

The Effect of Music Therapy on Chest Tube Removal Pain in Patients Undergoing Heart Bypasses Surgery

Sajad Yarahmadi^{1*}, Mohammad Gholami¹, Mandana Saki¹, Tayebeh Cheraghian²,
Razieh Shirzadegan¹

¹Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran

²Student Research Committee, Lorestan University of Medical Sciences, Khorramabad, Iran

ABSTRACT

Chest Tube Removal (CTR) is a painful procedure that may not respond well to palliative therapies, and there are no selected and recommended procedures or guidelines to manage CTR pain. This study aimed to examine the effect of music therapy on pain reduction during and after CTR. This study was a randomized clinical trial with a control group that was conducted on 90 hospitalized patients undergoing heart bypass surgery in intensive care units where they had at least one pleural chest tube. Patients were randomly divided into two groups with 45 participants in each group. Music was played for the patient by headphone in Group A from 15 minutes before until 15 minutes after CTR, and only usual interventions were executed for chest tube removal in Group B. The pain severity was measured in two groups before, during and 15 minutes after chest tube removal by visual analogue scale. ANOVA with repeated measures tests was employed for data analysis. There was no statistically significant difference in the baseline pain scores among the study groups ($P=0.53$). There was no statistically significant difference between pain severity scores during chest tube removal among the music group (4.93 ± 1.06) and the control group (4.73 ± 1.08) ($P=0.36$). There was no statistically significant difference between the pain severity scores 15 min after chest tube removal between the two groups ($P=0.31$). Music therapy as a non-pharmacological intervention does not affect the pain relief caused by CTR.

Keywords: Chest tube, Pain, Music therapy, Visual Analog Scale

Introduction:

Cardiovascular diseases is one of the most common diseases with the highest rate of mortality and causes more than 16 million deaths in each year [1, 2]. Heart surgery is the most frequent intervention to treat ischemic heart diseases and cardiac valve diseases [3]. Thousands of patients with cardiovascular diseases usually undergo a surgery on vascular or valvular diseases in both developed and

developing countries in each year, in addition, it has been reported that almost 25 thousand cases is undergoing heart surgery on vascular and valvular problems in Iran every year [4].

In order to facilitate lung expansion and drainage of secretions from chest cavity to out, it is necessary to insert at least one chest tube post-operatively in all types of cardiac surgeries. Typically, chest tubes are removed

* Corresponding author: Fatemeh Ghasemi
Nursing and Midwifery Faculty, Lorestan University of Medical Sciences, Kamalvand Campus,
Khorramabad, Iran; Telefax: 06633120140 E-mail: s.yarahmadioo@gmail.com

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24-48 hours after cardiac surgery when the volume of drainage is less than 100-150cc in patients who have normal respiratory sounds within 24 hours [5]. Chest Tube Removal (CTR) is considered as a painful procedure and debilitating experience for all patients [6]. A medium to severe level of pain has been experienced and reported by patients during CTR and there is no selected and recommended procedure and guideline to manage CTR pain [7]. Pain relief can reduce cardiovascular and pulmonary complications [8].

Relieving of medium to severe level of pain, which causes by painful interventions such as CTR, is generally based on administration of narcotic drugs. Although use of narcotic drugs is typically efficient to relieve such pain, the studies have shown that CTR is still recognized as a painful intervention despite of applying narcotic medications and local anesthetics [9]. Besides, narcotic medications have some significant side effects including respiratory depression, drowsiness, nausea, and vomiting. Using non-narcotic medications have also unfavorable side effects that these side effects can limit to apply non-narcotic analgesia [10]. Today, nurses and medical staff use non-pharmacological interventions during CTR in order to reduce pain severity as well as to reduce administration dosage of narcotic medications [11].

