

Short Communications



The effect of the distraction of thought by music on pain relief in patients undergoing extracorporeal shock wave lithotripsy: A randomized controlled trial

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Abstract

Background and aims: The distraction of thought is a technique in which a pleasant stimulus is presented to the patient. This study aimed to investigate the effect of the distraction of thought by music on pain relief in patients undergoing extracorporeal shock wave lithotripsy (ESWL).

Methods: This clinical trial was performed on 120 patients referring to Ayatollah Kashani Hospital in Shahrekord for ESWL in 2019. Patients were randomly divided into two experimental and control groups. In addition to routine care, the experimental group received the natural sound of the event, along with its beautiful scenery, while the control group only received routine care. The pain score was measured by the McGill Pain Questionnaire. The data obtained were analyzed by SPSS (version 18) using paired and independent t-tests and Tukey's test.

Results: The two groups were significantly different in terms of pain changes ($P=0.007$). The mean difference in addictive drug consumption between the control and experimental groups was significant ($P=0.004$).

Conclusion: Thought distraction by music reduces pain and narcotic use of analgesics by the patients under ESWL.

Keywords: Extracorporeal shock wave lithotripsy, Pain, Distraction, Music, Renal stones

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Introduction

Extracorporeal shock wave lithotripsy (ESWL) is one of the most accepted and used therapies for patients with kidney stones and is considered to be the least invasive method for this purpose (1). Most patients experience pain during surgery that is due to damages caused by the effects of low-frequency sound waves and cavitation in the kidney tissue (2). However, patients should inevitably tolerate the pain during lithotripsy processes. Faster and earlier relief of pain will lead to faster recovery and promote patient satisfaction. When pain is not controlled, human coping skills also represent a reduction (3). Numerous conventional treatments exist for pain relief that can be generally classified into two pharmacological and medicinal methods. Pharmacological pain management merely considers the physical and sensory aspects of pain, and some of them may have side effects (4). One of the obstacles and challenges resulting from the lack of proper management of pain by nurses is the fear of the side effects of drugs; therefore, non-pharmacological methods can be used to control pain (5).

Notably, non-pharmacological methods are cheap

and convenient with few complications. The distraction of thought is a technique in which a pleasant stimulus is presented to the patient to distract his/her attention from the unpleasant process. Generally, it reduces the perception of pain (6). One distraction method is music therapy, which is an effective adjunct in the control of mental disorders and is a safe, free of side-effect method that improves the quality of care (7). However, some studies report the lack of the effect of music therapy on surgical pain, and due to the ambiguities aspect in this area (8), this study was conducted to investigate the effect of the distraction of thought by music on pain in patients undergoing ESWL.

Materials and Methods

The study was designed as a clinical trial study and was conducted from February 2018 to March 2018 on patients nominated for ESWL referring to Ayatollah Kashani hospital. They fulfilled the inclusion criteria and provided written consent to participate in this single-blind study (blinded investigators). Participants were collected by convenience sampling and randomly assigned to two test

and control groups. Randomization was performed using a block method based on age group variables and the history of lithotripsy. The number of blocks was obtained by multiplying the modes of each variable by each other.

The sample size was calculated as 60 patients in each group by the following sample size formula.

$$N = (Z_{1-\alpha/2} + Z_{1-\beta})^2 (s_1^2 + s_2^2) / d^2$$

$$Z_{1-\alpha/2} = 1/96, Z_{1-\beta} = 1/28, d = 1/2, n = 60$$

The inclusion criteria were age over 18 years, awareness of the patient of time and place, lack of hearing problems, lack of history of diseases with pain, and the lack of active mental diseases. Moreover, the other criteria included the lack of mental retardation, blood thinners (aspirin, warfarin, and the like), and the consumption of antiepileptic drugs, benzodiazepines, barbiturates, and hypnotics such as zolpidem and tricyclic antidepressants. In addition, the lack of history of depression, anxiety, and severe stressful events and illness during the last 6 months, and the lack of thyroid disease were the remaining inclusion criteria. On the other hand, the exclusion criteria included lack of willingness to continue participation in the study, children, acute urinary tract infection, coagulopathy, or untreated bleeding disorders of pregnancy.

