

Early Ambulation Lowering Pain Intensity Inpatient Post Heart Catheterization in the Intensive Care Unit (ICU) in Dr M. Damil Hospital, Padang, Indonesia

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ABSTRACT

Background: Cardiac catheterization causes several complications such as discomfort (pain on the waist, back, and thigh folds), hemorrhage, prolonged length of hospitalization, and increasing treatment costs. Pharmacological therapy as the usual method to solve this problem has not shown improvement in reducing discomfort. This early ambulation nursing intervention method is expected to reduce pain. This research purpose to describedetermine the effect of early ambulation on patients' discomfort due to pain caused by post-cardiac catheterization. Methods: This researchwas a quasi-experiment with two groups pretest-posttest design. The participants were posted cardiac catheterization patients divided into two groups with 16 participants. Hypothesis testing used an independent T-Test with a p-value < 0.05. Results and Discussion: The average pain scale of the intervention group before and after early ambulation was 3.63 and 0.38. While in the control group was 3.38 and without early ambulation 3.75, with a p-value of 0.000. Conclusion: There is a significant effect of early ambulation on the pain intensity of patients post-cardiac catheterization. It is suggested that applying early ambulation as the supportive treatment for these patients is useful.

Keywords: Post-cardiac Catheterization, pain, early ambulation.

1. INTRODUCTION

Cardiac catheterization is a procedure for diagnosing and treating heart disease which is a permanent diagnostic of coronary angiography[1][2]. Coronary Heart Disease (CHD) is a life-threatening condition characterized by the formation of a local necrotic area of the heart muscle that occurs due to sudden occlusion of a coronary artery, resulting in the heart muscle being deprived of nutrients and oxygen which leads to myocardial infarction. CHD is the main cause of death in America, in 2016 alone 1,520,000 people had a heart attack [3], with more than 5 million patients undergoing cardiac catheterization every year. Data from WHO (2015), of the 56.5 million deaths worldwide, 17.5million (31%) people die from cardiovascular disease, and about 8.7 million were due to coronary heart disease [4][5]. A cardiovascular hospital in Indonesia, Harapan Kita Hospital, reported that in 2012-2018

there were around 30-40 patients each day seek treatment with various actions, namely Coroangiography and PTCA[6][7][8]. The top one of the number of cardiovascular disease patients with catheterization, approximately 1.6% [9][5].

Cardiac catheterization causes several complications, such as pain in the waist, back, and thigh folds), hemorrhage, prolonged length of hospitalization, and increasing treatment costs [10]. The intensity of back pain has a significant difference, namely at the fourth and fifth hours after changing the position of post-cardiac catheterization[11]. Discomfort is a condition when the individual experiences an unpleasant sensation in response to a stimulus.

Pain management in post-cardiac catheterization patients is generally carried out with pharmacological therapy which aims to reduce the but it has not shown any improvement in reducing

pain. Non-pharmacological treatment is one alternative in reducing pain to support pharmacological treatment, such as by performing early ambulation as an intervention of nursing care[12][13][14][15].

Early ambulation is a nursing intervention to increase physical activity and maintain or improve the autonomy of body functions during surgical procedures or recovery from illness [16][17]. The positions could be varied with different techniques and angles such as the supine position, low fowler, elevation 15°, 30°, 45°, and 90°. Early ambulation is also recommended starting at different times, from 1 to 24 hours depends on the type and location of surgery. Cardiac catheterization through the femoral artery can relieve the level of back pain by changing the patient's lying position after undergoing surgery. Thus, does not affect the physiological signs and bleeding complications. Changing the lying position every two hours after cardiac catheterization through the femoral artery to improve the quality of patients' recovery as the goal of nursing care. Found out among 104 participants, 46 patients (44.2%) expressed discomfort due to back pain with different intensities during immobilization and explained that the severity of pain was significantly associated with length of bedrest[18][19]. Back pain often occurs in patients after cardiac catheterization and is associated with immobility and limitations on position[20].

Early ambulation had an effect on pain intensity in post-cardiac catheterization ($p = 0.001$)[21]. Some other studies also revealed that there is an effect of early ambulation on pain intensity ($p=0.001$), and this therapy was found to be very effective [22][23][24].

2. RESEARCH METHODS

This study was a quasi-experiment with two groups pretest-posttest design, took place at M. Djamil Hospital, Indonesia, inpatient department of the center for cardiovascular disease. The participants were 727 post-cardiac catheterization patients selected using purposive sampling methods divided into two groups, 8 participants in the intervention group and 8 control group. The participants were selected based on the inclusion criteria: post-cardiac catheterization with mild and moderate pain, have the catheterization through the femoral artery, and in the first hour after surgery. Pain is measured pre and post-administering the early ambulation in the intervention group and pre and post-test in the control group without early ambulation. Analyzed using an independent T-Test with a p -value < 0.05 .

