain and sedative drug use in cardiac surgery patients

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This study was conducted to determine the effects of foot and hand massage on postoperative pain and sedative drug use in cardiac surgery patients. One of the most important problems and complaint that have been experienced by patients who are influenced by surgery is the pain. Physiological responses to pain create harmful effects on the body recovery after cardiac surgery, and they routinely report mild to moderate pain even though sedative drugs have been administered. This study was a clinical trial performed in the intensive care cardiac unit (ICCU) and cardiac surgery ward of Gollestan hospital, dependent on Jondishapour University of Medical Sciences in Ahwaz city, Iran. Sixty-five patients were selected based on aim and randomly assigned to either control (n = 33) or massage group (n = 32). The massage group received a 20 min foot and hand massage (each extremity 5 min) and control group rested in bed and researcher was near them for 20 min. Pain intensity measured by visual analogue scale and other variables were measured by check list before and after intervention in two groups. There was statistically significant difference on the pain intensity and type, and amount of sedative drug used between the two groups after intervention (massage) (p-value = 0.000). According to the obtained findings, first and second hypothesis were approved, and the pain was reduced by hand and foot massage. Our study supports the effectiveness of massage in postoperative cardiac surgical pain.

Key words: Foot and hand massage, cardiac surgery, pain.

INTRODUCTION

One of the most important problems and complaints experienced by patients undergoing surgery is the pain. They routinely report mild to moderate pain even though they were administered sedative drugs. Postoperative pain is one of the acute pain features (Monahan et al., 2007; Smeltzer et al., 2008). Physiological response to pain may cause harmful effects on the recovery of the body after cardiac surgery (Wang et al., 2004).

Postoperative pain for the adult patients who undergo cardiac surgery has many facets. Pain may be caused by incisions (Walsh et al., 1997), intra-operative tissue retraction and dissection, multiple intravascular cannulations, chest tubes insertion after surgery, and multiple invasive procedures that patients undergo as part of

their therapeutic regimen (Ignatavicius et al., 1995). Pain has been pointed out as one of the primary sources of concern to ICU patients and similar findings have been reported for cardiac surgery patients as well (Monahan et al., 2008; Mueller, 2000). Uncontrolled postoperative pain may lead to a variety of complications in cardiovascular, immunity (Hancock, 1996; Ignatavicius et al., 1995), respiratory (Stenseth et al., 1996), metabolic, endocrine (Smeltzer et al., 2008), mentality systems (Lynch et al., 1998) and also increase immobility, thrombosis, emboli (Smeltzer et al., 2008), lengthened hospitalization and increased costs (Stenseth, 1996). Pain management in cardiac surgery is becoming more important with the establishment of minimally invasive direct coronary artery bypass surgery and fast-track management of conventional cardiac surgery patients (Roediger, 2006).

Thus, pain relief is very important for the recovery speed and going back to previous activities in patients, this point deserves emphasis. The most common

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intervention for pain control is analgesic medications. In many people, analgesic medications can have unpleasant side effects (Perry and Potter, 2006; Smeltzer et al., 2008). There has been an explosion of pain literature and research in the last three decades, but few studies have focused on postoperative pain of cardiac surgery patients. However, most of them focused on pain intensity. Pain intensity provides a useful measure to recognize the amount of pain perceived by the patient and a useful comparison with other painful experiences (Mueller, 2000).

Complementary strategies based on sound research findings are needed to supplement postoperative pain relief using pharmacologic management (Monahan et al., 2007). Massage therapy has a long history in cultures around the world. Today, people use many different types of massage therapy for a variety of health-related purposes. Although scientific research on massage therapy - whether it works and, if so, how - is limited, there is evidence that massage may be beneficial for some patients. Conclusions generally cannot yet be drawn about its effectiveness for specific health conditions (National Center for CAM, 2009).

In recent years, many studies have been done about massage therapy and most of them are related to the last 200 years (Grealish et al., 2000). Some studies show that massage has useful effects on cardiac, respiratory, endocrinology and immunity systems (Kim et al., 2001), mentality, anxiety and stress (Tappen et al., 1998). Primarily, complementary and alternative medicine (CAM) has some conventional uses. According to the National Health Interview Survey in 2007, which included a comprehensive survey of CAM use by Americans, it was estimated that 18 million U.S. adults and 700,000 children had received massage therapy in the previous year (National center for CAM, 2009).

