Cold Compresses Effect of on Postoperative Orif Pain in Fracture Patients

Opra Desnita[1], Rachmawaty M. Noer[2], Mira Agusthia[3]
opradesnita@gmail.om[1], agusthiamira@gmail.com[2],
rachmawatymnoer1977@gmail.com[3]
STIKes Awal Bros Batam[1,2,3]

Abstract. The effect of cold compress administration using cold pack in patients post orif surgery is to reduce the sensation of pain. Fractures are both a potential and actual threat to a person‘s integrity, which can lead to physiological and psychological disorders. Orif is a fixation tool used to clamp bones. Pain is a major problem in postoperative orif patients. One of the non-pharmacological efforts in reducing pain is by compressing cold using a cold pack. The purpose of this study is to determine the effect of cold pack administration in reducing pain in post orif fracture patients. The research design used is quasy- experiment pre-test and post-test without control with the research subject determined by using purposive sampling technique that amounts to 15 respondents. In all respondents, cold compress intervention treatment was carried out using cold pack. from shapiro wilk test results on the patient‘s pain level before cold compress with significance values of 0,001 and 0.004 after cold compress where p value < 0.05. All patients given cold compressesexperienced a decrease in the frequ ency of pain scales where clients experienced more mild pain by 10 patients (66.7%) who experienced mild pain and as many as 5 patients (33.3%) who are experiencing moderate pain. These results indicate that cold compress treatment has an effect in reducing postoperative orif pain. Nurses are advised to apply cold compress therapy as one of the non-pharmacological interventions to reduce postoperative orific pain.

Keywords: Compress; Experienced; Determined

1 Introduction

Today‘s technological advances have a positive and negative impact on life. One of the negative impacts is the frequent occurrence of various accidents. Motor vehicle accidents and work accidents are examples of events that can cause fractures (Astutik, 2011). Fracture is the loss of bone continuity, whether total or partial due to physical trauma, angular strength, energy, bone state and soft tissue (Price &Wilson, 2013). Based on data from the World Health Organization (WHO) in 2011, there are 5.6 million people who died due to accidents and about 1.3 million people have physical disabilities. In Indonesia fractures are the third largest cause of death under coroner‘s heart disease and tuberculosis. According to (Riskedas, 2018) of the many cases of fractures in Indonesia, fractures in the lower extremities due to accidents have the highest prevalence among fractures in indonesia among other fractures is about 67.9%. From 92. 976 people with lower extremity fractures due to accidents, 19,754 people suffered fractures in the femur, 14,027 people suffered cruris invoices, 3,775 people experienced tibia fractures, 970 people suffered fractures to small bones in the legs and 337 people experienced fibula

fractures.

Fractures are both potential and actual threats to a person‘s integrity, which can lead to physiological and psychological disorders (Prasetyo, 2010). The first principle of handling fractures is the act of reduction and immobilization. Surgical reduction is called open reduction performed in more than 60% of fracture cases (Aslam, 2009). Immobilization in the management of fractures is an action to maintain the reduction process until the healing process occurs. Screw and plate installation or pen is one form of reduction and immobilization performed by surgical procedures commonly known as Open Reduction and Internal Fixation (ORIF).

ORIF is a fixation tool used consisting of several long metals that penetrate the axis of bone and are connected by clamps so that the bones are reduced in clamps by the metal (Canale, 2016). One of the clinical manifestations in fracture patients performed by ORIF adala is pain (Rizaldi, 2014). Pain is a subjective condition in which a person exhibits verbal or non-verbal discomfort (Astutik, 2011). Pain in fracture sufferers is sharp and piercing. Sharp pain can also be caused by bone infections due to muscle spasm or suppression of sensory nerves (Helmi, 2012).

Cold compresses can relieve pain because cold compresses can reduce blood flow to a part and reduce edema bleeding which is thought to cause analgetic effects by slowing down nerve delivery speed so that pain impulses reach the brain less (Price &Wilson, 2013).