3. RESULT

3.1 Univariate Analysis

3.1.1 Average Pain Intensity Before Early Ambulation in the Intervention Group

Table 1. Average Pain Intervention Group (Before)

Variable	Mean	SD	Min-Max	n
Intervention Group (before)	3,63	1,061	2-5	8

Based on table 1, the average pain scale on the intervention group before early ambulations is 3.63 , standard deviation 1.061 and the minimum/ maximum pain scale is 2 and 5.

3.1.2 Average Pain Intensity Before Early Ambulation in the control group

Table 2. Average Pain Intervention Group (after)

Variable	Mean	SD	Min-Max	n
Intervention Group (after)	0,38	0,518	0-1	8

Table 2 shows that the average pain scale in the intervention group after is 0.38, the standard deviation of 0.518, and the minimum/ maximum pain scale is 0/1.

3.1.3 Average Pain Intensity After Early Ambulation in the Intervention Group

Table 3 Average Pain Control Group (before)

Variable	Mean	SD	Min-Max	n
Control Group (before)	3,38	0,916	2-5	8

From table 3 could be seen that the average pain scale of the control group on pre-test is 3.63, a standard deviation of 1.061, and the minimum pain scale is 2 and the maximum is 5.

3.1.4 Average Pain Intensity without Early Ambulation in the control group

Table 4. Average Pain Control Group (after)

Variable	Mean	SD	Min-Max	n
Control Group (after)	3,75	0,463	3-4	8

Based on table 4, the average pain scale of the control group without early ambulation is 3.75, a standard deviation of 0.463, the minimum/ maximum pain scale is 3/4.

3.2 Bivariate Analysis

Table 5. Effect of Early ambulation on Pain intensity among Patients with Post Cardiac Catheterization

Variabel	Mean	SD	P Value	n
Post Cardiac Catheterization in Control and intervention groups	3,375	0,245	0,000	16

Table 5 obtained the results of the statistic test using T-test independent get p-value = 0.000 ($p \leq 0.05$). The result is statistically significant, which means there is an effect of early ambulation on pain intensity among patients with post-cardiac catheterization.

4. DISCUSSION

4.1 Pain Intensity in the Intervention Group Before and after Early Ambulation of Post Cardiac Catheterization Patients

The finding of the current study showed an average of pain intensity in the Intervention Group Before and after Early Ambulation in patients post cardiac Catheterization are 3.63 and 0.38, with standard deviations of 1.061 and 0.518. These findings are consistent with a previous study which found that there are differences in pain intensity before and after changing the position of the right and left lateral oblique in patients post cardiac catheterization. The results of the statistical analysis of the paired t-test showed that in the intervention group there was a significant difference between before and after setting the right side and left side on back pain ($t=6.071$; $p < 0.000$).

Pain is an unpleasant sensory and emotional experience accompanied by potential and actual tissue damage (International Association for the Study of Pain [IASP], It is a multidimensional phenomenon and is very difficult to interpret. Pain is a subjective and personal experience [26]. Melzack & Casey in Ardinata (2007) stated that pain is not only a mere sensory experience but also related to the motivation and affective components of the individual.

Early ambulation is increasing the physical activity to maintain or improve the body functions during the procedure of surgery or recovery from illness [27]. Early ambulation is a complex three-dimensional activity involving the lower extremities, pelvis, trunk, and upper extremities [28]. Early ambulation is very important because it can prevent the occurrence of orthostatic hypotension, excessive heart workload, and the formation of a thrombus [29].

4.2 Pain Scale in the Controls Group Before and After Without Early Ambulation In Patients Post Cardiac Catheterization

The result of this study found that the mean of pain intensity pre and post-test without applying early ambulation is 3.38 and 3,75, with standard deviations 0.916 and 0.463. This result corresponds with other studies which found the differences in the intensity of pain back in patients post catheterization pre and post-test in the control group [31].

Cardiac catheterization is an examination of the heart by inserting a catheter into the cardiovascular system to examine the anatomy and function of the heart. Non-pharmacological pain management can be done with physical therapy (including early ambulation, skin stimulation, massage, warm cold compresses, acupuncture, and acupressure) as well as cognitive and behavioral therapy (deep breathing exercises, progressive relaxation, rhythmic breathing, music therapy, imagination guidance, biofeedback, distraction, therapeutic touch, meditation, humor and magnetic hypnosis [30].

