



COMPARE THE EFFECT OF HEGU POINT ICE MASSAGE AND 2% LIDOCAINE GEL ON ARTERIOVENOUS FISTULA PUNCTURE RELATED PAIN AMONG PATIENTS ON HEMODIALYSIS

Author

Mrs. Prajusha Unni. K
Assistant Professor
Department of Medical Surgical Nursing

Co author

Mrs. Seelia Peter
Associate Professor, Phd scholar
Manipal College of Nursing

Abstract

The present study entitled “Compare the effect of Hegu point ice massage and 2% Lidocaine gel on arteriovenous fistula puncture related pain among patients on hemodialysis in a selected hospital, Perinthalmanna. **Objectives:** Assess the pre-test level of pain during arteriovenous fistula puncture among hemodialysis patients in both experimental groups; Assess the effect of Hegu point ice massage on level of pain during arteriovenous fistula puncture among hemodialysis patients; Assess the effect of 2% Lidocaine gel on level of pain during arteriovenous fistula puncture among hemodialysis patients; Compare the effect of Hegu point ice massage and 2% Lidocaine gel on level of pain during arteriovenous fistula puncture among hemodialysis patients; Find out the association between pretest level of pain with selected socio demographic and clinical variables. **Methodology:** Quantitative approach and Quasi experimental pre-test post-test two group design was selected. The study was based on modified Donabedian model. The study was conducted in KIMS Al Shifa hospital, Perinthalmanna among 70 hemodialysis patients using non-probability purposive

sampling technique. Semi structured questionnaire and Numerical Pain Rating scale was used for data collection. Pre-test was done during first session of hemodialysis for both experimental group 1 and 2. Experimental group 1 received Hegu point ice massage and experimental group 2 received 2% Lidocaine gel and post-test was done during second session of hemodialysis using Numerical Pain Rating Scale. **Analysis:** Data were analysed by using descriptive and inferential statistics. **Results:** The mean post-test pain score of both experimental group 1 and group 2 was 4.21 and 2.7 respectively which was highly significant compared to the pre-test pain score of 6.21 and 6.42 respectively. The obtained t value was 6.551 with a p value of <0.001. The findings showed that both Hegu point ice massage and 2% Lidocaine gel was effective in reducing AV fistula puncture related pain, with 2% Lidocaine gel being more effective. The study also revealed that there is significant association between gender and past history of habits with pre-test level of pain. **Conclusion:** The study concluded that both Hegu point ice massage and 2% Lidocaine gel was effective in reducing arteriovenous fistula puncture related pain among patients on hemodialysis with 2% Lidocaine gel being more effective, comparing the mean post-test pain score of both groups. The study also concluded that there was significant association between gender and past history of personal habits with pre-test level of pain whereas on the other hand there was no significant association between pre-test level of pain with their selected clinical variables.

Keywords: AV Fistula puncture related pain, Numerical Pain Rating Scale, Hegu point ice massage, 2% Lidocaine gel, Hemodialysis patients.

Background of the problem

Chronic renal failure is a devastating medical, social, and economic problem for both patients and their families in India. Most CKD patients reporting to tertiary care centers in India are in the final stage where Renal Replacement Therapy (RRT) is the only option at that stage. Hemodialysis (HD) is the most frequently used RRT with the AV fistula (AVF) being the gold standard for vascular access. Hemodialysis is extracorporeal removal of waste products such as creatinine and urea and free water from the blood when kidney are in a state of failure. There are three different types of vascular access for hemodialysis arteriovenous fistula (AVF), arteriovenous graft (AVG) and central venous catheter (CVC). In comparison with arteriovenous graft and central venous catheters, the use of arteriovenous fistula are consistently associated with low rates of morbidity and mortality.

A study published in Open Journal of Nursing [2016] reported pain intensity in chronic renal patients undergoing hemodialysis during the arteriovenous fistula cannulation. Pain was reported as moderate in

58.5% of patients, intense in 30% and mild in 11.5%. Pain relief is emphasized as an important part of ESRD treatment. Alleviation of this pain might improve the acceptance of the procedure and the quality of life. A review of literature reveals various pharmacological and nonpharmacological interventions for reducing fistula puncture-related pain, including the use of Lidocaine spray, EMLA topical anesthetic cream, Lidocaine gel 2%, aromatherapy with lavender, ethyl chloride spray and buttonhole cannulation technique. Non-pharmacological interventions to reduce pain such as rhythmic breathing, fistula cryotherapy, behavioral cognitive strategies as distraction, relaxation, biofeedback, thought stopping, positive self talk, guided imagery and biophysical, intervention such as massage, pressure, transcutaneous electrical nerve stimulation [TENS] and heat and cold application.

