

Experiences of cardiac care nurses related to the management and delayed removal of trans-radial band of patients at a private tertiary care hospital, Islamabad

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Abstract

Objective: To explore the experiences of cardiac care nurses in managing transradial band of patients in a tertiary care setting.

Method: The exploratory, descriptive, qualitative study was conducted at a private-sector tertiary care hospital in Islamabad, Pakistan, from March to September 2021, and comprised registered cardiac care nurses with >6 months of relevant experience. Data was collected through face-to-face interviews using a semi-structured interview guide. Data was analysed qualitatively using the Creswell and Creswell framework.

Results: Of the 10 nurses, 5(50%) were males and 5(50%) were females. In terms of age, 5(50%) were aged <25 years. Cardiac specialisation had been done by 2(20%) nurses, and none of the subjects had formal training related to transradial band. The main theme that emerged from the data was nurses' management of patients with transradial band, and the three categories were nurses' knowledge and practices about transradial band, reasons for delayed transradial band removal, and strategies to minimise complications.

Conclusion: To minimise transradial band-related complications, in-service training of nurses and ensuring a safe nurse-patient ratio are necessary.

Keywords: Assessment, Complications, Cardiac care nurses, Radial angiography, Transradial band. (JPMA 74: 880; 2024)

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Introduction

Radial artery access is the preferred procedure for coronary intervention or cardiac catheterisation (CC).^{1,2} The most common form of percutaneous cardiac intervention (PCI) is left heart catheterisation, which is performed for diagnostic or therapeutic purposes to determine the existence and the extent of coronary artery disease (CAD), to assess left ventricular (LV) function, and/or to evaluate the heart's valves or myocardium.³ The transradial (TR) band is a transparent compression device used to stop bleeding and achieve haemostasis of the radial artery after TR coronary angiography or CC.⁴

In the United States, over one million CCs are performed each year.⁴ Pakistan lacks statistical data for coronary angiography and CC procedures performed annually, but different hospitals have done single-centre studies to report the number of people undergoing percutaneous coronary angiography (PCA) or CC at their respective centres in different parts of the country. At the Punjab Institute of Cardiology, approximately 16,000 coronary

procedures are performed each year, while a cross-sectional study at the major CC laboratory of the Lady Reading Hospital in Peshawar reported performing 21,362 PCIs for CAD.³

TR band application is a recommended method to enhance early haemostasis because of less complications and bleeding.⁵ In low-income countries, like Pakistan, complications due to cardiovascular diseases are very high, and, therefore, effective measures are needed to decrease complication rates in radial angiography.^{6,7}

There are numerous post-CC (PCC) complications, and the most common among them are vascular access site complications (VASCs), including bleeding, haematoma, pseudo-aneurysm, arteriovenous fistula, retroperitoneal haemorrhage, and arterial occlusion⁷⁻⁹ as well as device leak.⁸ Vascular complications, especially when severe, can increase morbidity and mortality, as well as increase costs for both the patient and the healthcare facility.⁹ When recognised and treated in an appropriate and timely manner, severe complications can be avoided or mitigated. Nurses play an important role when the cardiologist performs the angiography or CC, from pre-procedure assessment to post-procedure care and discharge.¹⁰ When a patient is admitted for this invasive high-risk procedure, the nurses assess and prepare a patient for angiography, including the assessment of radial artery patency.¹¹

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However, cardiac nurses generally delay deflating the TR band beyond the standard prescribed time.¹² Therefore, nurses associated with cardiology departments need proper training, protocols and continuous teaching about the identification and prevention of complications.¹³ Early assessment of complications and timely treatment of it highly depend on the competence of the registered nurses working in the cardiac care facility. Despite the fact that the TR band is increasingly used worldwide, including in Pakistan, there seems to be a lack of standard protocols for the safe deflation and removal of the band.¹³

The current study was planned to explore the experiences of cardiac care nurses in managing TR band of patients in a tertiary care setting, and the reasons to delay the removal of the TR band.

Subjects and Methods

The exploratory, descriptive, qualitative study was conducted at a private-sector tertiary care hospital in Islamabad, Pakistan, from March to September 2021. After approval from the institutional ethics review board of Shifa Tameer-Millat University, Islamabad, the sample was raised using purposive sampling technique. Information flyers outlining the study purpose, inclusion and excluding criteria, and the contact information of the researcher were posted on the notice boards of all cardiology units. Additionally, a digital picture of the flyer was shared with nurses of respective units through WhatsApp group with the help of the team leader. The nurses who contacted the

Table-1: The interview guide.