4.3 The Effect of Early ambulation on Pain intensity in Patients with Post Cardiac Catheterization

The finding of the current study revealed that there are significant differences between the scale of pain in the intervention and control group which means a significant effect between early ambulation and the decreasing of discomfort due to pain ($p\text{-value}=0.000$ ($p < 0,05$)). These findings are consistent with previous studies. Abdollahi (2015) found that

there is an effect of early ambulation on pain intensity in post-cardiac catheterization patients ($p = 0.001$). Study Urine Retention and Increasing Comfort in Post Transfemoral Cardiac Catheterization Patients, found that there is an effect of early ambulation on pain intensity ($p = 0.001$).

In this current study, the intervention group was ambulated early at the third hour when the patient arrived in the room and changed position by raising the head of the bed every two hours and at the ninth hour the patient was positioned on his right and left side, and at the eleventh hour, they could mobilize as usual.

Patients can ambulate 3-4 hours after removal of the percutaneous coronary sheath. Furthermore, Mohammady stated that early ambulation has no risk of vascular complications, but can reduce back pain. This study was conducted to reduce discomfort in post-cardiac catheterization patients, by applying early ambulation by changing positions with different techniques and angles such as are in the supine position, low fowler, elevation 15° , 30° , 45° , and 90° . In addition, early ambulation is also recommended starting at different times, from 1 to 24 hours [32].

5. CONCLUSION

Performing early ambulation among patients with post-cardiac catheterization has a significant effect on the pain intensity. Different techniques and angles of mobilization and time of starting ambulation will reduce the discomfort.

REFERENCES

- [1] Edmont, Strange, & Baumbach. (2008). Introduction to cardiac catheterization part 1: Diagnostic coronary angiography. *British Journal of Cardiac Nursing* September 2008 Vol 3 No 9.
- [2] Price, S. A., & Wilson, L. M. (2006). *Patofisiologi: Konsep Klinis Proses-Proses Penyakit*. (6th Edition). Jakarta: EGC
- [3] AHA (American Heart Association). *Cardiovascular Disease: A Costly Burden For America Projections Through 2035*. The American Heart Association Office of Federal Advocacy: Washington DC; 2017.
- [4] World Health Organization, 2015, *Angka Kejadian Akut Miokard Infark*, Diakses dari [Http://www.who.int/healthinfo](http://www.who.int/healthinfo)
- [5] Kementerian Kesehatan RI, 2018, *Riset Kesehatan Dasar (Riskerdas) 2018*, Badan Penelitian dan Pengembangan Kesehatan, Jakarta.
- [6] Rahman, Dally, 2016, Penerapan Pengaturan Posisi dan Early Ambulation untuk Mencegah Back Pain, Retensi Urine dan Meningkatkan Kenyamanan Pasien Post Trans-Femoral Cardiac Catheterization, Proposal EBN, Fakultas Ilmu Keperawatan Spesialis Keperawatan Medikal Medah, Jakarta, h.11-12.
- [7] Wilcoxson, V. L. (2012). Early Ambulation After Diagnostic Cardiac Catheterization via Femoral Artery Access. *Journal for Nurse Practitioners*, 8(10), 810-815. <http://doi.org/10.1016/j.nurpra.2012.06.02>
- [8] Chair, S. Y., Yu, M., Choi, K. C., Wong, E. M. L., Sit, J. W. H., & Ip, W. Y. (2012). Effect of early ambulation after transfemoral cardiac catheterization in Hong Kong: a single-blinded randomized controlled trial. *Anadolu Kardiyoloji Dergisi: AKD = the Anatolian Journal of Cardiology*, 12(3), 222–30. <http://doi.org/10.5152/akd.2012.065>.
- [9] Riskesdas Riskesdas (2018). Laporan Nasional Riskesdas 2013. <http://litbag.depkes.o.id/>
- [10] PA-PSRS Patient Safety Advisor. (2014). "Strategies to Minimize Vascular Complications Following a Cardiac Catheterization". Article PA-PSRS Patient Safety Advisory, vol. 4 2014.
- [11] Chen, Hui, Li, Fang, Chiung., & Huey (2013). The Effect of Body Positioning in Patients after Femoral Artery Cardiac Catheterization. *Wung Shin-Huey*, No. 201, Sec. 2, Shih-Pai Rd., Taipei
- [12] Noida, G., & Hamdard, J. (2013). Effect of Low Fowler's Position on Back Pain and Local Vascular Complications within Six Hours, among Patients who have Undergone Transfemoral Cardiac Catheterization. *International Journal of Nursing Education*, 5(2), 102–110.
- [13] Steffenino, G., Dutto, S., Conte, L., Dutto, M., Lice, G., Tomatis, M., ... LaScala, E. (2013). Vascular access complications after cardiac catheterization: a nurse-led quality assurance program. *European Journal of Cardiovascular Nursing: Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology*, 5(1), 31–36. <http://doi.org/10.1016/j.ejcnurse.2005.06.001>
- [14] Burn, Leigh Kelly. (2012). Early Mobilisation After Coronary Angiography to Reduce Back Pain
- [15] Rezaei-Adaryani, M., Ahmadi, F., & Asghari-Jafarabadi, M. (2009). The effect of changing position and early ambulation after cardiac catheterization on patients' outcomes: A single-blind randomized controlled trial. *International Journal of Nursing Studies*, 46(8), 1047–1053.

