PROFESIONAL HEALTH JOURNAL
Volume 7, No. 1, December 2025 (Page. 167-173)
Available Online at https://www.ojsstikesbanyuwangi.com/index.php/PHJ/index
E-ISSN 2715-6249
DOI: https://doi.org/ 10.54832/phj. v7i1.1043

The Effect of Cold Compresses on Pain in Patients with Lower Leg Varicose Veins (VVTB) Post Evovenous Laser Ablation (EVLA) in the IPJVT Cathlab Action Room, Dr. Saiful Anwar Hospital, East Java Province

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ARTICLE INFORMATION

Article history
Received (14 January 2025)
Revised (4 February 2025)
Accepted (5 February 2025)

Keywords
Cold compress, CVI, EVLA, Pain

ABSTRACT

Introduction: Varicose veins are a manifestation of venous insufficiency syndrome where in this syndrome the blood flow in the veins experiences a retrograde flow direction or backflow towards the legs which then experiences congestion. Minimally invasive surgical therapy such as Endovenous Laser Ablation (EVLA) causes pain, so therapy is needed to reduce pain, one of which is with cold compresses
Objectives: The purpose of this study was to identify the effect of cold compresses on pain
Methods: *The design of this study was observational analytic with a cross-sectional approach, using total sampling technique with a sample of 36 respondents. This research instrument used an observation sheet with a Numeric Rating Scale (NRS). Data analysis with the Wilcoxon test with SPSS IBM Version 23*
Results:*The results showed that most respondents (pre-test) were 23 (63.9%), while most (post-test) experienced mild pain 32 respondents (88.9%). The results of the Wilcoxon statistical test obtained a p value = 0.000, which can be concluded that there is an average difference between pre-test and post-test pain*
Conclusions: *The application of cold compresses can help post-operative patients to reduce the intensity of pain, by giving cold compresses, patients who experience pain feel a cold sensation given using a cold pack on the area of the former operation or around the area of the former operation can smooth blood circulation, reduce post-operative edema that has been performed so that patients feel reduced pain after being given the cold compress*

Introduction

Varicose veins are a manifestation of venous insufficiency syndrome where in this syndrome the blood flow in the veins experiences a retrograde flow direction or backflow towards the legs which then experiences congestion. There are 3 types of veins in the legs, namely peripheral veins, deep veins and connecting veins (perforating). This vein is the vein that most often suffers from varicose veins. Although this disease is often found in clinics, there is still little attention from the medical profession, on the grounds that this disorder has a mild course and low mortality (Pratiknyo et al., 2016). The prevalence of varicose veins in the United States and Europe is 25-35% in women and 15% in men. Meanwhile, in China, data was found that 8.9% of the adult population had varicose veins . However, in Indonesia there is no definite statistical data due to the lack of data collection on this disease (Sahreni and Christina 2019). In Indonesia, the

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current incidence of varicose veins is estimated at around 25%-30% in women and 10%-20% in men (Aisyah, 2021). Meanwhile, a study conducted on female tobacco pickers in Ajung District, Jember Regency found that almost 50% of female tobacco pickers aged > 40 years suffered from Lower Leg Varicose Veins (VTB) (Faizal Akbar et al. 2019). According to Kartika (2015), 2.5 million people suffer from Chronic Venous Insufficiency (CVI) and 20% of them develop venous ulcers in the United States. According to Makivaara (2009), people with VTB have a higher risk of suffering from congestive heart failure (CHF) (Akbar, Astuti, and Wisudanti 2019). Nowadays, varicose veins are starting to get public attention, because they can cause cosmetic problems due to discomfort and unattractive appearance of the sufferer's legs, in addition to complaints of pain, redness, burning, itching, cramps, calf muscle spasms and mild swelling in the legs. In severe cases, permanent leg edema can occur accompanied by pigmentation, ulceration, and recurrent cellulitis. This condition causes discomfort and a lack of self-confidence in sufferers (Pratiknyo et al. 2016).

Therapy for varicose veins varies from conservative to surgical. In patients with varicose veins, it is necessary to explain to patients that therapy is only to reduce complaints, widen the veins, and can worsen over time. So it is important to educate patients if surgery is needed. In the therapy of small and early varicose veins, conservative therapy and sclerotherapy can be performed in the initial management. In accordance with current guidelines, endovenous laser ablation (EVLA) has replaced high ligation and stripping as the first choice of treatment for incompetent saphenous veins in many countries, because it has proven to be very effective.