Question
1 What do you know about the TR band? Planned probes: What is the purpose of the TR band? How TR band is applied? How do you assess the TR band? What are complications associated with the TR band?
2 How do you care for the patient with the TR band? Planned probes: When TR band is applied? When TR band is removed? What is the hospital policy for the TR band? Who is responsible for TR band removal? How TR band is removed?
3 What are the factors that delay the removal of the TR band?
4 What types of complications, do you think, develop due to delay in the removal of the TR band? Planned probes: What complications can occur prior to the removal of the TR band? What complications can occur during the removal of the TR band? What complication can occur after removal of the TR band? How do you identify complications related to the TR band?
4 What are the ways to minimize complications related to delay in the removal of the Trans-radial band?

primary investigator and met the eligibility criteria were enrolled. Those included were registered nurses (RNs) who had the experience of >6 months in cardiology departments and had an active registration with the Pakistan Nursing Council. Nursing interns and staff nurses doing part-time jobs were excluded. For maximum variation, RNs were recruited from the daycare unit, the cardiology ward and the cardiac care unit (CCU) having varied clinical experience.

After taking informed consent, demographic data was collected from each participant before conducting individual face-to-face interviews that were done using a semi-structured interview guide (Table 1). The interviews were conducted in the CCU conference room, and were audio-recorded. The time for each interview remained between 30 and 45 minutes. The interviews were conducted in the English language, but the participants had the choice to use Urdu language as per their convenience. The researchers being bi-linguists were able to translate the words or phrases from Urdu to English language for analysis purposes.

Data was analysed using the five-step process of qualitative analysis that is part of Creswell and Creswell framework.¹⁴

Results

Of the 10 nurses, 5(50%) were males and 5(50%) were females. In terms of age, 5(50%) were aged <25 years. Cardiac specialisation had been done by 2(20%) nurses, and none of the subjects had formal training related to TR band (Table 2).

The main theme that emerged from the data was nurses' management of patients with TR band, and the 3 categories, based on 11 sub-categories, were nurses' knowledge and practices about TR band, reasons for delayed TR band removal, and strategies to minimise complications.

All the 10(100%) participants said they had adequate knowledge about the purpose and benefits of TR band, assessment needs of a patient with TR band, documentation related to TR band management, patient teaching, and complications due to TR band.

All the 10(100%) nurses identified at least 2 purposes of the TR band. "A transparent TR band is applied on the radial site [after catheterisation] to prevent bleeding. It decreases the chances of haematoma; mobility is not restricted and the patient can easily move." (P1).

"The purpose is to apply compression to assist in haemostasis of the radial artery after performing the procedure" (P4).

In addition to knowing the benefits of the TR band, the nurses emphasised the importance of patient assessment.

"We need to assess the blood supply [of the arm], checking for any signs of compromise ... Assessment for bleeding, skin temperature, skin colour, capillary refill and some system parameters should be conducted. Additionally, a comparison of the colour of the skin of the left hand and palm with the right hand should be performed." (P1)

"We ask a patient about pain, swelling and numbness, and inform the doctor. A prescribed painkiller, like injection paracetamol, is administered to relieve the pain. If TR band pressure is high, we remove 2ml of air from the balloon and then assess for bleeding and oozing. Capillary refill, oxygen

Table-2: Demographic characteristics of the participants.

Characteristics	n (%)
Gender:	
Male	5 (50)
Female	5 (50)
Age (years):	
< 25	5 (50)
25-30	4 (40)
31-35	-
36-40	-
> 41	1 (10)
Qualification:	
Diploma	3 (30)
BSN	3 (30)
Post RN	3 (30)
MSN	1 (10)
Clinical Experience:	
1-5 years	7 (70)
6-10 years	2 (20)
>10 years	1 (10)
Cardiac Specialization:	
Yes	2 (20)
No	8 (80)
Experience in Cardiology:	
1-5 years	6 (60)
>5-10 years	2 (20)
>10 years	2 (20)
Designation:	
RN	8 (80)
AHN	1 (10)
HN	1 (10)
Formal Training Session on TR band Attended:	
Yes	0
No	10 (100)
TR Band Removed:	
< 10	1 (10)
10 to 20	2 (20)
21 to 30	2 (20)
31 to 40	1 (10)
> 40	4 (40)

TR: Transradial, RN: Registered nurse, AHN: , HN: BSN: , MSN:

saturation, and skin temperature should be checked." (P7)

The participants were aware of the importance of documenting their patient's assessment findings and the care provided. However, they acknowledged some shortcomings in their documentation practices.