The administration of cold compresses at this time has been widely developed by using cold packs as a substitute for ice cubes. Cold packs have several advantages compared to ice cubes. The use of ice cubes can not be done for a long time because the ice cubes will melt and turn into carbon dioxide and ice cubes can only be used once in a short time. While the use of cold pack can be used many times by cooling the cold pack first in the freezer with a temperature of 3.50C (Arofah, 2009).. Cold pack also has frost resistance up to 8 - 12 hours at outside temperature (Kristanto &Arofiati, 2016). Treatment in the administration of cold compresses using cold packs can be done near the location of pain or on the opposite side of the body but related to the location of pain, compress is done diving 10-15 minutes.

Based on research conducted by Anugerah, Purwandri, and Hakam in 2017 on “The effect of cold compress therapy on post ORIF pain in fracture patients at Dr. H. Koesnadi Bondowoso Hospital” was obtained as a result that cold compresses can relieve postoperative fracture pain. While the research conducted by Kristanto &Arofiati (2016) on “Effectiveness of cold pack use compared to relaxation of deep breath to overcome post-ORIF pain” to moderate pain patients (scale 4-5) obtained the result that the administration of cold pack is proven to provide a decrease in pain effect up to 2 -3 points compared to relaxation of deep breath that only decreased by 1 point. Some previous studies have explained that cold packs are effective at reducing pain in mild orthopedic cases (Kristanto &Arofiati, 2016).

Based on the data obtained in RS X, the highest data on fracture cases was in 2019 as many as 143 cases, with ORIF actions as many as 63 cases. In 2020 there will be an increase in fracture cases to 248 cases, with ORIF measures as many as 64 cases. Preliminary studies that have been conducted against the Head of Hospital X hospital room obtained data that has never been done cold compress administration using cold pack by nurses to reduce post ORIF pain in fracture patients. This is because the patient has received pharmacological therapy in the form of analgesics to overcome the pain. While the results of interviews conducted on the families of patients in the ward obtained data of the patient‘s family said that it is not yet known the usefulness of cold compresses to overcome the pain felt by patients and patients have also never received cold compress treatment to overcome the pain experienced.

Meanwhile, there has been no research on the effect of cold compresses on orif postoperative pain in RS X Pekanbaru. Based on the description of the background that has been stated above, researchers are interested in conducting research on "The effect of cold compressing on postoperative pain orif in fracture patients in hospital room X in Pekanbaru.

2 Methods

This research is quantitative research. Quantitative research is a way used to answer research problems related to data in the form of numbers and statistical programs (Wahidmurni, 2017). The research design used is quasy-experiment. Quasy-experiment research is a study that tests an intervention on a group of subjects with or without a comparison group but does not randomize to include the subjects into the treatment or control group. The study used a pre-test and post-test without control approach, where researchers only intervened in one group without comparison. The number of samples in this study was 15 respondents who fit the inclusion criteria, namely post ORIF H-1 patients, willing to be respondents to research and awareness of compos mentis patients. In this study, researchers used a data collection tool of assessment instrument sheets, which is designed to contain general data on patients including name, age, gender, pain value before intervention, pain value after intervention, cold pack, Numeric Rating Scale pain measurement tool. Then do the documenting. Data analysis in this study is univariate and bivariate analysis. Bivariate data analysis using Wilcoxon Test with the result of ρ value < α (0.05).

3 Results

3.1 Univariate analysis

Univariate analysis is used to describe variables bound in free variables to get an idea or characteristics of the sample. The variables analyzed were characteristics of respondents including age, gender, and occupation. The results of the analysis are as follows:

Table 1. Frequency Distribution of Respondents PostOperative ORIF Fracture Patients (n=15)

Variable	**Resondent (n=15)**	
	F	**%**
Age		
21-30	3	20,0
31-40	6	40,0
41-50	2	13,3
51- 60	4	26,7
Gender		
Male	12	80,0
Female	3	20,0
Profession		
Not Working	1	6,7
Housewife	2	13,3
Self employed	7	46,7
Civil servants	5	33,3

Based on table 1, it can be described that the age distribution of respondents was found to be almost half of the respondents as many as 6 people (40.0%) 31-40 years old. Gender distribution of respondents found most respondents as many as 12 people (80.0%) is a man. The

distribution of the frequency of respondents‘ work was found to be almost half of the respondents as many as 7 people (46.7%) is self-employed.

