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CLINICAL TRIAL STUDY

The Effect of Distraction with a Loved One's Voice on Pain Reduction While Extracting the Chest Tube after Open Heart Surgery

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Abstract:

Background:

One of the forms of ost-operative care after open heart surgery is controlling the pain resulting from chest tube insertion. Management of pain is considered vital and requires the awareness of health care providers. One of the main responsibilities of nurses is to prepare patients for invasive procedures such as the removal of the chest tube. This study was designed to analyze the impact of a loved one's voice for distraction in patients undergoing open heart surgery.

Methods:

This study was a clinical trial. The research sample was randomly selected from patients undergoing open heart surgery. In this study, the number of samples for each group was considered to be 64 people, where the total number of samples was 128 people. The data collection tools included Visual Analog Scale (VAS) assessment tool and a researcher-made questionnaire. After selecting the eligible samples and obtaining the informed consent, each patient was randomly assigned to one of the two groups (intervention group and control group). The pain was measured before, immediately, and 10 minutes after removing the chest tube.

Results:

The findings of this study indicated that the two groups had no statistically significant differences in pain before chest tube removal. The mean pain during chest tube removal and 10 minutes later in both groups indicated a significant difference based on Mann-Whitney test ($P<0.001$).

Conclusion:

This study showed that a loved one's voice is effective in reducing pain during chest tube removal after open heart surgery.

Keywords: Distraction, Pain, Chest tube, Open heart surgery, Visual Analog Scale (VAS), Mann-Whitney.

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1. INTRODUCTION

Over the last two centuries, incidence of heart disease has been rising. However, developments in new treatments such as thrombolytic therapy, angioplasty by balloon, laser, and atherectomy have led to great advances in the medical measures for the management of cardiac patients. Therefore, surgery is still the only choice of treatment for many cardiac patients. The nature of heart surgery demands 1-3 days of hospitalization in ICU [1]. In patients undergoing open heart surgery, some chest tubes are inserted in the pleural cavity in the intercostal area and below the xiphoid area to prevent pneumothorax and hemothorax [2]. One of the forms of care after open heart surgery is controlling the pain resulting from the chest tube insertion [3]. Chest tubes are usually removed 2-3 days after surgery, when air, fluid and blood have been properly evacuated. The pain of chest tube removal is described as one of the worst experiences of ICU patients [4].

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Management of pain is one of the vital signs or sometimes known as the fifth vital sign. The unrelieved pain after surgery may be associated with clinical and physiological changes, and could cause morbidity, mortality, and costs, and reduce the quality of life [5]. Pain management is one of the oldest human needs and the main task of nurses [6].

Pain assessment tools should be simple to understand and use. One of these measures is a 10-inch horizontal line, whose ends represent the minimum and maximum pain [5]. Although painkillers are the most powerful tool available to relieve the pain, they are not the only solution. The combination of non-pharmacological interventions with drugs may be a more effective way to relieve pain [7]. Distraction is one of the non-pharmacological ways to reduce pain. In this technique, setting a stimulus as the focus of attention, the attention of the person to other stimuli is reduced [8]. Distraction is a nursing intervention distracting the patient's attention to stimuli that reduce pain thereby leading to better pain control [9]. There are several methods for distraction used for acute pain including music, mental imagination, revocation imagination, watching TV, hypnosis, cutaneous stimulation, massage, hydrotherapy, warmth, singing, rhythmic breathing, modeling, and describing images [8].

Some painful interventions that can be relieved by distraction include sucking cerebrospinal fluid under local anesthesia, debridement of burn wound or other wounds, changing bandage, removing the catheter and drainage pipes, sampling various tissues or different types of injection and blood sampling, the pain caused by movement such as from bed to chair, as well as placing catheter and bladder catheterization [10]. It is not clear whether distraction raises the pain threshold or increases the individual's pain tolerance. Most patients who relieve their pain by distraction techniques report their ability to push the pain outside their scope of consciousness [11]. The aim of distraction technique is to strengthen the relationship between doctors and patients, more adaptation with pain for the patient, preventing stress and anxiety, and reducing pressure on the members who are sensitive to pain. Helping patients to use methods of distraction, medical staff contribute to reducing fatigue, harmful effects and mood swings resulting from pain. It also increases the ability to solve problems by adopting the right solutions and increasing their confidence and self-control to cope with the pain.

Given the severe pain of patients while removing the chest tube, this study was designed to analyze the impact of a loved one's voice for distraction in patients undergoing open heart surgery.

