



A Case Study

Cold Compress Therapy Against Muscle Stiffness in Patients with Hypokalemia

Yanti Srinayanti¹, Andika Abdul Malik¹, Yudisa D. S. Lutfi²¹ STIKes Muhammadiyah Ciamis, Jln. KH. Ahmad Dahlan No. 20 Ciamis 46216, Indonesia² Akademi Keperawatan Pemerintah Kabupaten Ngawi, Department of Nursing, East Java, Indonesia

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CORRESPONDENCE

Phone: +62 813-2018-7221

E-mail: yanti678@gmail.com

A B S T R A C T

Introduction: Progressive muscle stiffness, especially in the proximal muscle groups of the lower limbs, in patients with hypokalemia paralysis causes recurrent acute attacks.

Objective: The purpose of this study was to describe the results of applying cold compress therapy as an effort to reduce muscle stiffness in hypokalemia paralysis patients.

Method: This research used the design of the Evidence Based Nursing implementation process consisting of: (1) compiling questions (Problem/population, Intervention, Comparison and Outcome) to be implemented, (2) tracing evidence related to cases to be discussed, (3) assessing the evidence presented. obtained in stage two, and (5) evaluation of the implementation of Evidence Based Nursing.

Result: Giving cold compress therapy intervention, the visual analog scale decreased from level 7 (very severe scale) or scale 1 (mild pain), the patient said that significant decrease in pain scale after cold compress therapy.

Conclusion: Cold compress therapy for 15 minutes can reduce the scale of pain and muscle stiffness.

INTRODUCTION

Hypokalemia is a lack of potassium in human blood. Potassium is the most important mineral and contains positively charged ions in body cells. Potassium keeps the heart, brain, kidneys, muscle tissue, and other body organs in normal condition (Pardede SO, 2012) (Septilia, Arfida., Mohammad, 2019). Potassium levels in hypokalemia are below the normal value of 3.5 mEq/L (Nathania, 2019). The trigger for hypoglycemia for each individual is not the same, nor is there a correlation between decreased serum potassium levels and the severity of paralysis or skeletal muscle weakness. Aggression can last from a few minutes to a few days. Weakness in attacks can be general or focal (Ulfa, 2013). Patients can experience attacks several times, can also be repeated attacks

using the time interval of the attack also varies. Weakness usually occurs in the muscles of the legs and arms, but can sometimes affect the eye muscles, respiratory muscles and swallowing muscles. Disorders of respiratory muscle weakness and swallowing muscles can be fatal (Samurti, 2015).

Periodic paralysis is a condition of episodic, reversible paralysis or weakness associated with transient changes in serum potassium levels caused by hypokalemia but also hyperkalemia (Surya, Angga Pratama Fauziah, 2021). Hypokalemia periodic paralysis is a disorder characterized by acute muscle weakness due to episodic hypokalemia (Statland JM, Fontaine B, Hanna MG & NE, Kissel JT, Sansone VA, 2018). Hypokalemia Paralysis is thought to be associated with

increased activity of the Na/K ATPase pump, which is the transfer of potassium into the intracellular space of skeletal muscle (Gunawan Septa Dinata, 2018). One hypothesis is that patients with thyrotoxicosis Hypokalemia paralysis have a predisposition to activation of Na/K ATPase by thyroid hormones and hyperinsulinism. (Kokunai Y, Nakata T, Furuta M, Sakata S & Aiba T, 2014).

Prevalence number 1 in 100,000 people, the incidence of hypokalemia is more common in men than women and is usually more severe (Ismy, 2020). The frequency of attacks is highest at the age of 15 to 35 years and then decreases with increasing age, the disorder is characterized by low potassium levels (<3.5 mmol / L) at the time of the attack, accompanied by weakness to skeletal muscle paralysis or often called hypokalemia paralysis. Hypokalemia can occur due to precipitating factors such as foods with high carbohydrate levels, rest after physical exercise, long trips, administration of certain drugs, surgery, menstruation, alcohol consumption and others. (Widjajantia, 2015).

Recommendations for the management of muscle paralysis due to potassium deficiency with hypokalemia paralysis is to do cold compresses in the lower extremity muscle area. Where giving this cold compress aims to treat pain and reduce signs of inflammation in the muscles (Peake et al, 2017), and cold water stimulation helps the performance function of capillary permeability to decrease, improve cognitive function, lower the prefrontal cortex temperature in the brain thereby reducing tension on the nerves of the brain and decreasing physiological responses so that the body becomes relaxed (Kellmann, 2018).

