Time to discharge following diagnostic coronary procedures via transradial artery approach: A comparison of Terumo band and StatSeal hemostasis

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A B S T R A C T
Background: The transradial artery (TRA) approach for cardiac catheterization is associated with fewer complications, earlier mobilization and a shorter stay at the hospital. The objective of this study was to determine whether hemostasis with a combination of a compression band (Terumo TR band™) and a hemostatic patch (StatSeal™) decreases the time to discharge from the hospital compared to the Terumo (TR) band alone in patients undergoing diagnostic coronary catheterizations through a TRA approach.

Methods: We retrospectively looked at 445 patients who underwent diagnostic coronary angiography through the TRA approach at the Jack and Jane Hamilton Heart and Vascular Hospital, Dallas, Texas between July 2016 and June 2017. The difference in the time to discharge between the two groups was assessed by a Wilcoxon Rank-sum test.

Results: The combination of a TR band and a StatSeal hemostatic patch was used in 70.3% (313) of the patients. Comparison of the two groups demonstrated a statistically significant reduction in time from the end of the procedure to discharge (p < 0.001), with no significant alteration in safety among those with a combination of TR band and a StatSeal hemostatic patch.

Conclusion: With increasing frequency of TRA procedures in the United States, we demonstrate one effective method to significantly reduce the time to radial hemostasis and reduce the time to patient discharge from the hospital.

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1. Introduction

The transradial artery (TRA) approach for cardiac catheterization and coronary intervention has steadily increased from 1% in 2008 to 40.6% in the first quarter of 2017 [1] in the United States and TRA constitutes 20% of the interventional procedures worldwide [2]. TRA approach has been associated with fewer bleeding complications, less kidney injury, earlier mobilization, and swifter discharge from the hospital [3]. Studies have shown that the incidence of radial artery occlusion (RAO) post procedure is in the range of 1% to 10% [4] and maintaining radial artery patency helps to prevent ischemia as well as to preserve the artery for future access [5]. The patency of the radial artery can be maintained successfully by following various techniques such as proper anticoagulation, appropriate sheath size, patent hemostasis, reducing the hemostatic time, and assessing dual circulation before the procedure [6]. It is helpful to reduce the time to complete hemostasis with transradial sheath removed immediately after the procedure. Extended durations of compression post sheath removal have been associated with increased incidence of RAO [7]. Various compressive devices [8] and hemostatic patches are available to achieve the necessary hemostasis within a shorter period of time [4]. The objective of this study was to determine whether hemostasis with a combination of a compression band (Terumo TR band™) and a hemostatic patch (StatSeal™) decreases the time to discharge from the hospital compared to the Terumo (TR) band alone in patients undergoing diagnostic coronary catheterizations through a transradial approach.
2. Methods

A retrospective cohort study was conducted including patients who had a diagnostic coronary angiography procedure at the Jack and Jane Hamilton Heart and Vascular Hospital, Dallas, Texas between July 2016 and June 2017. All patients included in the analyses had the diagnostic catheterization procedure done via TRA approach. Demographic details such as age, gender and body mass index were collected. The date/time of the application of the StatSeal/TR band to the patient along with their corresponding discharge details from the hospital were obtained. The patients were discharged from the hospital if they had no chest pain or any significant pain at the site and if there was no bleeding, hematoma, or lack of palpable pulse. Patients were assessed for RAO using symptom evaluation and radial artery palpation. No patient had symptoms of occlusion at discharge or at follow up. StatSeal [9] is an iron-based coagulant which is placed over the arteriotomy, and then compressed gently over the site using an inflated compression band (in our study, the TR Band™). It shortens time to hemostasis by accelerating clotting at the site of the arteriotomy, shortening the time it takes to remove the compression bandage, and thereby facilitating time to discharge. The TR band was applied according to the TR Band manufacturer protocol [10].

Statistical analyses were conducted using STATA 14.2. Categorical variables were presented as proportions and continuous variables as mean (SD) or median (range) where applicable. Chi-Square/Fisher’s Exact tests were employed to compare proportions and t-test/Wilcoxon tests were used for continuous variables, as appropriate. The time in minutes from the application of the compression to hospital discharge was calculated in minutes. Due to the skewed values of the minutes, natural log values of the time were used.

