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The Effect of Acupressure on the Severity of Nausea During Hemodialysis

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Abstract

Objectives: Most patients bearing chronic renal failure (CRF) in end-stage renal disease (ESRD) need hemodialysis to survive. Although there are many advanced hemodialysis equipment, some of them still have complications. Nausea is general complicacy during hemodialysis, which leads to unsightly feeling. In this regard, the present study was conducted to investigate the effect of acupressure on the severity of nausea during hemodialysis.

Materials and Methods: The current single-blind clinical trial was conducted on 60 patients in the dialysis wards of some selected hospitals affiliated to Semnan University of Medical Sciences in Iran. The sampling method was easy, accessible, and purposive and the order of interventions was selected randomly. In addition, the nausea severity was measured during hemodialysis in one group in three different conditions of routine care, placebo administration, and acupressure. The verbal numerical rating scale was used to measure the nausea severity. To determine the difference in the mean of nausea severity in different conditions, repeated measures analysis of variance (ANOVA) test was used, followed by applying the post hoc test of Bonferroni for two-by-two comparisons in different conditions.

Results: The mean of nausea severity was 1.15±2.08 in the routine care while it was 0.55±1.44 and 0.05±0.29 in placebo administration and acupressure conditions. The findings of the repeated measures ANOVA test represented a remarkable difference among the mean severity of nausea in different conditions ($P<0.001$, F=11.61). Further, there was a significant difference between the mean of nausea severity in routine care compared to placebo administration ($P=0.024$) and acupressure ($P<0.001$) conditions. Finally, a significant difference was observed between the mean of nausea severity in placebo administration and acupressure conditions ($P=0.030$).

Conclusions: The results demonstrated that acupressure was effective in attenuating the severity of nausea during hemodialysis thus using acupressure can be suggested to reduce nausea during hemodialysis.

Keywords: Hemodialysis, Nausea, Acupressure

Introduction

Chronic renal failure (CRF) refers to a progressive and irreversible kidney dysfunction that is usually progressive. In CRF, the toxic wastes from the metabolism are accumulated in the body due to the decreased function of the kidneys. An imbalance in water and electrolytes and acid-base, as well as the dysfunction in the endocrine function of the kidney are observed as well. The end-stage renal disease (ESRD) is considered as the last stage of CRF, which means that renal function is no longer sufficient to maintain life. Therefore, all patients need dialysis or kidney transplants to survive at this stage (1).

The prevalence of CRF is increasing globally for several reasons. In 2000, the number of CRF patients worldwide was around 1 100 000 while the number of these patients amounted to 2 654 000 at the end of 2009. With an increase of 6%-7%, this figure has significantly grown more than the world population. It is foreshowed that in 2020, the quantity of hemodialysis patients reaches 3 500 000 (2). In addition, about 31 500 patients underwent dialysis in Iran at the end of 2016 (1).

Hemodialysis is the most commonly used treatment for the ESRD. Patients who undergo hemodialysis should be treated with this treatment for the rest of their life until they are successfully transplanted. Further, hemodialysis usually takes place three times a week for 3-4 hours (3). It can increase the patient's life expectancy, but cannot change the normal period of the fundamental kidney disease and entirely replace the kidney function. Although hemodialysis equipment has extensively developed, some of them still have complications that cause great discomfort to the patients (4).

Nausea is one of the most common side effects during hemodialysis. After starting the hemodialysis, nausea and vomiting happen due to different reasons (5), which should be taken into account and prevented because they cause complications in patients (6). Furthermore, these two symptoms cause unpleasant dialysis for patients and lead to the early termination of dialysis, leading to undesirable dialysis in spite of the high cost (7).

Currently, various pharmacological and non-pharmaceutical methods are used to prevent and control

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nausea in clinical practices (8). Acupressure is considered as one of the non-pharmacological therapies that is used to control nausea in various clinical situations (9). More precisely, it is a branch of acupuncture that uses no needle (10). Similarly, this intervention is a non-invasive and relatively inexpensive method with no side effects (11).

