

Association between Pain of Arteriovenous Fistula and Cryotherapy of Hemodialysis Patients

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Abstract

Objectives: To find out relationship between arteriovenous fistula pain and cryotherapy intervention.

Methodology: A descriptive study was conducted on a purposive sample consisting of (113) patients from hemodialysis who use arteriovenous fistula in the hemodialysis center in Baghdad Teaching Hospital to find out the relationship between arteriovenous fistula pain and cryotherapy intervention. The study was conducted for the period (from January 3 to March 20, 2023). The data were analyzed using descriptive statistical data analysis approaches such as frequency, percentage, arithmetic mean, and standard deviation, in addition to inferential statistical data analysis such as the paired t-test.

Results: The results show that all responses of the study sample in the pre-test were average, with a statistical mean of the scale (55.522) and the results of the post-test 45.188, meaning that the degree of pain decreased by 10 degrees.

Recommendations: The study recommends that future research focus on encouraging and motivating patients to use non-pharmacological methods to reduce the pain of arteriovenous fistula.

Keywords: Pain, Arteriovenous Fistula, Cryotherapy, Hemodialysis Patients.

Introduction

A total of 850 million people were predicted to have CKD in 2017, which was more than 20 times the estimated incidence of HIV or AIDS worldwide and double the anticipated prevalence of diabetes (Jager, et al., 2019)¹. Even though most other chronic diseases, such as cancer and cardiovascular disease (CVD), have seen a decline in age-standardized mortality over the past few decades, CKD is the third fastest growing cause of death globally and is expected to overtake cancer as the fifth most common cause of years lost to premature death by 2040 (Carney, 2020)².

Hemodialysis calls for specialized nursing care, including the development of a personal connection. Patients undergoing hemodialysis require psychological assistance to adjust to their present situation, and nurses may provide this by easing anxiety, fostering adaptation, and offering emotional support. This will help patients get used to their challenges and worries related to the condition. Patients are more comforted by people than by their surroundings and contemporary conveniences (Saeed, AL-Mosawi, 2020)³

The AVF cannulation requires highly experienced, well-skilled nurses to ensure safe and complication free vascular access considering the significant negative consequences,

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which may result in severe pain and anxiety levels if the AVF cannulation procedure is not done properly (Harwood, et al., 2017).⁴

Cryotherapy can be suggested for the management of pain at AVF puncture since it offers more efficiency with fewer restrictions (Kortobi et al, 2020).⁵

Regarding the positive effect of cryotherapy on arteriovenous fistula puncture-related pain, cryotherapy as a low-risk and uncomplicated procedure seems to be effective and useful in reducing pain and ultimately reducing its unpleasant psychological and physical side effects. (Moosazadeh, 2020).⁶

Research Methods & Procedures

Study Design and Setting: a pre-experimental study design is conducted to determine the relationship between arteriovenous fistula pain and cryotherapy intervention.. The study was conducted at the Hemodialysis Centers in Baghdad Teaching hospital.

Sample and Sampling: A purposive sampling method was used to select (113) hemodialysis patients who are doing session by arteriovenous fistula. (10) patients for the pilot study were eliminated from the main study.

Ethical Considerations:

After the approval Nursing College Council of the University of Baghdad was obtained for the study protocol before data collection, official approval was obtained from the Institutional Review Board (IRB), represented by the Research Ethics Committee (REC) of the Nursing Faculty, University of Baghdad and official permission was obtained from the Ministry of Planning to conduct the study. Of equal importance, approval was obtained from Baghdad teaching hospital to ensure their cooperation. obtained from the hospital management. After obtaining verbal consent from the patients, the face-to-face interview method was used to collect the data from the hemodialysis patients.

The Study Instrument: A tool of three sections was used in the study: the first section was composed of the demographic characteristics (age, gender, educational level, smoking), the second section consist of Pain Assessment Tool for arteriovenous fistula is visual analogue pain scale, which consist The VAS grading system used a straight line to depict the range from "no pain" to "most severe pain" (Between 0 and 100 millimeters). No pain(0-4mm), mild pain,(5-44), (45-74mm)moderate pain, (75-100mm)sever pain. (The patient was instructed to annotate a sign or point to signify their level of suffering.

Validity of the Scale: The content validity is assessed through a panel of (13) experts Nine of them are faculty members of the Adult Nursing Department, four of them are nephrology specialists.

Reliability of the Scale: the reliability had been determined using the internal consistency reliability method. Cronbach's Alpha (α) of hemodialysis patients Study Group rating scale was (0.72) which is acceptable.

Data collection: Data are gathered using a self-report and a tool of two sections: the first section is composed of the demographic characteristics (age, gender, educational level, and smoking), the second section consists of The VAS grading system used a straight line to depict the range from "no pain" to "most severe pain" (Between 0 and 100 millimeters). No pain(0-4mm), mild pain, (5-44), (45-74mm) moderate pain, (75-100mm) sever pain. (The patient was instructed to annotate a sign or point to signify their level of suffering.