From a survey conducted in the Cathlab Action Room of Dr. Soetomo Hospital. Saiful Anwar East Java Province, as many as 179 patients in 2022 and 118 patients in 2023 suffered from CVI disease with a classification of C4 to C6 which required EVLA. And patients often complain of pain during the ablation process. When a preliminary study was conducted on February 1 to February 29, 2024 to 5 respondents, all five said pain during ablation. And of the 5 patients said the pain was reduced by applying cold compresses after the procedure in the area where EVLA had been performed. The aim of this reasearch was interested in taking a study entitled "The effect of giving cold compresses on reducing the pain scale in patients with Varicose veins post Endovenous Laser Ablation (EVLA) in the Cathlab Action Room of the Integrated Heart and Vascular Installation (IPJVT) of Dr. Saiful Anwar Hospital, East Java Province.

Methods

This study used a cross-sectional design and an analytical method. The population in this study was 36 respondents, with a sample size of 36 respondents undergoing Endovenous Laser Ablation. A total sampling strategy was utilized to choose this study sample. In this study, a numerical rating scale (NRS) research instrument was used, a standard instrument so that no repeat validity and reliability tests were carried out. Following the administration of PSP (explanation before consent) and the attainment of written informed consent, data collection was initiated. The next step in processing quantitative data is cleaning, editing, coding, and entering the data after collection. To examine the distribution of frequencies for each variable, descriptive statistics were used to the data. After the data is obtained, it is statistically tested, namely by analyzing the frequency of pain scale using a Wilcoxon test. The results of this analysis are then used to conclude a hypothesis which has been approved by the health research ethics commission of the RSSA with letter number 400/155/K.3/102.7/2024

Results

Data grouping of pre and post pain criteria given compresses are shown in Table 1.

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Table 1 Pre and Post Cold Compress Pain Criteria

Criteria	Frequency (n)	Percentage (%)
Pretest		
Light	1	2,8
Medium	23	63,9
Heavy	12	33,3
Total	**36**	**100**
Postest		
Light	32	88,9
Medium	4	11,1
Heavy	0	0
Total	**36**	**100**

The results of the study showed that most respondents (pre-test) experienced moderate pain, 23 respondents (63.9%), while most respondents (post-test) experienced mild pain, 32 respondents (88.9%).

Table 2 Wilcoxon Test Analysis of Pain in Chronic Venous Insufficiency Patients Post Endovenous Laser Ablation (EVLA) in the Cathlab Action Room of IPJVT Dr. Saiful Anwar Hospital, East Java Province

	Pre Pain – Post Pain
Z	-5,359[b]
Asymp. Sig. (2-tailed)	0,000

Based on table 2, the results of the Wilcoxon Pain Test in Chronic Venous Insufficiency Post Endovenous Laser Ablation (EVLA) Patients in the IPJVT Cathlab Action Room, Dr. Saiful Anwar Hospital, East Java Province, obtained sig. (tailed) or p value of 0.000 <α, which means H1 is accepted or there is an average difference between pre-test and post-test pain. It can be concluded that there is an effect of pre-test and post-test pain in the control group.

Discussion

Based on the results of the study, the level of pain in patients when EVLA was performed showed that most respondents (pre-test) experienced moderate pain 23 respondents (63.9%), almost half of the respondents experienced severe pain 12 respondents (33.3%) and a small number of respondents experienced mild pain 1 respondent (2.8%). And from 36 respondents, almost all respondents who underwent EVLA in the action room of Dr. Saiful Anwar Hospital, East Java Province were women with a total of 28 respondents (77.8%) with almost all respondents aged > 50 years, namely 32 respondents (88.9%). (Potter & Perry, 2016) states that pain is defined as a condition that affects a person and its extension is known if someone has experienced it. Pain is a warning sign of tissue damage, which must be a primary consideration in nursing. The physiology of pain occurs where pain receptors are organs of the body that function to receive pain stimuli. Organs that act as pain receptors (nociceptors) are free nerve endings in the skin that respond only to strong stimuli that are potentially damaging. Gate control theory states that pain impulses are regulated or inhibited by open and closed defense mechanisms. Efforts to close

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these defenses are the basis of the theory of pain relief (Budi, 2020) in the book Management of Pain in Bunga Rampai (Ningtyas 2023).

