



EFFECTIVENESS OF CONVENTIONAL METHOD VERSUS TRANSRADIAL (TR) BAND METHOD ON HEMATOMA AMONG PATIENTS UNDERGOING CORONARY ANGIOGRAPHY

Medical Surgical Nursing

Femina Joy

Msc Nursing student, 14th Batch, Govt. College of Nursing, Kottayam,

Dr. Liny Joseph

Assistant Professor, Govt. College of Nursing, Kottayam.

ABSTRACT

The present study compared the effectiveness of conventional method versus transradial (TR) band method on hematoma among patients undergoing coronary angiography (CAG), admitted in Cath lab and Cardiology ward of Govt. Medical College Hospital, Kottayam. A quantitative research approach with true experimental post test only design was used for this study. The study was theoretically supported by Roy's adaptation model. A total of 60 patients, with 30 each in group 1 and group 2 who are undergoing CAG were selected for this study by using random sampling technique. The data were collected for a period of 6 weeks. The data were collected with socio personal and clinical data sheet and easy hematoma classification scale. The intervention ie, the conventional method was applied to group 1 and the TR band method was applied to group 2. Hematoma was assessed at two and eight hours after CAG by using easy hematoma classification scale. The study revealed that TR band method had significant effect in reducing hematoma among patients undergoing CAG after two hours of procedure. The study proved that there was an immediate effect of reducing hematoma in patients undergoing CAG with TR band method at two hours of CAG ($p < 0.05$) and there was no delayed effect in both the groups. As the time passes it was noted that both the interventions are equally effective in terms of hematoma.

KEYWORDS

Effectiveness; Conventional method; Transradial band method; Hematoma; Patients undergoing coronary angiography.

1. INTRODUCTION

Coronary artery diseases (CAD) are the leading cause of death in the world¹. The Global Burden of Diseases study reported that the estimated mortality from CAD in India was 1.6 million in the year 2000. The current burden of CAD in India is more than 32 million patients. Epidemiological studies show a sizeable burden of CAD in rural (3-5%) and urban (7-10%) populations. A conservative estimate indicates that there could be 30 million CAD patients in India of which 14 million are in urban and 16 million in rural areas². The prevalence of definite CAD in Kerala increased nearly three times since 1993 without any difference in urban and rural areas³.

Coronary angiography is a diagnostic gold standard to determine the extent of disease in coronary arteries due to atherosclerosis⁴. Globally, there has been a substantial rise in the proportion of people undergoing CAG over the last few years⁵. Among the two approaches for angiography, (transradial and transfemoral) transradial approach has gained more popularity than conventional transfemoral approach over the past decade with availability of compression devices for radial artery that assure lesser risk for bleeding and pain and has translated into increased patient comfort and early mobility after procedure⁶. The TR band is a transparent band and has precision pressure balloons that enable reportedly unobstructed visualization and monitoring of radial artery compression – all while preventing numbness and pain for enhanced patient comfort⁶. A number of studies have found that TR band method is effective in reducing pain, hematoma and radial artery occlusion (RAO) among patients undergoing CAG¹¹⁻¹³.

Although transradial arterial access has demonstrated a lower incidence of bleeding and vascular complications compared to femoral and brachial arterial access, complications after transradial access nonetheless occur. One complication unique to this approach is the forearm hematoma. Single-center experiences reported that major hematomas occurring in 0.4% to 0.73% of cases and minor hematomas or bruising in up to 6%⁷.

2. OBJECTIVES

- To assess hematoma among patients undergoing coronary angiography.
- To compare the effectiveness of conventional method versus transradial (TR) band method on hematoma among patients undergoing coronary angiography.

3. MATERIALS AND METHODS

A quantitative approach was used for the study. The research design selected was true experimental post test only design. The duration of the study was six weeks. Cath list was used as the sampling frame and simple random sampling technique was used to select sixty patients who were undergoing CAG, admitted in Cath lab and Cardiology ward of Govt. Medical College Hospital, Kottayam with random number generation using Microsoft excel. Inclusion criteria of the present

study was patients undergoing CAG who are able to comprehend, read and communicate Malayalam or English and between the age of 41 and 80 years. Those excluded from the study were patients undergoing CAG who are critically ill, with known RAO, with history of radial angiography within the past three months, having bleeding disorders or hypercoagulable state, punctured radial artery more than one and posted for adhoc percutaneous coronary angioplasty. Among the selected patients, each of the 30 patients was then randomly allocated to group 1 and group 2. The conventional method was administered to group 1 and TR band method was administered to group 2. In conventional method the investigator compressed the radial artery by pressure bandage dressing (22x8cm) for eight hours directly to the puncture site immediately after sheath removal. In TR band method the investigator compressed the radial artery by TR band which was applied 1-2 mm proximal to the puncture site. Hematoma was assessed using easy hematoma classification scale at two hours and eight hours of CAG both in group 1 and group 2 and observation method was used as a method of data collection. The obtained data was tabulated and analysed in terms of objectives of the study using descriptive and inferential statistics.