2. METHODS

This study was a clinical trial conducted in 2013 in Shafa educational hospital affiliated with Kerman University of Medical Sciences. The research sample was randomly selected from patients undergoing open heart surgery. In this study, inclusion criteria were the patients undergoing open heart surgery, with a chest tube, vigilant and volunteer for coordination, aged up to 18 years old. Also, the patient's loved one was available for voice recording. On the other hand, the exclusion criteria included people who had a hearing, visual, and mental impairment, and those with drug addiction.

To determine the sample size, using the study by Montgomery (2000) and by selecting alpha and power of 5% and 80%, respectively, the number of samples for each group was considered to be 64 people, where the total number of samples was 128 people [12]. The data collection tools included Visual Analog Scale (VAS) assessment tool and a researcher-made questionnaire.

The questionnaire consisted of three parts. The first part had 5 questions related to demographic characteristics; the second part included the VAS assessment tool for assessing the amount of pain involving three parts (the amount of pain before the intervention, immediately after the intervention, and 10 minutes after the intervention); finally, the third part included 5 questions related to the surgical operation.

VAS assessment tool, which was in the second part of the questionnaire, consists of a 10 cm horizontal line, whose ends represent the minimum and maximum pain. Validation of VAS has been proven many times and mentioned in nursing books. The questionnaire and VAS assessment tool have been attached at the end of the article.

Content validity method was used to verify the validity of the questionnaire. After reading books and scientific papers, the questionnaire was prepared and given to 10 members of the Faculty of Nursing, Midwifery at Shahid Beheshti University of Medical Sciences. Also, the necessary corrections were made and guided by supervisors and advisors. The researcher began the work after acquiring the code of ethics with No. 312.433 from the ethics committee.

After selecting the eligible samples and obtaining the informed consent, each patient was randomly assigned to one of the two groups (intervention group and control group). Concerning the randomization method, the patients with the odd numbers entered the intervention group while the patients with the even numbers entered the control group.

In both groups, the standard postoperative cares were provided by surgeons and nurses according to cardiovascular protocols. In the intervention group, the voice of patient's loved one was recorded the day before removing the drain by a tape recorder in the waiting room for 5 minutes. The content and the start of each recorded message announced the person the time, location and expression of sweet memories, ended with phrases such as healing the sick and his return to the family. The recorded voice of the loved one was played for the patient with headphones a few minutes before the last moments of removing the chest tube until its end. Then, using pain intensity assessment scale, the pain was measured before, immediately, and 10 minutes after removing the chest tube. In the control group, without the intervention, the pain was assessed before, immediately, and 10 minutes after removing the chest tube. In order to achieve the objectives, descriptive statistics, chi-square test, independent t-test, analysis of variance with repeated measures, and Mann-Whitney test were used to analyze the data and describe the numerical results. SPSS-16 statistical software was utilized for statistical calculation. Alpha 0.5 was considered as the level of significance.

Table 1. Comparison of demographic variables in both intervention and control groups before intervention.

Variables	Control Group	Intervention Group	Statistic Test
Age	58	51	T=3.01 DF=126 P=0.8
Sex: Male Sex: Female	73.4% 26.6%	62.5% 37.5%	DF=1 P=0.18 x^2=1.75
Education	Illiterate:34.4 Under the diploma:45.3 Diploma:15.6 Educated:4.7	Illiterate:25 Under the diploma:48.4 Diploma:17.2 Educated:2.4	Fisher Exact Test P=0.5
Underlying disease	Diabetes:15.6 Hypertension:31.2 Both of them:25 No disease:28.1	Diabetes:18.8 Hypertension:34.4 Both of them:7.8 No disease:39.1	DF=3 P=0.06 x^2=7.17
Loved one's voice		Parents:10.9 sister and brother: 7.8 Spouse: 42.2 Child and grandchild: 39.1	
Chest Tube location	Left Chest Tube: 59.4 Right Chest Tube: 6.2	Left Chest Tube: 54.7 Right Chest Tube: 7.8	Fisher Exact Test P=0.8

Table 2. Comparison of the mean pain before, during chest tube removal and 10 minutes later in both groups

Time	Control Group	Intervention Group	P value
pain before chest tube removal	1.42	1.34	P>0.05
pain during chest tube removal	7.42	3.25	P<0.001
10 minutes after	1.9	0.2	P<0.001

3. RESULTS

All the patients in both groups were homogeneous in demographic characteristics and disease characteristics (Table **1**).

The findings of this study indicated that the two groups had no statistically significant differences in pain before chest tube removal. The mean pain during chest tube removal and 10 minutes later in both groups indicated a significant difference based on Mann-Whitney test (Table **2**).