Cold application is a cutaneous stimulation technique and an inexpensive nursing intervention that is advocated to minimize pain in patients. Hegu point is an acupressure point between thumb and index finger. Modern physiologist has put forward the “neural hypothesis” stating that the clinical influence of acupressure is transmitted primarily through the stimulation of sensory nerves that provides signals to the brain, which processes this information and then causes clinical changes associated with treatment. Hegu point consist of deep branches of median nerve. Pain management is an integral part of nursing. Pain relief and alleviation is the base of nursing care. Nurse’s play a greater role in minimizing the pain and discomfort during any invasive procedure. Pain management is one of the main facets of nursing care, where nurses needs to be competent

NEED OF THE STUDY

Chronic renal failure is a worldwide public health problem. Chronic renal failure is more prevalent in the elderly population. According to the World Health Organization (WHO) Global Burden of Disease Project, diseases of the kidney and urinary tract contribute to approximately 8,50,000 deaths every year. According to statistics, the population of dialysis patients in the United States doubles every 10years. It is estimated that the number of hemodialysis patients in the world will have reached 3.5 million people by 2020. The Saudi Centre for Organ Transplantation reported in 2015 that there are 17,000 diagnosed CKD cases in KSA of which 15,000 undergo regular hemodialysis. In India, it is estimated that about 1 lakh persons suffer from ESRD each year. Maintenance dialysis therapy is the commonest mode of renal replacement therapy and demand for this service is increasing progressively. According to National Kidney Foundation, Dialysis Outcome Quality Initiative (DOQI), 2005 reported that AV fistula remains as a gold standard for vascular access in hemodialysis patients.

Hegu point ice massage is a treatment in which the patients are exposed to extreme cold for short duration. Ice massage reduces sensation, including pain sensation, by slowing the transmission of sensory message from local nerve fibers to the brain. It reduces the inflammation. Considering the significance of pain, analgesia relief must be considered as one part of treatment in these patients. Lidocaine is one of the important agent that can be used for HD pain. Nurses as advocates for adults, are committed to minimize the emotional and physical impacts of painful procedures.

Providing pain relief is considered a most basic human right and it is the obligation of the nurse to utilize best way to deal with pain control. Experience with patients on hemodialysis during clinical posting, their symptoms and problems they face in daily life initiated the researcher interest to help the patients. Among all the symptoms pain is one of their major problem. On an average, a patient on maintenance hemodialysis undergoes twenty four AV fistula punctures per month and would continue to do so throughout their lifetime or until a successful renal transplant. Pain inflicted by the insertion of large cannula into the AVF is a significant cause of concern for adults on regular hemodialysis.

REVIEW OF LITERATURE

A quasi experimental study was conducted in Iran in 2015 to investigate the effect of EMLA cream, Lidocaine spray, and ice pack on arteriovenous cannulation pain intensity in hemodialysis patients. 40 patients with AV fistula participated in the study. Pain intensity was measured in one group before intervention and after application of Lidocaine spray, EMLA cream, and ice pack using pain intensity numerical scale. The data were analyzed with SPSS16 using ANOVA. The reduction in mean pain intensity was significantly greater with EMLA cream compared to Lidocaine spray and ice pack ($P < 0.001$). The pain score was also significantly different before intervention and after application of three interventions ($P < 0.001$). The study concluded that all the three methods were effective in reducing pain intensity with EMLA cream exerting the great effect in decreasing the puncture related pain intensity of arteriovenous fistula cannulation.

A quasi experimental time series design was conducted to assess the effectiveness of cryotherapy during arteriovenous fistula puncture related pain among hemodialysis patients in Mangalore in 2015. The study consisted of 50 samples, 25 in experimental group and 25 in control group. Data was collected using the demographic variable, numerical rating scale and observational checklist for behavioral response. After 1st assessment of arteriovenous puncture related pain, cryotherapy was given next cycle of hemodialysis to experimental group. There was a significant difference between the pre-test and post- test behavioral response scores and pain scores in the experimental group ($p < 0.05$). The mean post-test pain scores of the experimental group (3.3 ± 1.37 , 2.8 ± 1.09) were lower than the mean post- test pain scores of the control group (4.32 ± 0.9 , 4.56 ± 1). The findings of the study concluded that cryotherapy was effective in reducing subjective pain and objective behavioral response scores of arteriovenous fistula puncture related pain.

STATEMENT OF THE PROBLEM

A study to compare the effect of Hegu point ice massage and 2% Lidocaine gel on arteriovenous fistula puncture related pain among patients on hemodialysis in a selected hospital, Perinthalmanna.

