Unveiling the Uncommon: A Rare Case of Radial Artery Pseudoaneurysm Following Coronary Angiography

Sidhi Laksono,[*,] Hillary Kusharsamita[***]**

**Department of Cardiology and Vascular Medicine, Pertamina Central Hospital, South Jakarta, Indonesia*
***Faculty of Medicine, Universitas Muhammadiyah Prof Dr Hamka, Tangerang, Indonesia*
****Pertamina Central Hospital, South Jakarta, Indonesia*

Abstract

Introduction: *Radial artery pseudoaneurysm is a rare but potentially severe complication that may occur after coronary angiography. Although uncommon, promptly identifying and addressing the issue is crucial to avoid further complications.*
Case Report: *Here, we describe the case of a 65-year-old female patient who developed a radial artery pseudoaneurysm after undergoing coronary angiography to evaluate her chest discomfort. The diagnosis of a pseudoaneurysm was confirmed by Doppler ultrasonography, which identified a swirling flow pattern. Persistent pain symptoms and ineffective conservative treatment necessitated surgery.*
Case Discussion: *This case highlights the importance of vigilance in identifying rare complications such as radial artery pseudoaneurysm following coronary angiography.*
Conclusion: *Prompt diagnosis and appropriate management strategies, including surgical intervention, when necessary, are crucial for optimal patient outcomes.*

Keywords: *Coronary angiography, Radial artery, Pseudoaneurysm, Surgical.*

Korespondensi: **Sidhi Laksono**
E-mail: *sidhilaksono@uhamka.ac.id*

Kasus Langka Pseudoaneurisma Arteri Radial Pasca Angiografi Koroner

Sidhi Laksono,[*, **] Hillary Kusharsamita*[***]

**Departemen Jantung dan Pembuluh Darah, Rumah Sakit Pusat Pertamina, Jakarta Selatan, Indonesia*
***Fakultas Kedokteran, Universitas Muhammadiyah Prof Dr Hamka, Tangerang, Indonesia*
****Rumah Sakit Pusat Pertamina, Jakarta Selatan, Indonesia*

Abstrak

***Pendahuluan**: Pseudoaneurisma arteri radialis adalah komplikasi pasca angiografi koroner yang jarang namun berpotensi fatal. Meskipun jarang terjadi, identifikasi dan penanganan masalah dengan cepat sangatlah penting untuk menghindari komplikasi lebih lanjut.*
***Laporan Kasus**: Penulis menggambarkan kasus seorang pasien perempuan berusia 65 tahun yang mengalami pseudoaneurisma arteri radialis setelah menjalani tindakan angiografi koroner untuk mengevaluasi rasa tidak nyaman pada dada. Diagnosis pseudoaneurisma dipastikan dengan ultrasonografi Doppler, yang mengidentifikasi pola aliran berputar. Gejala nyeri yang terus-menerus dan pengobatan konservatif yang tidak efektif menunjukkan perlunya tindakan pembedahan.*
***Diskusi kasus**: Kasus ini menyoroti pentingnya kewaspadaan dalam mengidentifikasi komplikasi yang jarang terjadi seperti pseudoaneurisma arteri radialis setelah angiografi koroner.*
***Kesimpulan**: Diagnosis yang cepat dan strategi penatalaksanaan yang tepat, termasuk intervensi bedah, bila diperlukan, sangat penting untuk prognosis akhir pasien yang baik.*

***Kata kunci:** Angiografi koroner, Arteri radialis, Pseudoaneurisma, Bedah.*

Introduction

The use of radial access for vascular intervention is becoming more popular owing to its superior safety record. Radial artery access, in comparison to femoral artery access, is linked to a reduced occurrence of bleeding issues and improved patient comfort, and a lower risk of complications (CSID). Following cardiac catheterization, a radial artery pseudoaneurysm is a rare but potentially serious complication following coronary angiography. There have been very few reports of radial pseudoaneurysms. According to one research, the transradial approach has a very low rate of post-angiography complications, which is 0.009%.[1] Due to the limited number of reported cases, no universal consensus on treatment has been established. Here we report an unusual case of a 65-year-old woman who underwent coronary angiography using the radial approach. The individual experienced the formation of a pseudoaneurysm, which necessitated the need for surgical surgery.