3. Results

There were 1925 patients who underwent a diagnostic coronary catheterization during the study period, and 445 (23.1%) had the procedure conducted via TRA approach. The median (range) time to discharge was 333 min (61–1439) for TFA vs. 197 min (62–1415) for TRA (p < 0.001). Among the 445 TRA patients included in the analysis, the combination of TR band and StatSeal was used in 313 (70.3%) patients for hemostasis. Age, BMI and the amount of heparin used during the combination of TR band and StatSeal was used in 313 (70.3%) patients. The time to discharge was 333 min (61–1439) for TFA vs. 197 min (62–1415) 167 (62–1415) for TFA vs. 197 min (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415) 167 (62–1415). The time to discharge was significantly shorter among patients who had a combination of TR band and StatSeal compared to those receiving only the TR band (p < 0.001).

4. Discussion

In our study, we found that the combination of a TR band and a StatSeal hemostatic patch reduced the time to discharge in patients undergoing diagnostic coronary catheterizations. Various studies have explored the efficiency of various hemostatic devices in order to reduce the time to discharge and prevent RAO [11,12]. Lower use of anticoagulants and longer compression time has been associated with higher incidence of RAO (8.8%) following diagnostic catheterization when compared to PCI (4.5%).

A retrospective study compared the efficiency of 3 different non-invasive compression aids following interventionl percutaneous procedures and found that StatSeal (named as Quick Relief powder in 2007) was more efficient in reducing the time to hemostasis [13]. A recent quality improvement project including 48 patients found that using StatSeal Advanced disc in conjunction with the TR band reduced the needed nursing hours and accelerated the time to hemostasis [14]. In our study, we found that the use of StatSeal in combination with the TR band performed more efficiently than the TR band alone in terms of reducing the time to discharge from the hospital, which appears largely due to the reduced time to achieve acceptable hemostasis.

Given the advantages of the TRA approach such as earlier ambulation, and fewer vascular complications, studies have proposed the use of the TRA approach over transfemoral artery approach. A systematic review suggested that the TRA approach costs the hospital $275 less for a single patient [15]. The TRA approach was further shown to reduce the bed, pharmacy and total hospital costs in another study. It was stated that patients prefer the TRA approach, given the reduction in the length of stay and better quality of life [16]. In addition, TRA can substantially reduce nursing time post diagnostic or interventional catheterization by about 47 min per patient [17]. Our study showed that in addition, the time to discharge can be further reduced with the aid of StatSeal hemostatic patches.

This is a retrospective cohort study where we diligently collected the data of all the patients who underwent diagnostic catheterizations during the study period. However, this study only included patients from a single center and we did not collect any follow-up details. Furthermore, use of the StatSeal hemostatic patch was based on the discretion of the interventionist which could have introduced a selection bias. The time to hemostasis was not captured for this study as it was not uniformly recorded in the clinical charts. In order to gauge actual change in throughput, we utilized the time from the end of case to the time of discharge as this data was uniformly recorded on every patient. Assessment for radial artery occlusion was performed prior to discharge as well as at follow up. Ultrasound assessment, which is known to be much more sensitive for RAO, was not used as it is not the standard of care at our institution. None of the patients who were evaluated had any physiologic signs or symptomatic radial artery occlusion at discharge or at follow up. While the scope of this study was not to explore the link between shorter compression times and RAO, it does appear that concurrent use of Statseal reduces compression times [7]. As it reduces the compression time, we hope that it would aid in the reduction of RAO. Future randomized studies are needed to validate our findings in larger population.

5. Conclusion

The time to hospital discharge was significantly reduced for patients who had a combination of TR band and Statseal post diagnostic coronary angiogram procedure when compared to those who had only the TR band. As the use of TRA procedures in the United States is increasing, there is an increased interest in reducing complications and length of stay in the hospital. Our findings identified one method to...
significantly reduce the time to hemostasis and, ultimately reduce the
time to discharge from the hospital.

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