Data Analysis: The researcher used the SPSS (Statistical Package for Social Sciences) version (24) application of the statistical analysis system to enter and analyze the collected data as well as Microsoft Excel Program (2010). In this study, (P-value = 0.

008) at the ($P \leq 0.05$) level of significance. Data were analyzed using descriptive statistical data analysis such as frequency, percentage, mean, and standard deviation, in addition to the inferential statistical data statistics such as paired T test was used to measure the association between the pain of AV fistula and cryotherapy for hemodialysis patients.

Results

Table (1): Assessing Pain for Arteriovenous Fistula Pre-Cryotherapy Intervention for Hemodialysis Patient (n= 113).

Variables	Groups	Descriptive statistic	
		F.	%
Pain score	No pain	0	0
	Mild pain	28	24.8
	Moderate pain	67	59.3
	Sever pain	18	15.9
	Mean± S.D	55.222 ±17.033	

No pain(0-4mm), Mild pain(5-44mm), Moderate pain(45-74mm), Sever pain(75-100mm)

The table (1): indicated that (59.9 %) of the study were have moderate pain related to arteriovenous fistula cannulation pre cryotherapy intervention and mean at 55.222.

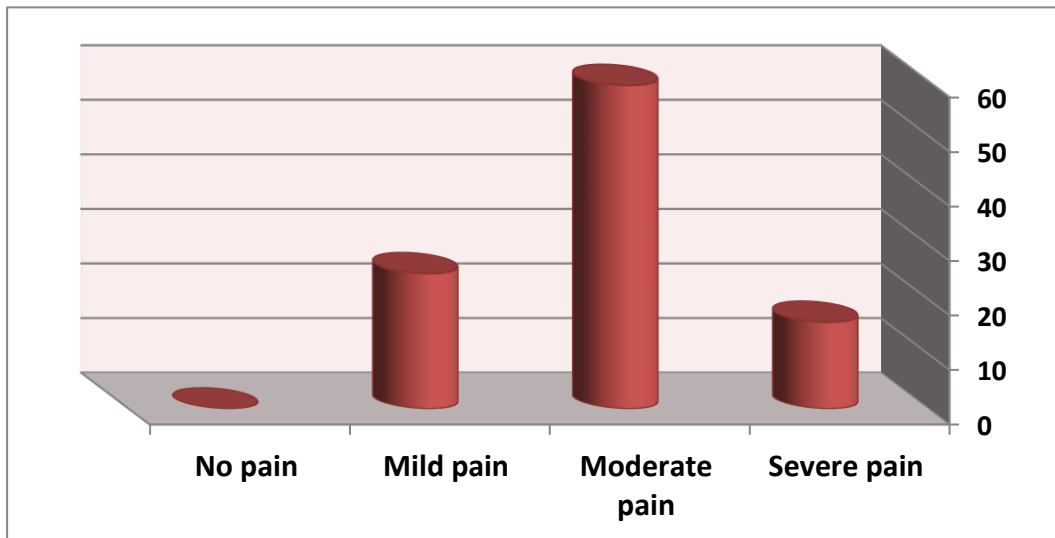


Figure (1) Overall assessment of pain level at Pre cryotherapy intervention for hemodialysis patient.

Table (2): Assessing Pain for Arteriovenous Fistula Post Cryotherapy Intervention for Hemodialysis Patient (n= 113).

Variables	Groups	Descriptive statistic	
		F.	%
Pain score	No pain	0	0
	Mild pain	57	50.4
	Moderate pain	48	42.5
	Sever pain	8	7.1

Mean± S.D	45.188 ±19.297
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No pain(0-4mm), Mild pain(5-44mm), Moderate pain(45-74mm), Severe pain (75-100mm)

The table (2): indicated that (50.4 %) of the study were have moderate pain related to arteriovenous fistula cannulation post cryotherapy intervention and mean at 45.188