Evidence is emerging that massage therapy may be an important component of the healing experience for patients after cardiovascular surgery (Brent et al., 2010). Nurses have used complementary therapies for many years to relieve anxiety, promote comfort, and reduce or alleviate pain (Monahan et al., 2007; Smeltzer et al., 2008).

Aim

This study was designed to evaluate the impact of foot and hand massage on postoperative cardiac pain and amount of analgesic drugs needed in the ICCU and cardiac surgery wards.

RESEARCH DESIGN

This was a randomized controlled trial which was done in educational Golestan hospital (ICCU and cardiac surgery wards). This hospital is related to the Ahvaz Jondishapur Medical University of Sciences located in Ahvaz city in south west area in Iran between 2005 and 2006.

Sampling size and participants

Sixty five patients who underwent cardiac surgery enrolled for the study. Sampling method was done continuously, while screening was done according to the factors included in the study. In this study, of 65 patients, 25% were female and 40% were male, 63% were married and 2% were single. Twenty seven of the participants were illiterate while 6% finished high school. Almost all patients in the two groups (64%) underwent general anesthesia and only one took spinal. Results showed that there was no significant difference between both groups regarding age, sex, marital status, educational level, anesthesia method, history of surgery, hospitalization and also pain severity ($p > 0.5$).

In the first postoperative night, patients were randomly (according to even or odd hospitalization day) assigned to either control ($n = 33$) or massage group ($n = 32$). Inclusion criterion included; having ability to answer to the interviewer's questions. Exclusion criteria included; hands and feet amputation, any problem related to vessels and blood, diabetes, visual disorders, hearing disorders and also hypersensitivity to hand and foot massage. Moreover, individual should not be dependent on oxygenation apparatus.

Data collection

Massage technique was included: finger kneading, thumb kneading (Margaret, 1998) and stroking (Sandy, 2004). At first, hands and feet were massaged from the base of fingers to the wrist, using the thumb and other fingers of one of the researchers (thumb kneading and finger kneading). Then massage continued on the hand and foot with the thumb transversing than the length of the base of the fingers to the wrist for heart massage (thumb kneading). At the next stage, fingers and toes were massaged, after which each finger between two fingertips was rotationally massaged in tension (finger kneading). Finally, the hands and feet, both ventral and dorsal, were massaged to the heart by palms (stroking).

The intervention group received a 20 min foot and hand massage, 5 min for each extremity at a time. Control group received routine nursing care and rested in the bed for the same time (20 min) while researcher was beside them (for emotional consideration). Then, pain intensity measured by visual analogue scale (VAS) and other variables were measured by check list before and after massage in two groups.

This study was approved by ethical committee of Ahvaz Jondishapur Medical Sciences University in Iran.

Data analysis

The statistical package of social sciences (SPSS) version 12 was used to analyze the data. Descriptive statistics and percentages for variables determined by counting mean and SD. Independent t-test was used to investigate differences between two groups and paired t-test was used for determine differences before and after in each group for variables which met parametric test assumption. The Mann-Whitney test was used for variables that did not meet these assumptions. The chi-square test was used to analyze the relationship between two variables in case of non-continuous data. P values < 0.05 accepted as statistically significant.

RESULTS

Table 1 shows socio-demographic and physical characteristic of case and control groups. Both groups were matched for age, sex, marital status, hospitalization times, education level and surgery history.

Table 1. Socio-demographic and physical characteristic of case and control groups.

Characteristic	Case (N=32)	Controls (N=33)	P value
Age mean	52.03	52.15	N S
Sex {N (%)}			N S
Male	20(62.5)	20(60.6)	
female	12(37.5)	13(36.4)	
Marital status N (%)			N S
Single	1(3.1)	1 (3)	
Married	31(96.9)	32 (91)	
Hospitalization times {N (%)}			N S
No time	7 (21.9)	11(33.3)	
One time	12(37.5)	14(42.4)	
Two times	10(31.3)	4 (12.1)	
≥three times	3(8.3)	4 (12.1)	
Education level {N (%)}			N S
illiteracy	13(40.6)	14(42.4)	
Primary school	6 (18.8)	6 18.2)	
Secondary school	5 (15.6)	6 (18.2)	
High school	5 (15.6)	4 (12.1)	
Diploma or university	3(9.4)	3(9.1)	
Surgery history {N (%)}			N S
Without	17(53.1)	17(51.5)	
≥ one time	15(46.9)	16(48.5)	