3.2 Bivariate Analysis

Frequency Distribution effect of Cold Compress on Orif Post Operative Pain In Fracture Patients In Hospital X.

Table 2. Frequency Distribution of Respondents Effect of Cold Compresses on ORIF PostOperative Pain in HospitalIzed Fracture Patients X (n=15) Before Treatment

Variable	**Before Treatment**	
Pain level		
Respondens (n=15) No pain	0	0,0
Mild pain	0	0,0
Moderate pain	15	100,0
Severe pain	0	0,0
Very severe pain	0	0,0

Based on table 2, it can be described that the distribution of pain levels in patients with fractures post orif surgery before cold compress treatment was found by all respondents as many as 15 people (100%) moderate pain category.

Table 3. Frequency Distribution of Respondents Effect of Cold Compresses on ORIF PostOperative Pain in HospitalIzed Fracture Patients X (n=15) After Treatment

Variable	**After treatment**	
Pain level	F	%
Respondent s (n=15) No pain	0	0,0
Mild pain	10	66,7
Moderate pain	5	33,3
Severe pain	0	0,0
Very severe pain	0	0,0

Based on table 3, it can be described that the distribution of pain levels in patients with fractures postoperative cold compress treatment was found to be more than half of respondents as many as 10 people (66.7%) in the category of mild pain.

3.3 Effect of Cold Compresses On Orif PostOperative Pain in Fracture Patients In Hospital X

Based on the test obtained that the data is normally distributed, so it can be done with Wilcoxon test. Wilcoxon test results in this study were to determine the effect of cold compresses on postoperative orif pain in fracture patients in respondents by measuring through the pain scale before treatment and after treatment. The analysis results are displayed as follows:

Table 4. Analysis of The Effect of Cold Compresses on ORIF PostOperative Pain in HospitalIzed Fracture Patients X (n=15)

Variable	N	Nilai P Value
Pain before treatmnent	15	0,002
Pain after treatmnent	15	0,002

4 Discussion

Distribution of PostOperative Pain Frequency orif Before Administration of Cold Compresses In Fracture Patients In Hospital X

The results showed that the distribution of all patients postoperative pain ORIF before being given a cold compress was found as many as 15 respondents (100%) who experience moderate pain.

The results of this study are in line with research conducted by Anugerah (2017), obtained by the results of the study showed that as many as 5 respondents (50%) moderate pain, 3 respondents (30%) severe pain, and 2 respondents (20%) experience mild pain.

Another study conducted by Anggraini (2020), explained that in the results of the study obtained pain scale before administration of cold compresses moderate pain category as many as 9 respondents (60%) and weight category of 6 respondents (40%). According to the International Association for The Study of Pain (IASP), pain is a subjective and emotional sensory that does not lift, associated with actual or potential tissue damage, describing the condition of the occurrence of damage.

In the study it was seen that all respondents before the cold compress was 100% experiencing moderate pain, then the cause of orif postoperative pain is caused by surgical wounds. But other possible reasons must be considered. The appearance of pain is closely related to receptors and the presence of pain stimuli. Pain receptors are closely related to the nociceptor which is a free nerve ending that has little or no myielin spread over the skin and mucosa, particularly in visera, joints, arterial walls, liver, and gallbladder. (Hidayat, 2006). In Suci Artanti 2020 research, about the effectiveness of cold therapy administration to pain orthopedic patients obtained dingi therapy proved effective to reduce pain, cold therapy is safe to use when appropriate procedures. Modification of the use of cold therapy equipment does not have a significant effect on pain but improves patient comfort.