Music therapy, relaxation, touch therapy, diathermy, cold therapy and acupuncture are some of common non-pharmacological pain relief interventions. These interventions provide patients independence and they are simple and can apply by simple equipment. In addition, they are accepted easily by all of patients and have no significant negative consequences and effects as like as pharmacological interventions [12]. Music therapy is a commonly used non-pharmacological intervention in intensive care units for pain relief [13]. The conducted studies show that music therapy is efficient intervention to manage patients' pain during painful procedures such as pain, anxiety, and vital signs in patients after thoracic surgery [14, 15]. Use of music for pain relief is the most

common and simplest intellectual deviation which should be proportionate with the spirit of the person [12] So the aim of this study to assess the effect of music therapy on chest tube removal pain in patients with heart bypasses surgery

Materials and Methods

This study is a randomized clinical trial with a control group which conducted from February 2016 to August 2016. The study was carried out in a single center in the Cardiac Surgery Intensive Care Unit (CSICU) of Shahid Madani Hospital, Khorramabad, Iran. It is a specialized referral hospital for various types of cardiac surgeries with 100 beds, featuring different departments, such as echocardiography, angiography, angioplasty, electrophysiology, coronary care unit and cardiac surgery intensive care units for men and women patients. The inclusion criteria were age of 18 - 65 years; having at least one pleural chest tube of which it has not passed less than 24 hours and more than 120 hours from time of insertion, absence of vision or hearing problem, ability to give response suitably to questions of researcher, no history of mental disorder, Not addicted to drug abuse or alcohol, Body Mass Index (BMI) < 30kg/m², no narcotic and sedative medication one hour before CTR, non-receiving of supportive mechanical ventilation and enthusiastic to listen folk and traditional music. In the present study, 90 eligible subjects were divided into the music application (group A) and control groups (group B). In A-group, use of music 15 minute before until 15 minutes after CTR and control group received routine measures based on ward's policy and procedure.

The exclusion criteria were having a higher score of a pain more than 7 at the beginning time of intervention, lack of inclination in the continuance of cooperation, using narcotic or sedative medication during the intervention and sudden changes in vital signs of patient. The sample size was calculated based on a prior study in which Mazloun et al [16] investigated the effect of applying cold on pain intensity

associated with chest tube removal after cardiac surgery and reported that the Mean± Standard deviation of pain intensity after the intervention in cold group, placebo and control groups were 0.6 ± 0.7 , 2.0 ± 2.6 and 1.9 ± 1.9 , respectively. Then, based on the mentioned study and considering $\beta=0.2$, $\alpha=0.05$, $S1=2.3$, $S2=2.7$, $\mu1=2.45$ and $\mu2=4$, 41 subjects were estimated to be needed in each group. However, we recruited 45 patients in each group to compensate probable attritions and achieve more reliable results and the sample size for the study was 90 post-heart bypass surgeries that they were admitted to Cardiac Surgery Intensive Care Unit (CSICU).

Ninety eligible patients were randomly allocated to either the music therapy group or the control group using randomized fixed quadruplicate blocks. The sampling method was convenience method and assigned to groups. Our subjects had an equal probability of being assigned to each of the two groups.

A data recording form was utilized for data collection that included two parts. The first part was used for recording basic and demographic data including ten questions such as age, sex, education, occupation, marital status andThe checklist was developed reviewing relevant literature, and its content validity was confirmed by 10 faculty members in Iran University of Medical Sciences. The second part was utilized to determine pain severity through Visual Analogue Scale (VAS). In this tool, a score of zero indicates no pain and score-10 shows the worst pain imaginable and study samples indicated the severity of pain on VAS. Numerous studies have used this scale to measure pain severity in heart surgery patients [7, 17]. Patients were familiarized with VAS instruction and method in this study before CTR.

Surgery was performed by one surgeon, and surgical methods were similar in patients. Anesthesia was executed in subsequent with a standardized protocol for heart surgery in both groups. Chest tubes diameter was similar in both groups [Fr=14-16].

Before intervention some information was given to the participants in this study about the

music therapy. The chest tubes were removed using a similar technique and based on clinical guidance by five experienced and employed nurses in CSICU.