One of the factors that influences pain is gender, where in women it is found that the hormones estrogen and progesterone play a major role in the patient's pain sensitivity. The hormone estrogen is known to have a pronociceptive effect that can stimulate the central and peripheral sensitization process. The hormone progesterone has an effect on reducing the pain threshold. This shows the reason why women tend to feel more pain than men. In addition to hormonal factors, psychological factors that influence behavioral expression also play a role in pain perception. So far, depression and anxiety disorders have been associated with increased pain. A study states that depression and anxiety disorders are common in female patients. Higher rates of depression and anxiety disorders among female patients indicate a contribution of gender to the pain scale. In addition, women tend to be excessive in expressing pain than men. (Hidayati et al. 2019)

In addition to gender, age is also a variable that affects pain, especially in children and the elderly. Cognitive abilities are unable to remember explanations about pain or associate pain as an experience that can occur in various situations. Pain is not an unavoidable part of the aging process, because the elderly have lived longer they are more likely to experience pathological conditions that accompany pain. The ability of elderly clients to interpret pain can be complicated by various diseases accompanied by vague symptoms that may affect the same part of the body (Ningtyas 2023).

Ice therapy can be in the form of cold compresses, especially to reduce swelling. This therapy reduces prostaglandins that strengthen the sensitivity of pain receptors and other subcutaneous at the site of injury by inhibiting the inflammatory process. Therapy should be carried out for no more than 30 minutes. In pain management, there are two therapies used, namely pain management with pharmacological and non-pharmacological therapy. Where non-pharmacological pain management is one of them with skin stimulation, namely the administration of cold compresses. Cold compresses are a method of using fluids or tools that can cause a cold sensation in the part of the body that needs it (Purnamasari, Ismonah, and Supriyadi 2014). Cold compresses are a method of using low temperatures that can cause several physiological effects. (Kharimah et al. 2020) Giving cold compresses can reduce pain because it can inhibit the journey of small-diameter nerves in transmitting pain stimuli. So that stimuli from the periphery cannot be transmitted to the central nervous system (Kharimah et al. 2020).

Based on the researcher's opinion, the pain felt by the patient is caused by a series of EVLA procedures such as tissue damage due to needle puncture and as a result of the heat energy emitted by the laser. The experience of sudden or acute pain in a person during EVLA is seen in the form of emotional and behavioral responses such as crying, groaning in pain, frowning or grinning. However, there were some respondents who seemed anxious and in pain during the EVLA process but tried to surrender to continue it. During the research, the thing that worried the patient the most was the pain during the procedure. They felt anxious that they would not be able to endure the pain caused. Of course, age and gender factors greatly influence a person's pain response when receiving pain stimulation. Cold compresses are very necessary to reduce the pain experienced by patients during EVLA procedures. Where most VVTB patients who undergo EVLA are patients with an elderly age of > 50 years. The response to pain stimulation in elderly patients is certainly different from the pain response in young patients. This is what underlies researchers trying to reduce the level of pain after the procedure by applying cold compresses. Cold compresses are one of the nursing actions that do not require collaboration with other medical teams in their administration, cold compresses are effective and easy to do independently by nurses in reducing pain levels. Cold compresses can not only reduce pain levels but also relax

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muscles by reducing tension, which strengthens the sensitivity of pain receptors and other subcutaneous at the site of injury by inhibiting the inflammatory process. The physiological effects of cold therapy can also reduce the temperature of the skin and underlying tissue due to the heat energy released by the laser catheter and are expected to cause vasoconstriction in the veins that have been lasered. And according to researchers, this is very necessary in addition to being a relaxing effect as well as vasoconstriction to prevent recanalization of varicose veins that have been killed. And researchers really hope that this cold compress can also be done when the patient is at home and experiences pain due to EVLA and the patient should not do a warm compress because it is contrary to EVLA. Where a warm compress will actually make the process of recanalization of the veins that have been lasered.

Based on the research results, it was found that the results of the Wilcoxon Pain Test in VVTB Patients after Endovenous Laser Ablation (EVLA) in the Cathlab Action Room of IPJVT Dr. Saiful Anwar Hospital, East Java Province obtained sig. (tailed) or p value of 0.000 <α, which means H1 is accepted or there is an average difference between pre-test and post-test pain. It can be concluded that there is an effect of giving cold compresses on reducing the level of pre-test and post-test pain in VVTB patients after EVLA action.

Varicose veins of the lower leg (VVTB) are normal veins that experience dilation due to the influence of increased venous pressure. Prominent and tortuous superficial veins in the lower extremities with abnormal valve function where blood flow in the veins experiences a retrograde flow direction or backflow towards the legs which then experiences congestion (Pratiknyo, Budiastuti, and Widodo 2016).