Pain receptors can respond due to simulations or stimuli. The stimulation can be chemical substances such as histamine, bradykinin, prostaglandins, and various acids released when there is damage to tissues due to lack of oxygen. Other stimulation can be thermal, electrical, or mechanical. Furthermore, the stimulation received by these receptors is transmitted in the form of pain impulses to the spinal cord by two types of fibers that are tightly twisted or seranut A (delta) and slow invasion C. Impulses transmitted by delta fibers have inhibitor properties. Afferent fibers enter the spinal cord through the dorsal root as well as synapses in the dorsal horn. Dorsal horn consists of several intertwined layers. The layer is sustantia gelatinosa which is the main channel of impulses. Then the pain impulse crosses the spinal cord on the inter neurons and into the spinal asendens pathway, the thalamic ract spino pathway (STT) or spinotalamus and spino recticular tract (SRT) pathways that carry information about the nature and location of pain.

If the pain of this surgery is not resolved it can cause stress in the patient and will affect the patient‘s daily activities and sleep rest. According to Brunner &Suddart (2014), that postoperative pain will increase stress and negatively affect wound healing post surgery. Pain management is very important after oeprasi. Pain felt by the patient can reduce anxiety in the

surgical wound, breathe easier, and can tolerate mobilization as early as possible. According to Potter &Perry (2006), that a person experiencing pain will have an impact on their daily activities and sleep rest.

According to Smetzler &Bare (2014) states that if pain is not handled adequately, it will cause discomfort can also affect the respiratory system, digestion, endocrine, cardiovascular, immunologic, and stress and can cause depression inability to do activities. This incompetence starts from limiting participation in activities to not being able to fulfill personal needs such as eating and dressing.

Effect of Cold Compress on PostOperative Pain ORIF After Administration of Cold Compresses In Fracture Patients In Hospital X

Cold compress is one of the nursing actions and is widely used to lower pain. The cold sensation that is felt provides physiological effects that can decrease inflammatory response, decrease blood flow, able to lower edema and reduce local pain. Physiologically 10-15 minutes after being administered cold compresses occurs vasocontriction process of smooth muscle reflex effects that can arise due to stimulation of the autonomic nervous system and able to stimulate the production of endorphin hormones. (Novita, 2010)

The purpose of administering cold compresses is to lower body temperature in hyperthermia, prevent widespread inflammation, reduce congestion, reduce local bleeding, and reduce pain in a local area (Asmadi, 2008).

All patients given cold compresses experienced a decrease in the frequency of pain scales where more clients experienced mild pain by 10 patients (66.7%) experienced mild pain and as many as 5 patients (33.3%) who experience moderate pain. These results showed that cold compresses are very good at treating post ORIF pain problems with the result of reduced pain after administration of cold compress interventions. Cold compress will give comfort to the patient by providing comfort and soothing sensation so that the patient‘s feelings become more relaxed and calm. According to Brunner &Suddart (2014) that cold compresses include nonpharmacological techniques in pain management because with cold compresses a person eats will form soothing and pleasant stimulation-st that is received by sensory stimuli. So that muscle tension and discomfort will be resolved, the body becomes relaxed and comfortable.

Cold compress intervention is also one of the nonpharmacological interventions in Nursing Intervention of Classification (NIC) according to Burleccheck (2013) in pain control intervention indicators. The administration of cold compresses will stimulate the senses of taste that flow into the uncomfortable areas as the tense muscles become more relaxed. Decreased pain. affects the adrenal simpato, so the hypothalamus does not activate the mechanism of sympathetic nerves and adrenal medulla to produce epineprin and non-epineprin hormones. Then there is a decrease in blood pressure, breath, pulse, and sweat (Brunner &Suddart, 2014).

The results of a study conducted by Anugerah (2017), showed that there is a significant influence of cold compress therapy on postoperative pain in ORIF fracture patients. The results of another study conducted by Anggraini (2020), showed there was an influence on the administration of cold compresses to decrease the pain scale in fracture patients with a p value of 0.000.