Similar studies have shown that cold therapy with water temperature of 10°C for 10 minutes can reduce muscle spasm and pain (Ascensão et al, 2011). Cold therapy provides physiological effects including arteriolar vasoconstriction, decreased cell metabolism resulting in decreased cell oxygen demand, reduced swelling process, reduced pain, reduced muscle spasm and the risk of cell

death (Leeder, J., Gissane, C., van Someren, K., Gregson, W., & Howatson, 2012). The provision of cold therapy with the cold compress method is expected to help deal with the problem of paralysis caused by hypokalemia. so that it becomes one of the support for muscle stiffness management.

OBJECTIVE

The purpose of this study was to describe the results of applying cold compress therapy as an effort to reduce muscle stiffness in hypokalemia paralysis patients

METHOD

Based on the implementation of Evidence Based Nursing (EBN) in nursing practice, the case study uses an activity flow based on the EBN process in nursing practice (Malik et al., 2021; Setiawan et al., 2021; Widiyanti et al., 2021). Five steps are carried out in the EBN implementation process consisting of: (1) compiling Problem/Population, Intervention, Comparison and Outcome (PICO) questions to be solved, tracing evidence related to cases to be discussed, (3) assessing the evidence obtained in stage two, and (5) evaluation of EBN implementation. In the first stage, the question presented refers to PICO, namely "what interventions can give to relieve pain due to muscle paralysis in patients with hypokalemia paralysis?"

This study used a descriptive approach with case study exposure through nursing care methods, namely assessment, nursing diagnosis enforcement, planning, implementation and evaluation of nursing results in the form of data.

The next step is the application of EBN given to a client with hypokalemia paralysis in Benda Village, Cikalang Village, Tawang District, Tasikmalaya City. First, the procedure is explained to the client prior to the intervention. At that time the client agreed to give verbal consent. Before the EBN is given, a comprehensive assessment of the patient is carried out first, and the implementation is carried out for 15 minutes within 3 days from 6-8 February 2021.

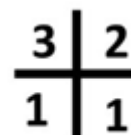
RESULTS

The results of the client assessment of Mrs. A, 48 years old, female gender, medical diagnosis of hypokalemia paralysis, the client says what she feels is muscle pain, cramps, tingling in the extremities, especially the lower extremities. Before doing cold compress therapy. Measurement of vital signs including BP 100/60 mmHg, temperature 36.7°C, R 24 x/minute.

Mrs. A is 48 years old, Muslim, married, teacher occupation, last education S1 and lives in Cikalang Village, Tawang District, Tasikmalaya City, a source of information from clients. The main complaint of the client when the assessment was carried out on February 6, 2021 was stiffness, pain, cramps in the lower extremity muscle area, characteristics of pain such as being stabbed with a

pain scale of 7, intensity of 30 minutes, complaints arise suddenly. The pain gets worse when the client changes position and makes movement.

Figure 1. muscle strength



Parameters:

1: No movement, muscle contractions can be palpated or seen

2: Full muscle movement against gravity, with support

3: Normal movement against gravity

Table 1. Nursing Diagnoses adaptation SDKI PPNI edition 1 issue 3, third revision 2017.

No	Diagnose	Number Diagnosa	Page
1	Acute pain	D.0077	172
2	Physics Impairment	D.0054	124
3	Activity Intolerance	D.0056	128
4	Anxiety	D.0080	180
5	Ineffective Coping	D.0096	210
6	Risk of injury	D.0136	294

Table 2. Intervention adaptation SIKI PPNI 1st edition issue 2, 2018

No	Intervention	Number of Intervention	Page	Done/not
1	Cold compress Apply a cold compress to the injured area	I.08234	131	Done
2	Mobility support Assess the patient's ability to move the lower and upper extremities	I.05173	30	Done
3	Energy management Identify body function disorders that result in weakness	I.05178	176	Done
4	Anxiety reduction Identify level of anxiety (eg condition, time of day, stressor)	I.09314	387	Done
5	Family coping support Identify emotional responses to current conditions	I.09260	28	Done
6	Fall prevention education Check readiness, ability to receive information and perception of fall risk	I.12407	81	Done

Pharmacological therapies given by doctors include Aspar-k 300mg 3x1, KSR 600mg 1x1 to relieve muscle stiffness and non-pharmacological therapy clients often apply cold compresses to stiff muscle areas, drink young coconut water 2 glasses each day, consume fruits that high in potassium such as bananas. Measurement of vital signs including BP 100/60 mmHg, temperature 36.7°C, R 24 x/m, pain scale 7.

The above diagnosis is characterized by muscle stiffness in the lower extremities, and the client said that prior to treatment he experienced dizziness, muscle pain, anxiety, nausea, stiffness, aches all over the body until dysarthria occurred..