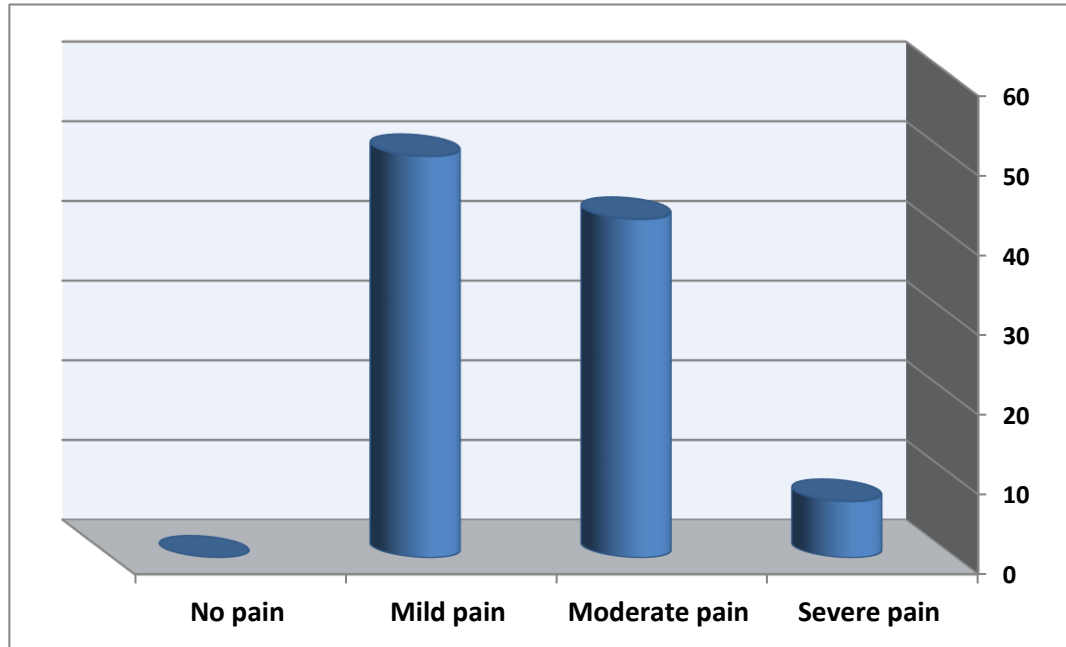


Figure (2) Overall assessment of pain level at post cryotherapy intervention for hemodialysis patient.

Discussion

Discussion of the pain of AV fistula pre cryotherapy

Pain indicated that (59.9 %) of the study were have moderate pain related to arteriovenous fistula cannulation pre cryotherapy intervention and mean at 55.222, this result agreed with celk etal.,(2011) pain of av fistula is mild to moderate.⁷

Cryotherapy was observed to considerably lower the pain score in the experimental group (P 0.001). Cryotherapy's adoption as a non-pharmacological alternative is linked to a number of advantages, including affordability and availability. Studies have shown that cryotherapy is effective at reducing pain. Cryotherapy also has practical relevance since it is simple for nurses to apply and provides quick pain relief for AVF puncture-related discomfort (Alameer etal.,2017).⁸

Ibrahim, et al., (2022) reported that 32.5% of hemodialysis patients had moderate pain, (30.8%) had mild pain, (27.4%) stated severe pain during AV fistula cannulation, this result of this study is 24.8 for mild pain, 59.3%for moderate pain , 15.9 for sever pain .that is mean agree with result of this study.⁹

Koulea etal., (2020) stated the review of articles showed a favorable effect of cryotherapy in minimizing the pain of arteriovenous fistula hemodialysis patients.¹⁰

Aitken etal.,(2013) stated mild pain of AV fistula disagree with result of this study..¹¹

Discussion of AV fistula post cryotherapy

Display significant differences between pre and post cryotherapy intervention for hemodialysis patient (P-value = 0.008) at the ($P \leq 0.05$) level of significance.

On days 1 and 2 of HD in the experimental group, the objective AV fistula puncture pain ratings were discovered to have dramatically decreased ($P = 0.001$) from an average of 3.8 on day 1 of HD (when the patient got regular treatment) to 0.7 on day 2 of HD (when cryotherapy was administered). When compared to the subjective AV fistula puncture pain scores (2–7) on day 1 of HD, there was a significant decrease ($P = 0.001$) on day 2 of HD (Sabitha &etal.,2008).¹²

In this study, cryotherapy was observed to considerably lower the pain score in the experimental group ($P = 0.001$). Cryotherapy's adoption as a non-pharmacological alternative is linked to a number of advantages, including affordability and availability. Studies have shown that cryotherapy is effective at reducing pain (sabitha etal.,2008)¹²,(Hassan etal.,2012)¹³ Cryotherapy also has practical relevance since it is simple for nurses to apply and provides quick pain relief for AVF puncture-related discomfort (Alamer etal., 2017).⁸

Patients on hemodialysis who experience AV fistula puncture discomfort might benefit from cryotherapy. The frequency of AV fistula punctures was not correlated with the duration of usage (number of punctures), educational level, or age of the patients; however, the degree of the pain was connected with the female sex (Sabitha etal.,2008).¹²

Conclusions

The study concluded that there is a positive effect for cryotherapy on pain of arteriovenous fistula for hemodialysis patients

Recommendations

The study recommends that future studies could focus on the pain of hemodialysis procedure with a larger sample size and in more Hemodialysis Centers in Iraq.

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