- [16] Eldawati. 2011. *Pengaruh Latihan Kekuatan Otot Pre Operasi Terhadap Kemampuan Ambulasi Dini Pasien Pasca Operasi Fraktur Ekstremitas Bawah Di RSUP Fatmawati Jakarta*. Tesis. Program Pascasarjana Fakultas Ilmu Keperawatan Kekhususan Medikal Bedah Universitas Indonesia
- [17] Mohammady, M., Heidari, K., Akbari Sari, A., Zolfaghari, M., & Janani, L. (2014). Early ambulation after diagnostic transfemoral catheterization: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 51 (1),39 – 50. <http://doi.org/10.1016/j.ijnurstu.2012.12.018>
- [18] Murphy J.G. (2007). Diagnostic Coronary Angiography and Ventriculography, Mayo Clinic Cardiology Concise Textbook, Third Edition, jilid 3, by Mayo Foundation for Medical Education and research.
- [19] Høglund & Stenstrand. (2011). The effect of early mobilization for the patient undergoing coronary angiography: A pilot study with a focus on vascular complications and back pain. *European Journal of Cardiovascular Nursing*, 10, 130–136.
- [20] Fowlow B., Price P., & Fung T. (2012). Ambulation after sheath removal: a comparison of 6 and 8 hours of bed rest after sheath removal in patients following a PTCA procedure. *Heart and Lung* 24, 28–37.
- [21] Abdollahi, A. A., et al. 2015. Effect of Positioning and Early Ambulation on Coronary Angiography Complications: a Randomized Clinical Trial, *Journal of Caring Sciences*, 4(2), 125-34. <http://doi.org/10.15171/jcs2015.01>
- [22] Lewis, S. L., Dirksen, S. R., Heitkemper, M. M., Bucher, L., & Camera, I. M. (2011). *Medical-surgical nursing: Assessment and management of clinical problems*. Eighth Edition, Vol. 1 & 2. Missouri: Elsevier Mosby
- [23] Reddy BK, Brewster PS, Walsh T, Burket MW, Thomas WJ., & Cooper CJ. (2004). Randomized comparison of rapid ambulation using radial, 4 French femoral access, or femoral access with Angioseal closure. *Catheter Cardiovasc Interv*. 2004;62:143-149.
- [24] Farmanbar, R., Mohammadiyan, M. A., Moghaddamniya, M. T., Ehsankazemnejad, & Salari, A. (2012). The Effect of Position Change and Bed-Rest Duration after Coronary Angiography on Vascular Complications. *Iranian Journal of critical care Nursing*, 4(4), 177–182
- [25] Price, S. A., & Wilson, L. M. (2006). *Patofisiologi: Konsep Klinis Proses-Proses Penyakit*. (6th Edition). Jakarta: EGC.
- [26] Smeltzer & Bare, 2010 *Textbook of Medical-Surgical Nursing*. Philadelphia: Lippin Scott
- [27] Rezaei-Adaryani, M., Ahmadi, F., & Asghari-Jafarabadi, M. (2009). The effect of changing position and early ambulation after cardiac catheterization on patients' outcomes: A single-blind randomized controlled trial. *International Journal of Nursing Studies*, 46(8), 1047–1053. <http://doi.org/10.1016/j.ijnurstu.2009.02.004>
- [28] Health, Communities. (2010). *Cardiac Catheterization Indications*. <http://www.cardiologychannel.com/cardiaccath/indications.shtm>
- [29] Woods, S. L., Froelicher, E. S. S., Motzer, S. U., & Bridge, E. J. (2010). *Cardiac Nursing*. Sixth edition Wolters Kluwer Health / Lippincott Williams & Wilkins
- [30] Potter. P. A. & Perry, A.G. (2013). *Fundamental of Nursing; Eighth Edition*. st. Louis: Mosby Elsevier, Inc.
- [31] Carpenito, L.J., 2006, *Rencana asuhan dan pendokumentasian keperawatan (Edisi 2)*, Alih Bahasa Monica Ester, Jakarta: EGC.
- [32] Black, J. M., & Hawks, J. H. (2009). *Medical-surgical nursing: Clinical management for positive outcomes*. Eighth Edition, Volume 1 & 2. Missouri: Saunders Elsevier