"As our unit and staff are very busy, TR band-related documentation is delayed. The number of activities in the unit makes it difficult to focus on documentation ... So, timely documentation is an area that we can improve upon." (P6)

"The drawback of late documentation is that we miss any important event that occurred during the morning shift. We try to document according to post-operative or post-catheterisation orders so that we can protect ourselves in case the file is reviewed later. We have no proper format to document the care given to a patient with TR band, but we include it in nurses' notes. We should improve our documentation." (P9)

Teaching patients about caring for the TR band was another important practice followed by the nurses. *"We teach patients that 'don't lift heavy things; inform us immediately if there is any problem'. We educate [patients] about two hours of bed-rest; not to put weight on or use the hand where the TR band is applied."* (P1)

"We also teach patients and attendants that if they find any swelling, discolouration or bleeding, inform us [nurses] immediately. We monitor the TR band, but also instruct them to identify the things [sign and symptoms] and inform us on time." (P2)

Nurses were better positioned to take immediate steps to prevent complications related to TR band, provided they were knowledgeable. The participants were aware of some of the complications of the TR band and when its removal was delayed.

"Common complications of TR band are bleeding, haematoma, swelling, bruise; sometimes it compromises the blood supply to the hand." (P1)

"The complications of the prolonged mechanical compression due to TR band are "hand ischemia, spasm, nerve damage, radial artery occlusion". (P2)

"The haematoma, bleeding, radial artery occlusion, numbness, pain, nerve damage and shock" were identified by P6.

"Minor complications are more common, but severe complications, like radial artery occlusion, bleeding, vasospasm and pseudoaneurysm occur rarely in patients." (P5).

Despite having knowledge about the complications related to the TR band, there were delays in the removal of the TR band.

The participants indicated that the staff, patients, and busy activities in cardiology units contributed to the delay in the removal of the TR band.

"They [staff nurses] will text message to the person who is scheduled for the next shift, that I am too busy and my duty is hectic, please remove the TR band during your shift and do not complain about me..." (P3).

"Most staff members take it lightly. So, they don't learn how to remove the band" (P6).

Incompetency of the assigned staff nurses also caused delay in the removal of the TR band. *"The assigned nurse is not competent or not trained to remove the TR band, so she may feel uncomfortable and that is why she or he can delay." (P1).* The participants also talked about shortage of staff nurses and the busy routine of the units contributing to the delay in the removal of the TR band.

Sometimes, patients themselves caused delay in the removal of the TR band. *"The patient is busy taking lunch or something like that ... they refuse to get the TR band removed." (P2).*

Additionally, the participants discussed the negative contribution of patients' families to the delay in the removal of TR band. *"At the time of TR band removal, the family member will say, 'please wait a little bit more as there are chances of bleeding'. Sometimes the family member will ask the patient to request for delay by giving the reason like, 'I am in pain, I am not feeling well, please remove it later.'" (P3)*

The high patient-to-nurse ratio also resulted in a delay in the removal of the band. *"When we receive the patient from the cath lab, the unit may be busy as one nurse is assigned to three patients in the CCU." (P2).*

At times, when the removal of the TR band is due, nurses are occupied with administering routine medications. *"We have to complete medication [administration] for other patients or something like that; we are busy with some other patients." (P1)*

"Our unit [daycare] is busy as it is a multi-specialty unit; cardiac patients come for angiography, there are patients for eye surgery, gynae, paed. We receive patients in the daycare after various procedures like MRI [magnetic resonance imaging] and other specialty procedures. Our staff members are busy transporting patients to and from the OR [operation room]. Many staff members are engaged in pre-assessment, admissions, and managing patients after procedures." (P6)

The participants suggested few strategies to minimise complications. The nurses suggested having a policy or a protocol on TR band, training for staff nurses, and ensuring a safe nurse-to-patient ratio to minimise complications.

The participants shared the concern that the hospital lacked a written policy on TR band management. *"There is no hospital policy for TR band here. I think this procedure is performed for a long time; there should be a policy." (P2).*

However, the participants also mentioned that there was a protocol for assessing the site where TR band has to be applied and for monitoring vital signs. *"Actually there is no written policy for TR band, but we have a protocol for post-operative care of TR band, and monitoring vital signs, and assessment of the site." (P4)*

"No written policy [is there], but we have a pre-cardiac checklist. We follow the three steps of a protocol in which the first step is to assess the radial site. The second step is to monitor the pressures, and, when needed, monitor the vital signs. Lastly, we assess pain every 15 minutes for the first hour and every 30 minutes in the next two hours ... and then one hourly." (P5)

The participants suggested in-service training or workshop for cardiac nurses. *"There is no training, any formal training or any workshop; I did not attend any workshop regarding the TR band removal or about TR band, but I have learned from my seniors." (P2).*

"Delay occurs because new staff members are not trained and most take it casually. We should organise seminars and workshops, and we should give them a certificate." (P6)

The final suggestion made by the participants was to recruit nurses to overcome the shortage. *"There is a staff shortage. The hospital management should have adequate staffing, and the nurses should be assigned fewer patients. Every nurse should have one patient (in CCU) so that he or she can assess the patient properly." (P5).*

"The hospital should recruit new staff so that the nurse-patient ratio may be proper." (P9).