Nursing interventions in this case include 1) Assessing the lower extremities, 2) Instructing the client to do cold compress therapy, 3) Evaluation of implementation results (Firmansyah, Setiawan, & Ariyanto, 2021; Setiawan, Khaerunnisa, Ariyanto, & Firdaus, 2020).

DISCUSSION

Researchers evaluated the provision of cold compress therapy interventions. The result Mrs. A admits that pain and stiffness from the paralysis are reduced. VAS (Visual Analogy Scale) before being given cold compress therapy was a very severe scale of 7 pain (very severe scale), and after being given cold compress therapy intervention decreased to a scale of 1 mild pain (mild pain), this proves that the intervention of cold compress therapy has a significant effect on paralysis in Mr. A. The client said that before being given cold compress therapy intervention, she often experienced muscle stiffness caused by motor nerve abnormalities in the lower extremities. After being given the cold compress intervention, the stiffness began to decrease, especially in the lower extremities from the initial scale of 1 to 3 in the lower right extremity and a scale of 1 to 4 in the lower left extremity.

In the Evidence-Based Nursing (EBN) implementation process, this study has a weakness, namely that the intervention was only carried out on one respondent. But even

so, at least this study has been able to provide an overview of the application of EBN in patients with hypokalemia paralysis. Suggestions for the next researcher to conduct research on several age levels who suffer from hypokalemia paralysis.

The results of the pain measurement graph using the Visual Analog Scale (VAS), and the measurement of extremity muscle stiffness using the extremity rating scale. Show in the figure below.

Figure 1. Visual Analog Scale

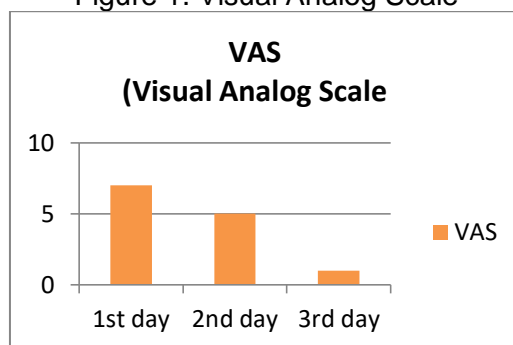


Figure 1. Implementation of the results, the graph above shows before and after doing cold compress therapy, on day 1 the client felt severe pain that was unbearable with a pain scale of 7, day 2 the pain scale decreased to 5, and the last day or day 3 the client felt good and the pain is starting to not feel.

Figure 2. Muscle Strength Assesment

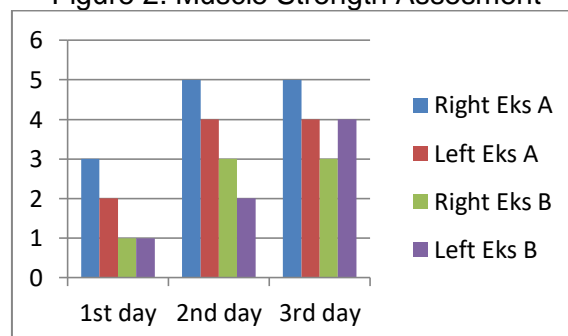


Figure 2. Implementation of the results, the graph above shows the scale of muscle stiffness before and after doing cold compress therapy. Day 1, a scale of 3 on the right upper extremity means normal movement against gravity, a scale of 2 on the left upper extremity means full muscle movement against gravity while on the right and left

lower extremities a scale of 1 means no muscle movement (experiencing paralysis). Day 2, a scale of 5 on the right upper extremity means normal muscle strength, a scale of 4 on the left upper extremity means normal full movement, while on the right lower extremity a scale of 3 means normal movement against gravity and a scale of 2 on the left lower extremity means full muscle movement against gravity. And for day 3, a scale of 5 on the right upper extremity means normal muscle strength, 4 on the left upper extremity means normal full movement, while on the right lower extremity a scale of 3 means normal movement against gravity and the left lower extremity on a scale of 4 means movement normal full.

From the two pictures above, cold compress therapy can both minimize pain and muscle stiffness in hypokalemia paralysis clients with significant results. For the pain scale it goes down to a scale of 1, and for the muscle stiffness scale it goes down to 4, which means that the muscles are getting stronger.

CONCLUSIONS

Cold compress therapy is significantly in reducing pain due to muscle stiffness in hypokalemia paralysis patients. Giving cold compress therapy for 3 days that decrease in pain scale and increase muscle strength, especially the lower extremity muscle.

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