EVLA complications can be categorized as minor or serious complications. Minor complications include bruising (51%), hematoma (2.3%), temporary numbness (3.8%), phlebitis (7.4%), induration (46.7%), and tightness (24.8%). More serious complications include skin burns (0.5%), deep vein thrombosis (0.4%), pulmonary embolism (0.1%), and nerve injury (0.8%). Retinal damage is a serious but very rare complication (<1%) that can occur during laser use (Samuel et al. 2013). Patients who undergo EVLA procedures will definitely feel pain as a result of complications of the procedure. So it is necessary to assess the level of pain in patients when the procedure is performed. Pain is a personal, individual, multifactorial and subjective experience. Pain is complex and dynamic and not just a simple response to an unpleasant sensation. Recognizing and assessing pain is needed to indicate the presence of pain and help evaluate the effectiveness of interventions or with pain management. Pain can also be classified as acute pain or chronic pain (Gregory 2019) The experience of sudden or acute pain in a person due to EVLA procedures can cause emotional and behavioral responses such as crying, groaning in pain, wrinkling the face or grimacing. Acute pain during EVLA procedures can be improved with simple strategies, namely assessing pain, treating it with existing drugs or techniques. Here the researcher uses one of the techniques to reduce pain, namely by applying a cold compress to the area where the puncture was done and along the area where the laser was applied. In pain management, there are two therapies used, namely pain management with pharmacological and non-pharmacological therapy. Where non-pharmacological pain management is one of them with skin stimulation, namely giving a cold compress. A cold compress is a method of using fluids or tools that can cause a cold sensation in the part of the body that needs it. (Purnamasari, Ismonah, and Supriyadi 2014). A cold compress is a method of using low temperatures that can cause several physiological effects (Kharimah et al. 2020). Giving a cold compress can reduce pain because it can inhibit the journey of small-diameter nerves in transmitting pain stimuli. So that stimuli from the periphery cannot be transmitted to the central nervous system.

The act of giving a cold compress is to give a cold sensation to a certain area by using a cold ice cool pack so that it gives a cold effect to the area. The place where the cold compress is given

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depends on the location and during the application of the compress, observe the skin after 5 minutes of application if there are no contraindications and it can be tolerated by the skin, the compress can be given for 20 minutes (Zakiyah, 2015). This cold compress therapy is recommended 1-3 days after injury or during the acute injury phase. During that time, the blood vessels around the injured tissue open up nutrients and fluids into the wound to help the tissue healing process (Risnah and Risnawati, 2019). In addition, cold compresses can relieve pain. Cold compresses reduce prostaglandins which increase the sensitivity of pain receptors and other substances at the wound site by inhibiting the inflammatory process. In addition, cold compresses can also reduce swelling and inflammation by reducing blood flow to the area (vasoconstriction effect). This is in line with research (Hardianto et al., 2022) showing that the pain scale on the first day obtained a pain scale of 7 (controlled severe pain) in the first respondent and a pain scale of 8 (severe pain) in the second respondent, after being given a cold compress for 3 days both respondents experienced a decrease in the pain scale to a pain scale of 2 (mild pain). The application of cold compresses can help postoperative patients to reduce pain intensity (Anggraini & Fadila, 2020) in their research the results of the analysis of the application of cold compresses to pain obtained a p value = 0.000 with a significance level of α = 0.05 which means 0.000 <0.05, it can be concluded that there is an effect of giving cold compresses on reducing the pain scale during EVLA procedures on the pain scale after EVLA procedures after being given cold compresses. In this study, researchers argue that actions that injure the skin or tissue will cause discomfort such as pain. And many patients are reluctant to take further action for EVLA on the other leg because they cannot stand the pain caused by the procedure. This often occurs in female patients who may have a very high level of sensitivity to pain. This is closely related to factors that influence pain, one of which is gender. In addition, varicose veins of the lower leg veins are often found in the elderly with an age range of over 50 years.

Conclusion

The administration of cold compresses is quite effective in reducing the scale of pain because by administering cold compresses, patients who experience pain feel a cold sensation given using a cold pack on the area of the former operation or around the area of the former operation can smooth blood circulation, reduce post-operative edema that has been performed so that patients feel reduced pain after being given the cold compress.

Ethics approval and consent to participate

The results of this analysis are then used to conclude a hypothesis which has been approved by the health research ethics commission of the RSSA with letter number 400/155/K.3/102.7/2024

Acknowledgments

I would like to thank all respondents involved in this study.

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