OBJECTIVES

- Assess the pre-test level of pain during arteriovenous fistula puncture among hemodialysis patients in both the experimental groups.
- Assess the effect of Hegu point ice massage on level of pain during arteriovenous fistula puncture among hemodialysis patients.
- Assess the effect of 2% Lidocaine gel on level of pain during arteriovenous fistula puncture among hemodialysis patients.
- Compare the effect of Hegu point ice massage and 2% Lidocaine gel on level of pain during arteriovenous fistula puncture among hemodialysis patients.
- Find out the association between pre-test level of pain with selected socio demographic and clinical variables.

HYPOTHESIS

H1 There is a significant difference in the level of pain among hemodialysis patients before and after Hegu point ice massage.

H2 There is a significant difference in the level of pain among hemodialysis patients before and after 2% Lidocaine gel.

H3 There is significant difference in post-test level of pain between hemodialysis patients in experiment group1 and group 2.

H4 There is a significant association between the pre-test level of pain with selected socio demographic and clinical variables.

CONCEPTUAL FRAMEWORK OF THE STUDY

The study was based on modified Donabedian's model

RESEARCH METHODOLOGY

Research approach: Quantitative approach

Research design: Quasi experimental pretest posttest two group design

Setting: The study was conducted in hemodialysis unit of KIMS Al Shifa hospital, Perinthalmanna.

Sample: The samples were patients with AV fistula in hemodialysis unit in KIMS Al Shifa hospital

Sample size: In this study sample size is 66

Sampling technique: Purposive sampling technique

Tool and technique: Semi structured questionnaire and Numerical Pain Rating Scale

TOOL-1 Semi structured questionnaire

It consist of two sections

Section A

Socio demographic variables: It consist of 3 items which includes age in years, gender and past history of personal habits.

Section B

Clinical variables: It consist of 5 items which includes chronicity of renal failure, presence of any comorbid illness, duration of hemodialysis, number of dialysis session per week and duration of fistula. Data collection technique used were self reporting.

TOOL 2: NUMERICAL PAIN RATING SCALE

The Numerical Pain Rating Scale (NPRS) is a subjective measure in which individuals rate their pain on an eleven-point numerical scale. The scale is composed of 0 (no pain at all) 1-3 [mild pain], 4-6 [moderate pain] and 7-10 [severe pain].

DATA COLLECTION PROCESS

The formal approval from Principal, Al Shifa College of Nursing, IRB and ethical committee of the institution was obtained. The study setting permission was collected from the hospital authorities. In the experimental group 1 study was conducted in patients who came for hemodialysis on monday, wednesday and friday sessions. In the first session of hemodialysis the socio demographic variables and clinical variables was obtained and pain level was assessed using Numerical Pain Rating Scale. In the second session of hemodialysis, Hegu point ice massage was given to the experimental group 1 with a 2x2x2cm ice cube that was inserted in a plastic glove and covered with a single- layer cotton cloth which was used to provide a rotational massage on the web between the thumb and index finger of the hand not having the AV Fistula [contralateral arm]. The procedure was started 10 minutes before the insertion of AV Fistula and continued for about 2 minutes. Pain was assessed for experimental group 1 using the Numerical Pain Rating Scale.

In the experimental group 2 study was conducted in patients who came for hemodialysis on tuesday, thursday and saturday sessions. In the first session of hemodialysis the socio demographic variables and clinical variables was obtained and pain level was assessed using Numerical Pain Rating Scale. In the second session of hemodialysis a 2cc of 2% Lidocaine gel was used in the area of 5cm over the fistula 12 minutes before the fistula needle insertion. The skin was then cleared off from the gel and then disinfected before insertion of fistula and the pain was assessed using Numerical Pain Rating Scale.

ETHICAL CONSIDERATION

Ethical clearance was taken from institutional authorities and ethical committee.

RESULTS

Section A: Distribution of samples based on socio demographic and clinical variables.

The characteristics of the study population were as follows:

Majority of the study participants in the experimental group 1, 18 (54.54%) and experimental group 2, 13 (39.4%) were in the age group of 41-60 years, 11 (33.33%) of study participants in the experimental group 1 and 10 (30.30%) of study participants in the experimental group 2 belonged to the age group of 61-80 years, 3 (9.1%) of study participants in the experimental group 1 and 9 (27.27%) of study participants in

the experimental group 2 were in the age group of 20- 40years. And remaining 1 (3.03%) of study participant each in the experimental group 1 and experimental group 2 belonged to the age group of >80 years.

With respect to gender, majority of the study participants, 20 (60.6%) in the experimental group 1 and experimental group 2 were males and 13 (39.4%) study participants in the experimental group 1 and in the experimental group 2 were females.

