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Case Report

Radial artery sheath entrapment post-percutaneous coronary intervention: A rare complication and management insights

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Introduction

Percutaneous coronary intervention (PCI) is the most commonly used, minimally invasive method of revascularisation and uses balloons, stents and other adjuncts. The two common access sites used are transradial and transfemoral access. Due to a lower number of reported vascular complications, transradial access (TRA) is preferred [1]. It provides direct access to the ascending aorta with the benefit of early mobilization. But the calibre is smaller compared to the femoral artery. Here we present a case of radial artery sheath entrapment due to severe vasospasm following PCI in a middle aged woman.

Case Presentation

A 51-year-old female patient with well-controlled diabetes mellitus had presented to the hospital two months back with chest pain and was medically managed as an NSTEMI. Following that, she underwent a coronary angiogram revealing double vessel disease. PCI was recommended. Until then she was on maximum medical therapy.

She presented to us for the PCI. She denied any symptoms and was hemodynamically stable. The preprocedural investigations were normal. PCI was performed through transradial access. The patient had minimal pain during the radial puncture. Intra-arterial verapamil was administered to prevent radial artery spasm. There were no complications

in catheter engagement. A 7Fr XB3 catheter was inserted and both lesions were successfully stented with the achievement of TIMI 3 flow.

Following the procedure, when the sheath was being removed, it became entrapped due to severe radial artery spasms. Intrarterial verapamil was given to reduce the spasms but there was no improvement. Next the patient was sedated with intravenous midazolam and we attempted to remove the sheath. The sheath was taken out with great difficulty but was severely disfigured and stretched (Figure1). Haemostasis was achieved and rest of the recovery was uneventful.

Figure 1: Right side 7 Fr normal vascular sheath. Left side same size vascular sheath severely distorted after the procedure.

Discussion

TRA currently represents the more preferred arterial access method for PCI, primarily due to the reduced access-site complications compared with trans femoral access (TFA) [1]. TRA has a Class I recommendation for patients with acute coronary syndrome in the current European Society of Cardiology guidelines [2]. Despite the reduced number of procedure-related complications, it is important to be aware of the specific complications related to TRA as there is notable variability in how these complications are reported, their presentations and the management, partially due to ambiguous symptoms and underdiagnosis.

A recent meta-analysis shows major vascular complications occurring in 0.2% following TRA with major bleeding occurring in just over 1% of cases but improved cardiovascular outcomes when compared with TFA [3]. TRA complications can be categorized as intra-procedural or post-procedural [4] (Table 01).

Table 01: Complications of transradial access (TRA)

Intra-procedural complications	Post-procedural complications
Radial artery perforation	Forearm hematoma and compartment syndrome
Radial artery spasms	Radial artery occlusion
Dissections	Pseudo aneurysm
Catheter kink	Arterio-venous fistula

Radial artery spasm (RAS) is defined as temporary, sudden narrowing of the radial artery. Due to the presence of numerous α-adreno receptors in the adventitia layer, the radial artery has higher vaso-reactivity and is susceptible to spasms following local trauma [5]. A systematic review that included 7197 patients showed RAS occurring in 15% of the patients [6]. RAS commonly manifests as forearm discomfort with resistance in wiring or catheter advancement and may worsen with further manipulation. In rare cases, RAS can be so severe and prolonged that it may cause sheath entrapment [7].

Several factors can predict RAS, which include radial artery anomaly, smaller radial artery diameter, female gender, increased number of puncture attempts, utilization of multiple catheters and the experience of moderate-to-severe pain during radial artery cannulation [8]. The use of prophylactic antispasmolytic therapy after sheath insertion and before sheath removal and using a hydrophilic sheath can reduce the occurrence of RAS.

Sheath entrapment can be a problematic issue during PCI. In a Roman study of 1,048 coronary angiographic procedures using TRA, four patients (0.4%) experienced severe RAS with sheath entrapment at the time of sheath withdrawal. In all four cases, the procedure was a PCI and three of the patients were female [9].

With limited data, management of radial artery entrapment can be challenging. Initially, intra-arterial nitrates or verapamil injection can be used as first-line treatment to resolve the spasm along with sedation and warm drapes placed on the affected site. Newer approaches such as pressure-mediated dilatation using a blood pressure cuff have shown promising results when compared with pharmacological management [10]. In more severe and persisting cases, general anesthesia should be considered. In refractory cases sympathectomy caused by regional nerve block may result in vasodilation. However, caution should be taken as clinical data is limited only to a few case reports [11].

In conclusion, this case report highlights a case of radial artery sheath entrapment following percutaneous coronary intervention, which is a rare but an important complication of TRA.

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Ethics Statement
Patient's consent was granted for the publication of this case report.

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