The demographic information questionnaire included data about age, gender, marriage status, stone size, and abuse of narcotic drugs. The McGill Pain Questionnaire was used to measure the rate of pain in patients. This questionnaire provides a subjective report of pain. Mousavi et al investigated the validity and reliability of this questionnaire (9). Three scales of sensory, emotional, and neuropathic pain were considered for this questionnaire. The findings showed that the validity and reliability of the questionnaire are acceptable for the four subscales of continuous, varied, neuropathic, and emotional pains. Khosravi et al, for example, reported that the overall Cronbach's alpha for this questionnaire was 0.85. The Cronbach's alpha of all four components was above 0.80 (10).

The age groups were 18-25, 25-35, 35-45, 45-55, and over 55 years old, and the history of lithotripsy had two states (patients with and without a history of lithotripsy). A total of 10 blocks were determined for the study. The capacity of each block is obtained by the division of the total sample size by the number of blocks, which was obtained by 12 individuals. This study consisted of two groups, thus each 12-member block was divided into two groups of 6 individuals.

To allocate patients to the test and control groups, based on the patients' information, the researcher determined that each patient belongs to each of the blocks. Then, patients were allocated to each group based on the patient's file number. Patients with even and odd numbers entered the test and control groups, respectively.

First, in the intervention group, which was exposed to the distraction of thought the nature sounds, along with beautiful nature images were displayed through headphones and TV, in addition to drug therapy. The control group received routine care. McGill Pain

Questionnaire was completed at baseline and after treatment completion by asking questions from patients. The lithotripsy action was performed with the Dornier model of compact Delta 2 and according to the same protocol in both groups. The lithotripsy action was performed for both groups by compact Delta according to the Dornier model and a fixed protocol. The treatment protocol was conducted at the rate of 90 beats per minute, and the lithotripsy was started at the power of number 1. Then, the power of number 1 increased to number 2 after 200 beats more. Again, the power turned to number 3 after 200 other beats and entered 2600 other beats so that a total of 3000 beats were exerted on the stone in question.

The data obtained were analyzed by SPSS (version 18) using paired and independent t-tests and Tukey's test. The significance level in this study was considered at 0.05.

Results

The results (Table 1) showed that there was no statistically significant difference between the two groups in terms of age ($P=0.68$), gender ($P=0.64$), marriage status ($P=0.17$), and abuse of narcotic drugs ($P=0.33$).

Table 2 presents data on pain before and after the intervention in the case and control groups. Changes in sensory and emotional pain perception and various pains in the group of the distraction of thought and control were not significantly different ($P=0.05$), but changes in pain perception between the distraction of thought and control groups represented a significant difference ($P=0.21$). Pain changes in the distraction of the thought and control groups were -12.38 ± 6.96 and -85.1 ± 8.67 , respectively, with a statistically significant difference according to the

Table 1. Demographic characteristics of patients

Variable	Thought Distraction		Control		P value	
	Number	Percent	Number	Percent		
Age group	18-25	12	20	12	20	0.68
	25-35	12	20	12	20	
	35-45	12	20	12	20	
	45-55	12	20	12	20	
	55 <	12	20	12	20	
	Total	60	100	60	100	
Gender	Male	37	61.73	32	53.32	0.64
	Female	23	38.32	28	46.75	
	Total	60	100	60	100	
Addiction	Yes	13	21.72	12	20	0.33
	No	47	78.32	48	80	
	Total	60	100	60	100	
Marriage status	Single	12	20	7	11.72	0.17
	Married	47	78.31	48	80	
	Divorced	0	0	2	3.33	
	Spouse's death	1	1.71	3	5	
	Total	60	100	60	100	

Table 2. The domination of pain intensity and mean score of participants before and after the intervention in the case and control groups