4. RESULTS

4.1 Findings related to sample characteristics

Among 60 patients, in both group 1 and group 2, 46.7% were in the age group of 51-60 years. Most of the patients (66.7%) in group 1 and (83.3%) in group 2 were males. The data revealed that most of the patients in group 1 (80%) and group 2 (93.4%) were married. With regard to educational status, 46.7% of the patients in group 1 and 36.7% of patients in group 2 were studied up to secondary school. While considering the occupation, nearly 40% in group 1 and 33.4% in group 2 were self employed. The data showed that 66.6% of the patients in group 1, 36.7% of patients in group 2 were having monthly income of < 5000. Most of the patients in the group 1 (80%) and group 2 (70%) belonged to nuclear family. The data pointed out that most of the patients in group 1 (93.3%) and group 2 (96.7%) were taking mixed diet. The data revealed that majority of patients in group 1 (63.3%) and group 2 (46.7%) were diagnosed with CAD for < 6 months. Nearly half of the patients in group 1, (53.4%) and 40% patients in group 2 were diagnosed with NSTEMI. It is seen that 20% of patients in group 1 and 40% of patients in group 2 had no comorbidities. For all the patients in group 1 and most of the patients in group 2 (96.7%), arterial catheter size of 6 F was used for CAG. The data indicated that majority of the patients (53.3%) in group 1 were having duration of CAG for ≤ 15 min. Among 60 patients, 53.3% in group 1 and 36.7% in group 2 were having normal blood pressure ($90/60 \leq BP \leq 120/80$ mmHg). The data depicted that most of the patients in group 1, (96.7%) and group 2 (93.3%) were having capillary refill of ≤ 2 seconds. Allens test was negative for all the patients in group 1 and group 2. The data pointed out that most of the patients (93.3%) in group 1 and group 2 were having normal sensation of hand. While considering the treatment on oral antiplatelets, most of the

patients in group 1, (93.3%) and group 2, (86.7%) were taking oral antiplatelets.

4.2 Findings related to hematoma among patients undergoing coronary angiography

Table 1 Frequency Distribution And Percentage Of Patients Undergoing Coronary Angiography Based On Hematoma (n=60)

Hematoma	Group 1 (n=30)		Group 2 (n=30)	
	f	%	f	%
2 Hours				
No (0)	26	86.7	30	100
Mild (1)	4	13.3	0	0
Moderate (2-3)	0	0	0	0
Severe (4-5)	0	0	0	0
8 Hours				
No (0)	30	100	30	100
Mild (1)	0	0	0	0
Moderate (2-3)	0	0	0	0
Severe (4-5)	0	0	0	0

The data presented in table 1 depicts that 86.7% of patients in group 1 had no hematoma and 13.3% of patients had mild hematoma after two hours of angiography. No patients in group 1 and group 2 had hematoma after eight hours of CAG.

4.3 Findings related to comparison of conventional method versus TR band method on hematoma among patients undergoing coronary angiography

Table 2 Median And (inter Quartile Range) IQR Of Post Test Scores Of Hematoma Among Patients Undergoing Coronary Angiography After Two Hours Between Group 1 And Group 2 (n=60)

Group	Hematoma after two hours		
	Mean rank	Sum of ranks	U
Group 1 (n=30)	32.50	975	390*
Group 2 (n=30)	28.50	855	

Table 3 Mean Rank, Sum Of Ranks And U Value Of Post Test Scores Of Hematoma Among Patients Undergoing Coronary Angiography After Two Hours Between Group 1 And Group 2 (n=60)

Group	Hematoma	
	Median	IQR
Group 1 (n=30)	0	0
Group 2 (n=30)	0	0

*Significant at 0.05 level

The table 3 shows that the obtained U value 390 was significant at 0.05 level. Hence the null hypothesis was rejected. It is interpreted that there was statistically significant difference in the post test scores of hematoma among patients undergoing CAG after two hours between group 1 and group 2.

This indicates that TR band method was effective in reducing hematoma among patients undergoing CAG after two hours of procedure.

Table 4 Median And IQR Of Post Test Scores Of Hematoma Among Patients Undergoing Coronary Angiography After Eight Hours Between Group 1 And Group 2 (n=60)

Group	Hematoma	
	Median	IQR
Group 1 (n=30)	0	0
Group 2 (n=30)	0	0

Table 5 Mean Rank, Sum Of Ranks And U Value Of Post Test Scores Of Hematoma Among Patients Undergoing Coronary Angiography After Eight Hours Between Group 1 And Group 2 (n=60)

Group	Hematoma after eight hours		
	Mean rank	Sum of ranks	U
Group 1 (n=30)	30.50	915	450
Group 2 (n=30)	30.50	915	

The table 5 shows that the obtained U value 450 was not significant at 0.05 level. Hence the null hypothesis was accepted. It is interpreted that there was statistically no significant difference in the post test scores of hematoma among patients undergoing CAG after eight hours

between group 1 and group 2. It indicated that although there was an immediate effect of reducing hematoma in group 2 with TR band method, there was no delayed effect in both the groups. As the time passes it was noted that both the interventions are equally effective in terms of hematoma.