The history of stimulating the meridian system in the body by needle, heat, or pressure for treating diseases and relieve pain has originated in China more than 2500 years ago (12). The use of acupuncture to relieve nausea and vomiting was first reported in the British Journal of Medicine by Dundee et al in 1986 (13). Acupressure can be performed by using finger pressure or elastic bands to stimulate the meridians in order to enhance the flow of chi (9). In numerous studies, these acupressure bands are effective in controlling morning sickness during pregnancy, chemotherapy-induced nausea, and motion sickness (14, 15)

Considering the unpleasant effects of nausea on hemodialysis patients and the significant role of the nurses in providing care to CRF patients receiving hemodialysis, it is necessary to help these patients to reduce their problems (16). Accordingly, the present study intended to evaluate the efficacy of acupressure on nausea severity during hemodialysis.

Materials and Methods

This study was a single-blinded clinical trial registered in the Iranian Registry of Clinical Trials (identifie: IRCT201304298717N2; https://www.irct.ir/trial/9213), which was conducted on 60 dialysis patients in selected hospitals affiliated to Semnan University of Medical Sciences in Iran. Data collection was done from January 2015 to April 2015. The severity of nausea during hemodialysis was measured in a group of patients in three conditions including routine care, placebo administration, and acupressure. The sampling method was simple, accessible, and purposive and the order of interventions was selected randomly. Moreover, the sample size was determined based on the results of a pilot study on 20 patients, with a 95% confidence interval and 80% power. The inclusion criteria were being conscious, not taking anti-nausea and anti-vomiting drugs six hours before hemodialysis, passing three months after hemodialysis, being over 20 years old, and requiring four-hour hemodialysis for three times.

Before initiating the research, the approval and permission were obtained from the Ethics Committee of Semnan University of Medical Sciences and the hospital managers regarding investigating the dialysis ward, respectively. Then, patients who had suitable conditions for recruiting in the study were selected as the sample. The researcher presented himself to the subjects, then provided them with sufficient explanations regarding the research objectives and method. Besides, the subjects were assured of the confidentiality of information, and finally, signed the consent letters for participation in this research.

The questionnaire contained two parts. The first entailed demographic information like age, gender, the place of residence, occupation, education level, and dialysis duration, as well as obvious pain in different body parts, obvious anxiety, and the signs of motion sickness. The second part of the questionnaire contained the measurement tool of nausea severity. The severity of nausea was evaluated by a verbal numeric rating scale (VNRS) and characterized as no nausea (0 scores), as well as mild (1-3), moderate (4-6), severe (7-9), and very severe (10) nausea. In the present study, the reliability of the tools was determined by a pilot study on the first 20 samples. Using the test-retest method, the reliability of the tools was determined to be 97% for VNRS.

The first part of the questionnaire was filled out with demographic information. Then, the severity of nausea during hemodialysis was measured among all patients in three conditions of routine care, placebo administration, and acupressure. In a routine care setting, the researcher, along with a nurse (as the collaborator of the project) visited the patient at the end of the hemodialysis and measured the severity of nausea during hemodialysis by questioning. Before starting the hemodialysis, the researcher accompanying a nurse visited the patient and then the intervention point (PC6) was determined in the intervention setting using acupressure. The Pointer Excel, which was a precise point finder device of acupuncture, was used to find the intervention point (PC6). This device could mark the intervention point as soon as it reached the point with a beep sound and light signal. Ten minutes before inserting hemodialysis needles, the researcher tried Sea-Band on the patient's wrist so that the button was placed on the p6 (Neiguan) point on the inner surface of the forearm two inches (three fingers wide) far from the inner wrinkle line of the wrist between flexor carpi radialis and palmaris longus tendons. Sea-Band remained at the site during hemodialysis and was removed at the end of hemodialysis just before removing the hemodialysis needles. In the setting of using a placebo, Sea-Band was fastened around the wrist like the intervention with acupuncture, but the button was located on the opposite side of the p6 point at the outer surface of the forearm as a false point. After removing hemodialysis needles and dressing vascular access sites, the severity of nausea during hemodialysis was measured by questioning the patient using the VNRS, and then the related questionnaire was filled out in all conditions.