Data were collected by another nurse who was not in the research study team to prevent from bias in data collection. Patients were placed in semi fowler's position with a pillow under their head and shoulder to achieve more comfort in order to execute intervention in this study, and their tough cloths were taken off. In music group, a list of music was played for study samples using MP3-Player for 15 minutes before CTR and through 15 minutes after CTR. The music list was consisted 15 folk and traditional pieces which have been prepared by a musician who was familiar with folk and traditional music. Study samples select optional music from the list. Music pieces were played at maximum sound level of 60db. Pain score was measured in patients from two groups before starting interventions, during, and 15 minutes after CTR using VAS.

The collected data were analyzed by means of SPSS soft ware version 16. Descriptive statistics were employed for summarizing demographic information of participants in this study. Chi-square test and t-test were utilized to compare basic and demographic data. The method of ANOVA with repeated measures was used for comparing pain score in each group at different times. ANOVA test was used for comparing pain score between groups at any time. P values of <0.05 were considered statistically significant.

Ethical consideration: Ethical approval for the study was obtained from the Ethics Committee of the Iran University of Medical Sciences, Tehran, Iran. The study was also recorded in Iran Clinical Trial Registration Center under the code of IRCT2016012626217N1. The study participants comprised of all patients who had been operated under heart bypass surgery in Shahid Madani Hospital. Before enrollment in the study, informed consent was obtained from each participant.

Results

Among total 90 patients, one patient in music therapy group and one patient in the control group were excluded from this study because of having pain score higher than 7. After excluding these cases from the survey, data from 88 patients were finally analyzed. The mean age of participants was 58.4 ± 7.4 years in this study. Among total studied samples 67% were male. Most of the participants in this study were operated under CABG surgery

(82.9%). There was no significant difference between the two groups with regard to the other baseline characteristics, such as: sex, Body Mass Index (BMI), education, occupation, marital status, type of surgery, history of presence of chronic pain before surgery, history of taking painkiller regularly before surgery and history of experience of chest tube before surgery ($P > 0.05$) (Table 1).

Table 1: Demographic characteristics of patients undergoing CABG in two groups of study

Characteristics	Music	Control	<i>p value</i>
Age, y	60±5.7	56.8±9.2	P=0.05*
Gender			P=0.82**
Female	14(31.8%)	15(34.1%)	
Male	30(68.2%)	29(65.9%)	
BMI			P=0.77 **
18.5>	2(4.5%)	3(6.8%)	
18.8-24.9	24(54.5%)	21(47.7%)	
25-29.9	18(40.9%)	20(45.5%)	
Education			P=0.57 **
Illiterate	13(29.5%)	16(36.4%)	
Under Diploma	14(31.8%)	17(38.6%)	
Diploma	13(29.5%)	9(20.5%)	
University	4(9.1%)	2(4.5%)	
Employment status			P=0.26 **
Unemployed	3(6.8%)	3(6.8%)	
Housewife	9(20.5%)	10(22.7%)	
office worker	16(36.4%)	23(52.3%)	
Retired	16(36.4%)	8(18.2%)	
Marital Status			P=0.42 **
Single	1(2.3%)	4(9.1%)	
Married	34(77.3%)	33(75%)	
Divorced	3(6.8%)	1(2.3%)	
Spouse has died	6(13.6%)	6 (13.6%)	
Type of surgery			P=0.29**
Valve surgery	8(18.2%)	7(15.9%)	
CABG	36(81.8%)	37(84.1%)	
History of chronic pain			P=0.24 **
YES	5(11.4%)	9(20.5%)	
NO	39(88.6%)	35(79.5%)	
History of taking analgesics			P=0.50 **
YES	6(13.6%)	4(9.1%)	
NO	38(86.4%)	40(90.9%)	
Experienced chest tube			P=0.13 **
YES	6(13.6%)	2(4.5%)	
NO	38(86.4%)	42(95.5%)	

Table 2: Comparison of pain intensity scores among the study groups at different time

Study Group	Before intervention Mean(SD)	Immediately after CTR Mean(SD)	15min after CTR Mean(SD)	Repeated measures analysis Mean(SD)
MUSIC	2.07±1.14	4.93±1.06	1.07±0.66	F=33.79 P<0.001
COTROL	1.91±1.21	4.73±1.08	0.89±0.97	F=31.42 P<0.001
ANOVA	T=0.63 P=0.53	T=0.89 P=0.36	T=1.03 P=0.31	F=61.89 P<0.001

** *Chi Square* * T test

In Table 2 the pain severity score means for the music and control groups are indicated based on the measurement times for the pain related to the CTR. There was no significant difference between the two groups in both stages of intervention (Table 2).