5. DISCUSSION

In the present study after two hours of CAG, 13.3% of patients in group 1 had mild hematoma whereas in group 2 no patients experienced hematoma. No patients in group 1 and group 2 had hematoma after eight hours of CAG. A cross sectional correlational study resembled similar findings and results showed that bleeding during hemostasis occurred in 14.1% of patients at 24 hours of CAG⁸. The findings were in line with an article review reported that the most common complications of CAG were hematoma (14.4%) and RAO (19.7%)⁹. An interventional study resembled similar findings and results showed that 7.3% of patients had hematoma after CAG¹⁰. The present study compared the effectiveness of conventional method versus TR band method on hematoma among patients undergoing CAG which revealed that there was an immediate effect of reducing hematoma in patients undergoing CAG with TR band method at two hours of CAG ($p < 0.05$) and there was no delayed effect in both the groups.

The present study findings were congruent with a study conducted to compare the hemostasis times with a hemostatic pad vs mechanical compression with TR band following transradial access showed that there is no pain, hematoma and RAO in patients receiving TR band method¹¹. The findings of study were parallel with a comparative study on manual versus mechanical compression of the radial artery after CAG via transradial access regarding RAO, access site bleeding complications and duration of hemostasis and the findings showed that there is no hematoma in patients with mechanical compression after CAG¹². The findings were in agreement with a study conducted among patients undergoing CAG and interventions revealed that there were significantly more patients reporting no discomfort in the TR band group compared to another compression device group radistop (77% vs. 61%; $p = 0.0001$)¹³.

6. CONCLUSION

The findings of the study concluded that there was an immediate effect of reducing hematoma in patients undergoing CAG with TR band method at two hours of CAG and there was no delayed effect in both the groups. As the time passes it was noted that both the interventions are equally effective in terms of hematoma.

REFERENCES

- Shyam, H., Lakshminathan, T., & Mohan, S. (2019). Cross Sectional Study on Assessment of Heart ailments in Patients reporting at Ayuthidoss Pandithar Hospital National Institute Of Siddha, Chennai, June, 2018. *Journal of Research in Biomedical Sciences*, 1(3), 31-35.
- Kaul, U., & Bhatia, V. (2010). Perspective on coronary interventions & cardiac surgeries in India. *The Indian journal of medical research*, 132(5), 543.
- Krishnan, M. N., Zachariah, G., Venugopal, K., Mohanan, P. P., Hari Krishnan, S., Sanjay, G., ... & Thankappan, K. R. (2016). Prevalence of coronary artery disease and its risk factors in Kerala, South India: a community-based cross-sectional study. *BMC cardiovascular disorders*, 16(1), 1-12.
- Metcalfe, B. (2010). The radial approach for percutaneous coronary intervention. *British Journal of Cardiac Nursing*, 5(11), 531-536.
- Dandekar, V. K., Vidovich, M. I., & Shroff, A. R. (2012). Complications of transradial catheterization. *Cardiovascular Revascularization Medicine*, 13(1), 39-50.
- <https://www.dicardiology.com/content/transparent-radial-artery-band-provides-clearer-view>
- Caputo, R. P., Tremmel, J. A., Rao, S., Gilchrist, I. C., Pyne, C., Pancholy, S., ... & Patel, T. (2011). Transradial arterial access for coronary and peripheral procedures: executive summary by the Transradial Committee of the SCAI. *Catheterization and Cardiovascular Interventions*, 78(6), 823-839.
- Cheng, K. Y., Chair, S. Y., & Choi, K. C. (2013). Access site complications and puncture site pain following transradial coronary procedures: a correlational study. *International Journal of Nursing Studies*, 50(10), 1304-1313.
- Tiru, B., Bloomstone, J. A., & McGee, W. T. (2012). Radial artery cannulation: a review article. *J Anesth Clin Res*, 3(5), 1000209.
- Jia, D. A., Zhou, Y. J., Shi, D. M., Liu, Y. Y., Wang, J. L., Liu, X. L., ... & Gao, F. (2010). Incidence and predictors of radial artery spasm during transradial coronary angiography and intervention. *Chinese medical journal*, 123(07), 843-847.
- Roberts, J. S., Niu, J., & Pastor-Cervantes, J. A. (2019). Comparison of hemostasis times with a chitosan-based hemostatic pad (Clo-SurPlus Radial™) vs mechanical compression (TR Band®) following transradial access: a pilot study. *Cardiovascular Revascularization Medicine*, 20(10), 871-874.
- Petroglou, D., Didagelos, M., Chalikias, G., Tziakas, D., Tsigkas, G., Hahalis, G., ... & Ziakas, A. (2018). Manual versus mechanical compression of the radial artery after transradial coronary angiography: the MEMORY multicenter randomized trial. *JACC: Cardiovascular Interventions*, 11(11), 1050-1058.
- Rathore, S., Stables, R. H., Pauriah, M., Hakeem, A., Mills, J. D., Palmer, N. D., ... & Morris, J. L. (2010). A randomized comparison of TR band and radistop hemostatic compression devices after transradial coronary intervention. *Catheterization and Cardiovascular Interventions*, 76(5), 660-667.