The data were entered into SPSS 18. The repeated measures analysis of variance (ANOVA) test was used to determine the difference in the mean of nausea severity in different conditions. Eventually, the post hoc test of Bonferroni was used for two-by-two comparisons in different conditions and $P<0.05$ was considered as a statistically significant level.

Results

In general, 56.7% and 43.3% of the subjects were males and females. Additionally, most of them (51.7%) were in the age group of 60 years and older and their mean age was 59.8±14.84. Most of the subjects (91.7%) lived in the cities as well. In terms of education, the majority of the subjects (36.7%) had elementary education while the minority (10%) had associate degrees or higher education. Regarding occupation, most subjects (38.7%) were retired while 10.7% of them were public sector employees. The mean duration of hemodialysis was 46.32±42.56 months as well.

Table 1 presents the absolute and relative frequency distribution of the subjects according to the severity of nausea in different conditions. In all conditions, most of the subjects had no sign of nausea and no subject had severe nausea. In routine care, 28% of the patients had some degree of nausea. In addition, the mean of nausea severity was 1.15±2.08, 0.55±1.44, and 0.05±0.29 for routine care, placebo, and acupressure.

Table 2 demonstrates the results of comparing the mean of nausea severity in the subjects in different conditions. The result of repeated measures ANOVA test represented a notable difference ($P < 0.05$) between the mean of nausea severity in different conditions.

Table 3 provides the results of the post hoc test of Bonferroni, which was used for two-by-two comparisons in different conditions. The results suggested that there was a substantial difference between the mean of nausea severity in routine care compared to the placebo administration (P=0.024) and acupressure ($P < 0.001$). In addition, a significant difference was observed between the mean of nausea severity in placebo and acupressure groups (P=0.030).

Table 2. Comparison of the Mean of Nausea Severity in the Subjects in Different Conditions

Results Conditions	Mean & SD of Nausea Severity	*P* value
Routine	1.15±2.08	F= 11.61 *$P < 0.001$
Placebo	0.55±1.44	
Acupressure	0.05±0.29	

Note. *There is a significant difference in $P<0.05$; SD: Standard deviation.

Table 3. The Results of Two-by-Two Comparison of the Nausea Severity in the Subjects in Different Conditions

Comparing the Conditions With Each Other		95% CI		*P* Value
		Minimum	Maximum	
Routine care with	Placebo	0.063	1.137	0.024*
	Acupressure	0.430	1.770	<0.001*
Placebo with	Routine care	-1.137	-0.063	0.024*
	Acupressure	0.037	0.963	0.030*
Acupressure with	Routine care	-1.770	0.430	<0.001*
	Placebo	-0.963	-0.037	0.030*

Note. *There is a significant difference in $P<0.05$.

Discussion

In this study, 56.7% of the subjects were males and 43.3% were females. In many other studies, the number of men was reported more than that of the women (17-19). Moreover, considering hypertension as the second most common cause of CRF (1, 20), the risk of ESRD was more than women because of hypertensive nephropathy in men (21).

The majority of the studied subjects (51.7%) were in the age group of 60 years and older while the minority of the subjects (8.3%) was in the age group of 20 to 39 years old. Further, the mean age of the subjects was 59.5 years. In the study of Mottahedian Tabrizi, the mean age of hemodialysis patients was 55.05 years (17). In another study, the incidence of CRF increased with age and most patients with renal failure were in the middle age (22). Similarly, the mean duration of subjects' hemodialysis was 46.32 months and hemodialysis duration in most subjects was more than 48 months (26.7%). In the study of Ghahri Sarabi, the mean duration of hemodialysis was 4.8 years (23).