Discussion

Findings of the present study showed that music therapy had no effect on reducing pain caused by CTR. In comparison with mean scores of pains before and 15 minutes after CTR, pain intensity indicated significant increase in both groups immediately after CTR and this indicates CTR is a painful procedure for patients. Different studies show similar results [18, 20-22]. No study was found during conducted inquires that indicated music therapy was efficient in reducing pain caused by CTR, but different studies have been conducted that showed music therapy might be effective on pain relief caused by labor [23], endotracheal suction [15], thoracic surgery [14] and spinal anesthesia [24]. One can refer to type of various nature of pain in these interventions as possible reasons for this contradiction. The results of Broscious's study indicated that music therapy had no effect on pain caused by CTR [25] that is similar to results of current research. Nonetheless, in addition to control group on which only usual interventions were done in study of Bursious, a group of white sound was also designated for patient as well where usual sounds were recorded and played for patient by headphone. Period of playing music was 10 minutes before

CTR in study of Bursious while period of playing music was between 15 minutes before and after CTR in current research.

The results of studies done by Safdari and Rafiei showed that in comparison with control group, music therapy and Hoku point ice massage each of which might be efficient to relieve labor pain [23], but it was seen in our study that music therapy had no effect on reducing pain caused by CTR. One can refer to difference in type of pain and period of pain as possible reasons for this paradox because the pain caused by CTR is of sharp and burning type and it lasts for shorter time [26] while labor pain is followed by pressure, rhythmic, and longer time [27] Similarly, it can be referred to difference in type of played music among two studies as one of the other reasons. Safdari and Rafiei played music for patient in 30 minutes similar to the present study and patient was responsible for selection of music. Unlike present study, Safdari and Rafiei did not checked twin effect of two interventions.

Results of study done by Bastani et al indicated that acupressure had no effect on reducing pain 15 minutes after CTR [28] while studies of Payami [22], Mazloun [16], Hasanzadeh [17], Gorji [19] and Friesner showed that implementation of non-pharmacological techniques of pain relief might be efficient in reducing pain severity 15 minutes after CTR. It is seen studies of Payami, Hassanzadeh, Gorji, and Friesner that oral and injection sedative treatment have been taken along with non-pharmacological interventions but patients received no sedative treatment based on usual instruction at intervention day

in current study and survey of Bastani et al. With respect to long half-life of drugs compared to period of effect of non-pharmacological therapies, it can be implied the pain score was reduced 15 minutes after CTR because of taking medicinal therapies.

It was seen that music therapy had no effect on pain relief during and after CTR and music therapy at this time as well.

One can refer to limitations of this study as execution of CTR by five different persons so that of course it was tried to reduce effect of this factor by training for use of similar technique for execution of CTR.

Study samples might express different response against pain with respect to physical, emotional, and cultural status as well as subjective nature of pain and create some biases in results although such potential biases were minimized by means of randomization design.

In conclusion, the results show that music therapy as non-pharmacological intervention has no effect in pain relief caused by CTR. Nevertheless, it recommends that a study with larger number of samples to conduct in order to confirm findings in the present study. One of the possible constraints of this study, which led to not seen significant statistical difference between the control and intervention group, is may be that the control group away from the eye of the team of analgesics or opiates to relieve pain Patients have used this, which is needed in more detail in other studies.

Conclusion

The results of the study did not show a statistically significant difference between pain relief in the intervention and control groups. It is suggested that the study should be done with consideration of the limitations of this study and in the larger society by observing and controlling the limitations.

Conflict of interests

The authors have no financial interest related to this article.

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