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Surgical Repair of a Radial Artery Aneurysm Following Elective Percutaneous Coronary Intervention: A Case Report

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ABSTRACT

Background: Transradial approach for percutaneous coronary intervention (PCI) is frequently preferred because it has lower complication rates than femoral access. However, unusual vascular complications, such as radial artery pseudoaneurysms, might arise, requiring diagnostic and treatment challenges.

Case Summary: We present a case of a 68-year-old man who underwent an elective right radial percutaneous coronary intervention (PCI) with a 6 Fr sheath. Following the procedure, he experienced the development of a non-painful, progressively growing pulsatile mass at the site of access ten days later. A duplex ultrasound revealed a saccular pseudoaneurysm measuring 22 × 18 mm, characterized by a 2.5 mm neck and to-and-fro flow patterns. A CT angiography confirmed the presence of a localized pseudoaneurysm without any signs of distal embolization. After a discussion among specialists, Surgical intervention was decided, while maintaining the patency of the radial artery and avoiding any distal ischemia. The patient was discharged the next day and remained asymptomatic with duplex-confirmed thrombosis after 1 and 6 months.

Conclusion: A delayed pulsatile swelling following transradial procedures should lead to the use of duplex imaging. For anatomically appropriate radial pseudoaneurysms, ultrasound-guided thrombin injection is an efficient and minimally invasive treatment option for small sized pseudoaneurysms.For large, symptotic pseudoaneurysm, Surgical removal is the treatment of choice.

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Introduction

Percutaneous coronary intervention (PCI) with transradial access has become the preferred technique in several hospitals due to lower bleeding risk, earlier ambulation, and greater patient comfort. Despite its benefits, transradial access is not without risks. Hematomas, arterial occlusion, and pseudoaneurysms are among the most common vascular injuries documented. Radial pseudoaneurysms are extremely rare and frequently go undiagnosed.

Atrue pseudoaneurysm dilates all three layers of the vessel wall: intima, medium, and adventitia. Pseudoaneurysms, on the other hand, are caused by a rupture in the artery wall that is filled with blood from surrounding tissues. True pseudoaneurysms can develop after PCI due to mechanical damage, recurrent puncture, or infection. This article reports a rare example of a genuine radial artery pseudoaneurysm after elective PCI and outlines its clinical implications.

Case Presentation

A 68-year-old male patient known to be hypertensive and dyslipidemia presented with stable angina.Elective coronary angiography was performed and right radial approach was preferred after careful examination of both radial arteries and it was done through the right radial artery using a 6F sheath. It showed a severe stenosis in the proximal left anterior descending artery (LAD). PCI and stenting to the LAD was performed the same setting through which heparin at a dose of 5000u IV with an ACT check within 10 minutes. The procedure was successful and the sheath was safely removed after the proceedure and compression was done by a TR band and the site is then monitored frequently for bleeding, swelling, and other signs of complications, with pressure adjusted as needed. The patient was discharged the next day with dual antiplatelet treatment.

Ten days after discharge, the patient noticed a gradually increasing, painless swelling on the volar aspect of his right wrist. He denied experiencing fever, trauma, or neurological problems. The physical examination showed a pulsatile mass with an audible bruit. The distal pulses were intact, and there was no evidence of ischemia or infection.

Doppler Ultrasound revealed a saccular pseudoaneurysm measuring 22 × 18 mm with intact arterial wall layers and laminar flow. CT Angiography was done and revealed a pseudoaneurysm of the radial artery without evidence of thrombosis or distal embolization.

Management

Due to the size and pulsatile nature of the pseudoaneurysm, surgical

intervention was considered essential. The procedure was performed under regional anesthesia, during which the pseudoaneurysm was removed, and the radial artery was repaired using end-to-end anastomosis. Intraoperative observations confirmed it was a true pseudoaneurysm with the arterial wall layers intact and no evidence of rupture or infection.

The recovery process post-surgery was uneventful. The patient was discharged on the third day following the surgery, with intact hand function and palpable distal pulsations.

postoperative follow-up after 1 and 3 months with clinical examination and doppler ultrasound showed patent radial artery.