Table 2 indicates intensity pain in both groups before and after cardiac surgery. The results reveal that there was no statistically significant difference between two groups for pain intensity before massage; however, they had significant difference in pain intensity immediately, and 24 h after intervention. The pain severity of intervention group was significantly lower than the control group ($p > 0.001$).

Table 3 shows that both groups had statistically significant difference for time and the kind of sedative drug which used PRN (as needed) ($p < 0.001$); this means that massage group demanded sedative drug less than the control group.

DISCUSSION

According to the present study results, there was no significant difference between intervention and control groups for pain severity before massage administration, but there was significant difference between the groups immediately after massage and 24 h after intervention. Clinical trials have shown that 20 min foot and hand

massage significantly reduced both pain intensity and distress resulting from incisional pain on the first postoperative day (Wang and Keck, 2004).

Hattan and King (2002) studied effects of foot massage and conducted relaxation on physiologic factors (pain, calm, anxiety, etc.) of 25 patients after coronary arteries by pass surgery. They did not find any significant relationship between foot massage and pain relief ($p > 0.05$). They suggested that other studies should be performed with more research sample size. It seems that in the study of Hatta and King (2002), the small sample size was a reason for non significant results. Brent et al. (2010) conducted a similar clinical trial on 113 patients (62 massage, 51 control). Massage group showed significant decrease in pain, anxiety, and tension after the intervention and they were highly satisfied and no major barriers to implementing massage therapy were identified. These researchers suggested massage therapy may be an important component of the healing experience for patients after cardiovascular surgery.

Moreover, we found significant difference between intervention and control group. Massage stimulates non-painful nerve fibers and releases

Table 2. Comparison of pain severity in the intervention and control groups.

Groups	Control		Cases		Mann witney	Kruskalwalis	z	p-value
	Frequency	Mean	Frequency	Mean				
Before massage	33	4.6970	32	6.3750	501.50	1062.500	-0.364	0.716
Immediately after massage	33	4.5152	32	2.0938	114	642	-0.028	0.00
24 h after massage	33	3.8788	32	1.6250	198	726	-4.339	0.00

Table 3. Distribution of participants according to need for analgesic drugs.

Groups	Control		Case		Total
	Frequency	Percent	Frequency	Percent	
None	7	21.3	25	78.1	32
Morphine 2 mg	21	63.6	6	18.8	27
Morphine and pethedine 25 mg	2	6.1	0	0	2
Morphine and suppiteri	2	6.1	0	0	2
Bruphen	1	3	1	3.1	2
Total	33	100	32	100	65

P=0.00.

endorphins; it has the potential ability to assist in pain relief (Wang and Keck, 2004). Massage is a cutaneous stimulation that uses touch and movement of muscle, tendon and ligament without manipulation of joints for pain relief (Perry and Potter, 2006). Related to this, Wang and Keck (2004) studied effects of hand and foot on pain severity after general surgeries (urology, gastrointestinal, gynecology, head and neck) in India. The patients experienced moderate pain after they received pain medications. This pain was reduced by the massage; the effectiveness of massage in postoperative pain management was supported. Foot and hand massage appears to be an effective, inexpensive, low-risk, flexible, and easily applied strategy for postoperative pain

management. These results confirm our results. Chang's findings also suggest that massage is a cost-effective nursing intervention that can decrease pain and anxiety during labour in 60 primiparous women (Chang et al., 2002), where there is need to use sedative drug (p= 0.00). This result is similar to that of Eghbali et al (2010) study in Iran. They studied the effects of hand and foot massage on postoperative patients who underwent arthroscopic knee surgery patients (p = 0.001).

Conclusion

Our results suggested that a 20 min hand and foot

massage intervention could be adjunct to analgesic agents to control the postoperative pain of cardiac surgery. This decreases the doses of analgesics and increase calmness level of these patients.

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