In the study, 10 respondents (66.7%) decreased the scale of pain to mild pain and as many as 5 respondents (33.3%) experienced a pain scale room but was insignificant and was still in moderate pain. Other possible factors that can cause no decrease in pain are cold compress media used such as the level of cold water, softness of the fabric used, or the use of rubber bag media. The rubber bag medium is more durable to withstand cold temperatures so that the cold sensation that blocks the transmission of pain will be more constant. (Grace, 2017)

The decrease in pain intensity felt according to Price &Wilson‘s theory that cold therapy can not only reduce muscle spasm tetapu can also cause analgetic effects that slow down the speed of nerve transmission so that pain impulses that reach the brain less. Therefore, the pain will be reduced. Surgery or other trauma causes prostaglandins, which cause sensations from nosceptive receptors and are secreted pain mediator substances such as histamine and serotonin that cause sensari pain.

Cold compressing can increase the release of endorphins that block the transmission of pain stimulus and also stimulate nerve fibers that have a large diameter of alpha-beta thus decreasing the transmission of pain impulses through alpha-delta small fibers and fiber c. pain reduction mechanisms by administering cold compresses based on gate control theory explaining pain transmission mechanisms. If the dominant input comes from alpha-beta fibers, it will close the defense mechanism. If the dominant comes from alpha-delta fibers and c fibers, it will open the defenses and the patient perceives the sensation of pain. Endorphin production is able to relieve the pain felt. Endorphin production can be increased through skin stimulation. Skin stimulation includes with massase, emphasis of fingers, and administration of cold or warm compresses. (Grace, 2017)

Based on this, according to the researchers‘ analysis of this study, it is also proven that the administration of cold compresses to reduce pain in patients post-surgery ORIF. Cold compress is a cold sensation that is felt to provide physiological effects that can decrease inflammatory response, decrease blood flow, able to lower edema and reduce local pain (Novita, 2010). Patients feel comfortable with a stimulus through the skin that affects the stress response, thus releasing endorphin hormones that are able to weaken the pain response and can reduce pain or lower the pain threshold.

The limitation of researchers in the administration of cold compresses is the difference in the medium of cold compresses provided so that the media greatly affects the consistency of temperature given when the compress is cold. So that the consistency when administering cold compresses becomes unequal (not constant). Researchers have observed and monitored so that the temperature of the cold pack can be maintained cold, but the presence of room temperature is also very affecting. Difficulty focusing attention and concentration to stay relaxed in patients post ORIF surgery in cold compress interventions can also be an obstacle in research. According to Potter &Perry (2009), environmental calm will help postoperative patients not to focus

Reference

[1] Anggraini, O., Fadila.,RA. (2020). Effect of Cold Compress On Pain Scale Reduction in Post-Operative Fracture Patients at Siloam Sriwijaya Hospital Palembang. Palembang: Siloam Hospital

[2] Anugrah, A.P., Purwandari, R., Hakam, M., (2017). Effect of Cold Compress Therapy On PostOperative Pain orif in Fracture Patients At RSD Dr. H, Koesnadi Bondowoso. Jember: University of Jember

[3] Arofah, N.I. (2009). Cold Therapy In Sports Injury Management. http://journal.uny.ac.id/index.php/medikora/article/viewfile/4696/4044. Date access 08 November 2020.

[4] Aslam M. Traumatology Treatment. [internet] Jakarta; (2009). [Cited 16 November2020]. Available From: http://onlinelibrary.wiley//trauma_nyeri_aslam.com

[5] Asmadi. (2008). Nursing Procedural Techniques And Client Basic Needs Application. Jakarta. Salemba Medika

[6] Asmadi. (2008). Nursing Procedural Techniques: Concepts and Applications of Client‘s Basic Needs. Jakarta: Salemba Medika

[7] Astutik. Nursing Procedural Techniques: Concepts and Differences in Mobility Levels In Patients Post-Operative Fractures of The Lower Extremities Before And After Health Counseling In