Table 1: Clinical Features of Reported Radial Artery Pseudoaneurysm Cases

Author	Year	Patient Age/Sex	Presentation	Time to Diagnosis	Symptoms
Cunha et al.	2023	65/M	Pulsatile wrist swelling	10 days	Bruit, mass
Papadoulas et al.	2022	72/F	Painful forearm lump	14 days	Pain, swelling
Majumdar et al.	2016	58/M	Expanding wrist hematoma	7 days	Pain, bruit
Present case	2025	68/M	Painless pulsatile swelling	10 days	Audible bruit, mass

Table 2: Summary of Reported Radial Artery Pseudoaneurysm Cases Post-PCI (Imaging and Outcomes)

Author	Year	Type	Imaging Used	Management	Outcome
Cunha et al.	2023	pseudoaneurysm	Doppler, CT Angio	Surgical	Full recovery
Papadoulas et al.	2022	pseudoaneurysm	Doppler	Surgical	Good outcome
Majumdar et al.	2016	pseudoaneurysm	Doppler, CT Angio	Surgical	No complications
Present case	2025	pseudoaneurysm	Doppler, CT Angio	Surgical	No complications

Table 3: Management Strategies for Radial Artery Pseudoaneurysm

Approach	Indication	Technique	Outcome
Conservative observation	Small, asymptomatic pseudoaneurysm	Clinical monitoring, compression	Often spontaneous resolution
Ultrasound-guided thrombin injection	Moderate-sized pseudoaneurysm with narrow neck	Percutaneous thrombin injection under Doppler	Rapid thrombosis, artery preserved
Surgical excision & repair	Large, symptomatic, or true aneurysm	Excision + end-to-end anastomosis	Definitive treatment, preserved flow

Discussion

Radial artery pseudoaneurysms are uncommon complications that can arise from transradial PCI. The majority of documented cases involve pseudoaneurysms, which are more prevalent due to disruption of the arterial wall during the insertion of sheaths or manipulation of catheters. True pseudoaneurysms, like the one discussed here, are less common and may be attributed to repeated trauma or inflammatory conditions.

Possible causes include mechanical injury from sheath or catheter placement, multiple punctures during various procedures, infections that weaken the arterial wall, and disorders related to connective tissue.

Imaging techniques are essential for diagnosis. Doppler Ultrasound is the primary, non-invasive method that effectively distinguishes between true and pseudoaneurysms. CT Angiography offers detailed anatomical images and aids in surgical preparation.

Management Depends on Size and Symptoms:

- Small, asymptomatic lesions may resolve conservatively.
- Moderate pseudoaneurysms respond well to thrombin injection.
- Large or symptomatic lesions require surgical repair.

An analysis of available cases indicates that the majority of radial artery pseudoaneurysms following PCI are pseudoaneurysms. True aneurysms are infrequently reported and often necessitate surgical intervention. Prompt identification is crucial to avoid complications such as rupture, thrombosis, or ischemia in the distal area.

In our patient, the proximal pseudoaneurysm formed after transradial PCI was successfully treated by surgical excision and end-to-end anastomosis, preserving distal perfusion and hand function.

Conclusion

This case highlights the necessity of post-PCI surveillance, particularly in patients having transradial access. Radial artery pseudoaneurysms, while rare, can cause catastrophic problems if not detected and treated early. When patients appear with forearm masses after catheterization, clinicians should exercise a high level of suspicion.

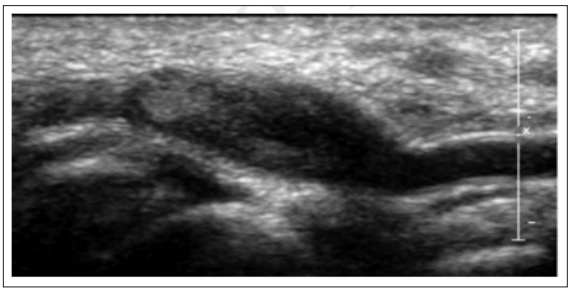

Figure 1: Doppler Ultrasound Showing Saccular Pseudoaneurysm with Preserved Arterial Wall Layers

Figure 2: CT Angiography Confirming Pseudoaneurysm Morphology and Absence of Distal Ischemia

Patient Consent and Ethics

Written informed consent for publication and use of clinical images was obtained from the patient. Institutional approval was obtained as required by local policy.

Disclaimer (Artificial Intelligence)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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