During routine care, 28% of patients had some degree of nausea. In another study, Chong and Tan investigated the occurrence of gastrointestinal symptoms in Asian patients bearing regular hemodialysis and found that the prevalence of nausea was 18.2% (24). In a study in Iran, the prevalence of nausea and vomiting reported up to 25.8% (25). The findings of the present study in terms of determining the severity of nausea in different conditions suggested that the mean nausea severity was 1.15, 0.55,

Table 1. Absolute and Relative Frequency Distribution of the Subjects Pursuant to the Nausea Severity in Various Conditions

Nausea Severity	Condition					
	Routine Care		Placebo		Acupressure	
	No.	%	No.	%	No.	%
Lack of nausea	43	71.7	52	86.7	58	96.7
Mild nausea	7	11.7	2	3.3	2	3.3
Moderate nausea	8	13.3	6	10	0	0
Severe nausea	2	3.3	0	0	0	0
Very severe nausea	0	0	0	0	0	0
Mean & SD of nausea severity	1.15±2.08		0.55±1.44		0.05±0.29	

SD, Standard deviation.

and 0.05 in the routine care condition, placebo treatment, and the acupressure, respectively. The results of the study by Khoshnevis et al showed that the prevalence of nausea was lower in the test group compared to the control group (26). Likewise, Bastani et al reported that the severity of nausea was remarkably lower in the test group instantly and one hour after the intervention in comparison with the placebo group (27). The results of the above-mentioned studies confirm those of the present study. However, the results of some other studies are contrary to the results of this study. For example, the results of the research by Adib-Hajbaghery demonstrated that the nausea severity had no remarkable difference in the test and control groups (28), which contradicts the findings of the present study.

Based on the findings of this study with regard to comparing the nausea severity during hemodialysis in routine care, placebo administration, and acupressure in hemodialysis patients, the results of the repeated measures ANOVA test had a notable difference ($P<0.001$) in the mean of nausea severity in different subjects during hemodialysis. According to the results of the study and the comparison of the three conditions, the lowest and highest levels of nausea severity were observed in acupressure and routine care with the means of 0.05 and 1.15, respectively. The results of other studies are consistent with the results of our study (26,29). Based on the results of the post hoc test of Bonferroni in terms of two-by-two comparisons of the mean severity of nausea in different conditions exhibited that there was a significant difference in this regard in routine care compared to placebo administration ($P=0.024$) and acupressure ($P<0.000$). In addition, a notable difference was found between the mean severity of nausea in placebo administration and acupressure ($P=0.030$).

The results of other studies showed that the mean severity of nausea was lower in acupressure compared to placebo administration and routine care, which is in line with the results of this study. In a study, Barrett examined the effect of Sea-Band application on preventing and controlling nausea and vomiting during hemodialysis in seven patients and indicated that four patients reported that the bands helped them control nausea and vomiting during dialysis (30). Further, Saberi et al found that, based on the Rhodes scale, the nausea severity decreased after intervention in the acupressure and placebo groups while the higher decrease was observed in the acupressure group (14). The results of the above-mentioned studies support the findings of the present study. However, the results of some other studies contradict those of our study. For example, Klein et al demonstrated that acupressure could not reduce the severity of nausea in patients undergoing cardiac surgery (31). Furthermore, Dibble et al concluded that there was no difference in the incidence and severity of acute nausea in the acupressure, placebo, and routine care groups (15). These contradictory results are probably due to the time of performing acupressure, which was after cardiac surgery, as well as different mechanisms of nausea in chemotherapy patients compared to patients on hemodialysis.

Conclusions

In general, acupressure is considered effective in diminishing the severity of nausea during hemodialysis. Therefore, using acupressure can be suggested to reduce nausea during hemodialysis.

Limitations of the Study

Despite all the precision and attention paid to this research, the study had some limitations. For instance, nausea was a mental phenomenon and there was no objective measurement tool for its assessment. Therefore, it was only based on the patient's response. In addition, there were not different sizes of Sea-Band to be selected for different wrist circumference thus just one size was used for all patients.

Considering the limitations of this study, it is suggested that future studies use at least two different measurement tools to evaluate nausea. Finally, different Sea-Band sizes should be prepared and used for different wrist sizes.

Conflict of Interests

The authors have no conflicts of interest in this study.

Ethical Issues

The ethics approval was obtained from the Semnan University of Medical Ethics Committee (IR. SEMUMS. REC.1392.372055).

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