Bougenville And Lotus Room Basic Needs Clients Rsud Dr. Soegiri Lamongan. [internet] Lamongan; (2011). [Cited 20 November 2020]. Available From: http://stikesmuhla.ac.id/v2/ wpcontent/uploads/jurnalsurya/noIX/0.pdf.
[8] Brunner., Suddart. (2014). Medical Surgical Skills Edisi 8. Jakarta: EGC Burleccheck, G.M., Bucher, H.K., Dochterman,J. Wagner, C. (2013). NursingInterventions Classification Edusi Keenan. United State: Mosby Elsevier
[9] Canale S. Campbell Operative Orthopaedics. [internet] St. Louis; (2003). [Cited 20 November 2020]. Available From: http://www.mdconsult.com/books/page.do?eid=4-ul.0-B987
[10] Depkes, RI. (2011). Health Profile Indonesia 2010. Jakarta: Ministry of Health of the Republic of Indonesia
[11] Dharma,K.K.(2011). Metodologi Penelitian Keperawatan: panduan melaksanakan dan menerapkan hasil penelitian. Jakarta: TIM.
[12] Helmi, Noor Zairin. (2013). Trigger Finger. Buku Ajar Gangguan Muskuloskeletal. Jakarta: Salemba Medik
[13] Hidayat, A.A., Alimul. (2009). Metode Penelitian Keperawatan dan Teknis Analisa Data. Jakarta: Salemba Medika
[14] Hidayat, Aziz A. A. (2009). Metode Penelitian Kebidanan dan Teknik Analisis Data. Jakarta: Salemba Medika.
[15] Jacobson. A.F.(2006). Cognitive-Behavioral Intervention for IV Insertion Pain. AORN JOURNAL, 84(6), 1031-1045.
[16] Kozier, B., & Erb, G., (2009). Buku Ajar Praktik Keperawatan Klinis. Alih Bahasa: Eny Meiliya, Esty Wahyuningsih, dan Devi Yulianti, Jakarta: EGC
[17] Leo, S. (2013). Kiat Jitu Menulis SKRIPSI, TESIS, DAN DISERTASI. Jakarta: Erlangga.
[18] Notoatmodjo, S. (2012). Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta. Novita Intan. (2010). Dasar-Dasar Fisioterapi Pada Cedera Olahraga. Yogyakarta
[19] Nursalam (2009). KONSEP DAN PENERAPAN METODOLOGI PENELITIAN ILMU KEPERAWATAN: pedoman skripsi, tesis, dan instrument penelitian. Ed. 2. Jakarta: Salemba Medika.
[20] Nursalam (2011). KONSEP DAN PENERAPAN METODOLOGI PENELITIAN ILMU KEPERAWATAN: pedoman skripsi, tesis, dan instrument penelitian. Ed. 2. Jakarta: Salemba Medika.
[21] Potter., Perry. (2005). Fundamental of Nursing Edisi 4. Jakarta: EGC
[22] Price, S.A., Wilson, L.M. (2013). Patofisiologi Konsep Klinis Proses-Proses Penyakit. Edisi VI. Jakarta: EGC.
[23] Setiadi. (2013). Konsep dan Praktek Penulisan Riset Keperawatan (Ed.2). Yogyakarta: Graha Ilmu
[24] Sjamsuhidayat. (2010). Buku Ajar Ilmu Bedah. Jakarta: EGC
[25] Smeltzer., Suzanne, C., Bare., G.H. (2014). Brunner & Suddart TextBook of Medical Surgical Nursing Edisi 12. Philadelphia: Wolters Kluwer Health
[26] Wahidmurni (2017). Pemaparan Metode Penelitian Kualitatif. Diakses pada November 2020 Pukul 20.10http://repository.uin- malang.ac.id/1984/2/1984.pdf
[27] Wiarto, G. (2017). Nyeri Tulang dan Sendi. Gosyen Publishing. Yunita. (2010). Clinical Psychology. Jakarta: Yayasan Bina Pustaka.