Discussion

Vascular complications can increase the probability of morbidity and mortality, as well as escalate costs for both the patient and the healthcare facility.⁹ Therefore, having knowledgeable cardiac nurses is critical. They can not only recognise and treat issues in an appropriate and timely manner, but also help in minimising complications. The current participants reported being knowledgeable about the management of the TR band, and also the related complications that may arise when the band was removed

late. They were aware of the increase in the cost of care and the extended hospital stay resulting from these complications. These findings are similar with previous studies.¹⁵⁻¹⁷ Furthermore, the nurses reported the use of Allen's tests and bilateral oxygen saturation (Barbeau's test) to diagnose any problem with peripheral circulation of their patients. These assessment tests are consistently reported in the literature.^{18,19}

Documentation is considered an essential and critical element in daily nursing practice. The current study reported that nurses did not document proper information related to the TR band management on a timely basis due to busy units. These practices question the standard nursing care that should be reflected in excellent documentation.²⁰ In addition, providing proper care and documenting it would prevent them from legal suits. Healthcare providers need to be aware of and compliant towards proper documentation for which the organisation must develop comprehensive policies. These policies will ensure standard reporting and documentation of TR band management for patients undergoing TR CC.²¹

There were several factors reported in the current study that contributed to the delay in the removal of the TR band, including staff shortage, lack of written policy, patients' requests, and busy units. In order to provide optimum services to patients, it is highly recommended that nurse-to-patient ratio should be adequate. In the context of Pakistan, the nurse-to-patient ratio is very poor, being 1:50 against the recommended ratio of 1:5.²² The shortage of nursing staff is one of the many factors that contribute to delay in providing patient care services that are beyond the control of the department.²³ Patients' outcomes and care are compromised due to nurses' burnout and high patient census.²⁴

Additionally, the current study reported another critical factor that equally contributes to sub-standard practices in the clinical setting. There was no policy or written guidelines for TR band removal except for the post-procedure orders by a cardiologist or an interventionist. The lack of universal guidelines for TR band management for staff nurses can increase the complications to the patients.²⁵ Conversely, systematic guidelines lead to improvement in providing quality care, enhance appropriateness of clinical procedures and decisions, increase patients' safety and outcomes of clinical care, and decrease the cost and time.^{26,27}

The current study suggested some strategies to minimise the delay in TR band removal to prevent complications associated with prolonged compression. These include in-service training of staff nurses, policy development, and

ensuring an adequate nurse-to-patient ratio. Many participants mentioned that they had not attended any formal training session, seminar, or workshop regarding the TR band. For providing quality care and reducing complications to angiography and angioplasty patients, the nurses need to be involved in education programmes, workshops, ongoing training and conferences.^{28,29}

The current study, to our knowledge, is the first in Pakistan to explore and provide a rich description of cardiac care nurses' experiences regarding TR band management. Further, the study recruited a diverse sample of participants from different units of cardiology, such as the CCU, the daycare unit and the cardiology ward, which led to data richness.

The current study also has limitations. Some of the participants used the Urdu language during the interviews, and it is possible that during translation, the true meaning may have been lost. However, the help of a bi-linguist was sought to minimise such an error. The study was conducted at a single private-sector teaching hospital, so the findings have to be used with caution in another hospital setting.

Quasi-experimental studies should be conducted to compare the effectiveness of training sessions on the management of TR band.

Conclusion

The nurses were knowledgeable about caring for patients with TR band. However, they expressed several reasons for a delay in the removal of the TR band. Some of the strategies, like staff training, policy development and ensuring appropriate nurse-to-patient ratio, were suggested to minimise delays and reduce complications of the TR band.

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Author Contribution:

SA: Concept, data collection, analysis and interpretation.

SI: Drafting, revision.

KAD: Revision, provided extensive feedback throughout the research process and writing.

SFK: Provided feedback and comments throughout the conduct of the research process.

All four authors approved the final version of the article and agreed to be accountable for all aspects of appropriately investigated and resolved.