With regard to past history of personal habits, 15 (45.45%) in the experimental group 1 and 13 (39.39%) in the experimental group 2 had no past history of personal habits, 6 (18.18%) study participants in the experimental group 1 and 8 (24.24%) in the experimental group 2 had combination of personal habits, 5 (15.15%) study participants in the experimental group 1 and 2 (6.06%) in the experimental group 2 had past history of tobacco chewing, 4 (12.12%) study participants in the experimental group 1 and 6 (18.18%) in the experimental group 2 had past history of smoking and 3 (9.1%) study participants each in the experimental group 1 and experimental group 2 had past history of alcoholism.

With respect to chronicity of renal failure, majority of the study participants in experimental group 1, 24 (72.7%) and 18 (54.6%) in the experimental group 2 had duration of 3 years and more. 8 (24.3%) study participants in the experimental group 1 and 14 (42.4%) in the experimental group 2 between 2-3 years, 1 (3%) study participant each in experimental group 1 and experimental group 2 between 1-2 years. No study participants had chronicity of renal failure less than 1 year.

With regard to presence of comorbid illness, 2 (6.06%) study participants each in experimental group 1 and experimental group 2 had diabetes mellitus, 13 (39.4%) study participants in the experimental group 1 and 18 (54.54%) in the experimental group 2 had hypertension. 18 (54.54%) study participants in the experimental group 1 and 13 (39.4%) in the experimental group 2 had both diabetes mellitus and hypertension.

With respect to duration of hemodialysis, 13 (39.4%) study participants in experimental group 1 and 14 (42.42%) in experimental group 2 had duration of hemodialysis for 3 years and more, 13 (39.4%) study participants in the experimental group 1 and 5 (15.15%) in the experimental group 2 between 2-3 years, 6 (18.2%) study participants in the experimental group 1 and 8 (24.24%) in the experimental group 2 between 1-2 years and 1 (3%) study participant in the experimental group 1 and 6 (18.2%) in the experimental group 2 had duration of <1year.

With respect to number of dialysis sessions per week, 27 (81.8%) of study participants in the experimental group 1 and 26 (78.8%) in the experimental group 2 had dialysis sessions of 3 times/week and 6 (18.2%) study participants in the experimental group 1 and 7 (21.2) in the experimental group 2 had dialysis sessions of 2 times/week.

With regard to duration of fistula, 13 (39.4%) study participants in the experimental group 1 and 13 (39.4%) in the experimental group 2 had duration of about 3 years and more, 11 (33.33%) study participants in the experimental group 1 and 5 (15.15%) in the experimental group 2 were between 2-3 years, 7 (21.21%) study participants in the experimental group 1 and 5 (15.15%) in the experimental group 2 belonged to 1-2 years and 2 (6.06%) study participants in the experimental group 1 and 10 (30.3%) in the experimental

group 2 had duration of 1 and 5 (15.15%) in the experimental group 2 were between 2-3 years, 7 (21.21%) study participants in the experimental group 1 and 5 (15.15%) in the experimental group 2 belonged to 1-2 years and 2 (6.06%) study participants in the experimental group 1 and 10 (30.3%) in the experimental group 2 had duration of <1 year.

Section B

In the assessment of pre-test level of pain, none of the study participants had mild intensity of pain. Majority of the study participants, in experimental group 1, 21 (63.6%) and 18 (54.5%) in the experimental group 2 had moderate intensity of pain and 12 (36.4%) study participants in the experimental group 1 and 15 (45.5%) in the experimental group 2 had severe intensity of pain.

In the assessment of post-test level of pain, none of the study participants had severe intensity of pain. 10 (30.3%) study participants in the experimental group 1 and 27 (81.8%) in the experimental group 2 had mild intensity of pain. 23 (69.7%) study participants in the experimental group 1 and 6 (18.2%) in the experimental group 2 had moderate intensity of pain.

Section C

Mean pre-test and post-test pain scores of experimental group 1 was 6.21 and 4.21 respectively. The obtained t value was 15.319 and p value was <0.001 and it indicates that Hegu point ice massage was effective in reduction of AV fistula puncture related pain in hemodialysis patients.

Mean pre-test and post-test pain scores of experimental group 2 was 6.42 and 2.7 respectively. The obtained t value was 28.126 and p value was <0.001 and it indicates that 2% Lidocaine gel was effective in reduction of AV fistula puncture related pain in hemodialysis patients.

Section D

Mean post-test pain scores of both experimental group 1 and group 2 was 4.21 and 2.7 respectively. The obtained t value was 6.551 and p value was <0.001 and it indicates that both Hegu point ice massage and 2% Lidocaine gel was effective in reduction of AV fistula puncture related pain in hemodialysis patients with 2% Lidocaine gel being more effective.

Section E

Study revealed that there was significant association between pre-test level of pain of study participants with their gender and past history of personal habits whereas on the other hand there was no association between pre-test level of pain of study participants with their clinical variables.

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