The findings revealed that the two groups had no statistically significant differences in pain before chest tube removal. The mean pain during chest tube removal and 10 minutes later in both groups showed a significant difference based on Mann-Whitney test (Fig. **1**).

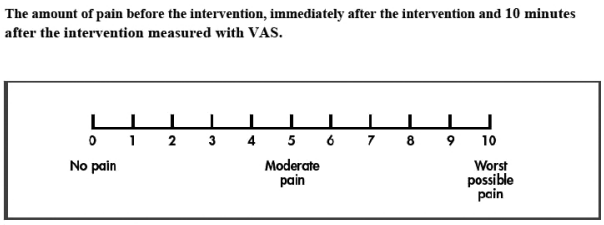

Fig. (1). Visual Analogue Tool for Pain

4. DISCUSSION

The findings of the current study suggested that distraction with the voice of a loved one had impacts on the pain of chest tube removal, and there was a significant difference in the pain severity in both intervention and control groups during chest tube removal and 10 minutes later (P <0.001). The pain before the chest tube removal was equal between the two groups and it was not significantly different (p > 0.05). The significant difference in the previous pain in the two groups is attributed to the equality of variables involved in the pain level. Many studies have indicated that non-pharmacological methods provide benefits including an increased sense of self-control, reduced feelings of weakness, increased levels of activity and functional capacity, reduced stress and anxiety, loss of focus on the pain, and reduced need for a dose of analgesics, thereby reducing the side effects [7].

This study is congruent with the study conducted by Demir (2010) entitled "the role of ice in combination with standard painkillers during chest tube removal". In this study, the two groups had no statistically significant differences in pain before chest tube removal. This is while, in the study conducted by Demir, the use of ice was effective in pain reduction immediately after removal and 15 minutes later [7]. In a study entitled "the impact of music on pain reduction after open heart surgery", Ozer (2010) found that in the intervention group, the mean pain before pre-test and after the intervention was 2.13 and 1.20, respectively, confirming the results of the present study [13].

Mollahosseini *et al*. conducted a research on patients with acute abdomen, 62% of whom had a great deal of pain before application of distraction technique. After performing the

technique, 58% suffered from moderate pain, where the mean pain before and after distraction was 7.88 and 4.38, respectively. Distraction was used in this study, and the results were in line with the present study findings [8]. Distraction helps relieve acute and chronic pain, supporting the patient to focus on something other than pain. The effectiveness of distraction depends on the patient's ability to receive and create a sense other than pain. Pain relief is usually contingent upon the active participation of the patient, the number of sensory cases used, and the patient's interest in the stimulus [5].

In the study conducted by Alhani (2010), distraction was used to ease the pain of needle insertion for 42 dialysis patients, and his method was effective in reducing pain using this technique [14]. This study showed that to have an effective distraction method, the patient must have an active role, and enough attention must be paid to the distraction factor. In this regard, distraction with a loved one's voice can be effective.

The results of the study conducted by Heidari Gorji showed that the familiar voice compared to an unfamiliar voice had a significant difference in increasing GCS in comatose patients (p=0.0001). The study which suggests the impact of a loved one's voice is consistent with this study [15]. In general, it can be concluded from the above results that the loved one's voice is effective in reducing pain during chest tube removal after open heart surgery.

CONCLUSION

Management of pain is considered vital and requires the awareness of health care providers. One of the main responsibilities of nurses is to prepare patients for invasive procedures such as removal of the chest tube [5]. Use of non-pharmacological methods of pain relief, such as distraction, is a cheap and safe intervention method which is associated with easy acceptance and good cooperation from all the patients. Further, it does not have the negative effects and consequences of drug interventions. Pain management through distraction for clients occurs by providing energy for mitigating weakness and fatigue, distraction from pain, potentiating the influence of pain reliever methods as well as enhancing pain tolerance and patient participation. The aim of all these is to relieve pain and reduce discomfort and fear of recurring pain. This study showed that a loved one's voice is effective in reducing pain during chest tube removal after open heart surgery.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This is to inform you that this clinical trial has been done after getting the code of ethics with No. 312.433 from the ethics committee of Faculty of Nursing, Midwifery at Shahid Beheshti University of Medical Sciences,Tehran, Iran.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

After selecting the eligible samples and obtaining the informed consent, each patient was randomly assigned to one of the two groups (intervention group and control group).

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

STANDARDS OF REPORTING

CONSORT guidelines and methodology were followed.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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