Types of Pain		Before intervention	After intervention	P value	Before and after intervention	P value
		Mean ± SD	Mean ± SD		Mean ± SD	
Sensory perception	Case	10.01 ± 4.40	3.73 ± 4.39	0.001*	-6.28 ± 5.29	0.001*
	Control	14.40 ± 6.72	12.38 ± 5.78	0.001*	-2.01 ± 4.64	
Emotional perception	Case	3.08 ± 1.86	1.13 ± 1.17	0.001*	-1.59 ± 1.87	0.001*
	Control	3.35 ± 2.17	4.2 ± 5.17	0.18	0.85 ± 4.91	
Assessment perception	Case	2.13 ± 3.94	0.51 ± 0.96	0.003*	-1.62 ± 4.05	0.21
	Control	2.11 ± 2.95	41.40 ± 1.34	0.053	-0.70 ± 2.81	
Various pains	Case	4.08 ± 3.50	1.55 ± 1.59	0.001*	-2.53 ± 3.82	0.004*
	Control	5.11 ± 5.17	5.10 ± 5.34	0.97	-0.01 ± 4.98	
Total	Case	19.31 ± 9.26	6.93 ± 6.83	0.001*	-12.38 ± 6.96	0.007*
	Control	24.93 ± 11.98	23.08 ± 13.05	0.10	-1.85 ± 8.67	

Note. SD: Standard deviation. *Significant level at $P < 0.05$.

results of Tukey's test ($P = 0.007$).

There was a significant difference ($P = 0.004$) between the case and control groups in mean consumption with 18.95 ± 7.90 and 25.25 ± 1.39 , respectively. In addition, a significant difference ($P = 0.001$) was found between the frequency of pethidine taking between the case and control groups (1.80 ± 0.27 and 1.38 ± 0.49 , respectively).

Discussion

The findings of the present study showed that distraction of thought by music can reduce patients' pain undergoing ESWL in addition to decreasing the amount of received dose and the times of pethidine consumption.

The results of a randomized controlled trial by Kongsawatvorakul et al revealed that the mean pain score was reduced in patients receiving music, while no significant difference was observed for the control group. Based on the findings of this study, distraction induced by music had no effect on pain and anxiety, and the results of these two studies are not consistent with those of our study (11). The findings of the different studies confirmed the effect of various types of the distraction of thought on reducing pain and unpleasantness caused by various diseases (12-14).

Mikaeili et al reported the effect of the distraction of thought on reducing the pain of children undergoing chemotherapy (15), which is in agreement with the result of the present study. According to another study, the distraction of thought using the auditory-visual method was a simple and practical way to reduce anxiety and distress during treatment and diagnostic-invasive procedures (6), which is in line with the results of our study.

Music can act as a mental attention-distracting device via the modification of the transmission of pain impulses; a stimulus of music may mask unwanted pain stimuli via distribution of attention. There are neural gates in the spinal cord that may be opened or closed to varying degrees, thereby allowing more or fewer of those pain impulses to be transmitted to the brain. These neural

gates can become blocked, and the perception of pain may be reduced in such instances (16). Listening to music distracts you from the pain, and thus reduces the sending of pain messages to the central nervous system and the severity of the pain.

One of the limitations of this study was that it was performed only in one medical center and it was a single-blind study.

Conclusion

The finding of the current study showed that distraction of thought from pain can alleviate pain in patients undergoing ESWL, along with decreasing the amount of received dose and repeated times of pethidine consumption. Based on these findings, it can be argued that nurses with non-pharmacological methods such as the distraction of thought relieve pain in patients undergoing ESWL with a lower dose of pethidine.

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Authors' Contribution

MT had a principal role in performing the study, and other co-authors were guides and consultants. All authors approved the final version of the manuscript.

Conflict of Interests

The authors declared that there is no conflict of interests.

Ethical Approval

The clinical trial code number (IRCT20170122032101N3) and the ethical code (IR.SKUMS.REC.1397.282) were obtained from the Clinical Examination Center of Iran and Shahrekord University of Medical Sciences, respectively.

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