Case Report

A 65-year-old female patient arrived at our hospital with a one-week history of chest discomfort. The pain is classified as Canadian Cardiovascular Society (CCS) Class III, suggesting unstable angina. She has a medical history of hypertension with sporadic therapy. She was admitted to our hospital for additional evaluation and medical intervention. A coronary angiography was performed via the right radial artery.

The interventional cardiologist successfully conducted punctures without encountering any difficulty and achieved hemostasis. The patient's coronary angiography revealed no clinically significant coronary artery disease (CAD). Upon completion of the surgery, the sheath was removed, and hemostasis was accomplished by applying a vascular hemoband using a TR band. As per protocol, the TR Band was deflated for the subsequent two hours, or until it was discontinued. There were no signs of bruising or bleeding when the TR Band was removed. Subsequently, the patient was released.

Figure 1. Pseudoaneurysm at the Site of Transradial Puncture

Two days following the angiography, the patient observed a gradually expanding small enlargement over the radial puncture site. The patient came for a consultation one week later. A swelling emerged in the lower part of the forearm, at the spot where the right radial puncture was made (Figure 1). Physical examination revealed the presence of a soft, painless, pulsatile, expandable mass with a murmur at the right radial artery palpation location, where the arterial catheter had previously been placed. Paresthesia, signs of ischemia, or inflammation of the hand were not detected.

A turbulent and swirling blood flow pattern inside the lesion was shown by further research using USG Doppler imaging. At each arterial pulsation, a fraction of the turbulent flow was diverted into the aneurysmal sac. The presence of the "yin-yang" sign in the arterial lesion verified the diagnosis of PA (Figure 2).

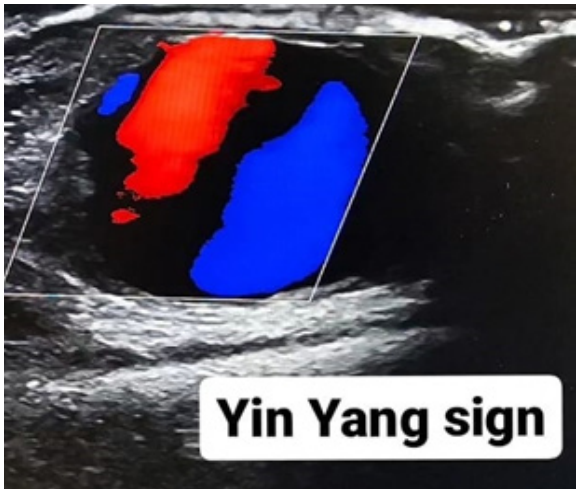

Figure 2. The Classic "Yin-Yang" Sign On Doppler Ultrasound, Indicates Pseudoaneurysm

Figure 3. Doppler Ultrasound Revealed a Narrow Connection between Pseudoaneurysm and Radial Artery

The pseudoaneurysm neck was compressed using a linear probe for one hour. The pseudoaneurysmal sac had partial thrombosis as a consequence. Nevertheless, there was still patent communication to the radial artery (Figure 3). Consequently, the medical team opted to perform a surgical procedure to close the neck of the aneurysm.

The patient then underwent a surgical procedure called PA resection with arteriography, which included making longitudinal sutures. The procedure was completed without any issues, and the patient was released from the hospital 24 hours after the operation. During the 1-month follow-up, the patient showed no symptoms, had a detectable radial pulse, and did not mention any sensory impairments (Figure 4).

Figure 4. Healed Wound at 1-Month Follow-up

Discussion

Although pseudoaneurysms are very uncommon, they pose a known risk associated with invasive procedures such as catheter angioplasty and arterial line insertion. A pseudoaneurysm is an accumulation of blood that develops outside of a blood vessel, within the adjacent soft tissues. Typically, it occurs following an injury or, in this case, an invasive procedure which is catheter angiography. Pseudoaneurysms develop due to a connection or channel between the point where blood is collecting and the injured blood vessel., where the pooling of blood is confined within all three layers of the artery.[2] A pseudoaneurysm is a localized rupture that indicates damage to at least one layer of the arterial wall (particularly, the intima or media or both), while the adventitia layer remains intact. This differs from a true aneurysm; The hallmark of a true aneurysm is the dilatation of a vessel with preservation of all three layers of the vessel wall (Figure 5).[3,4]

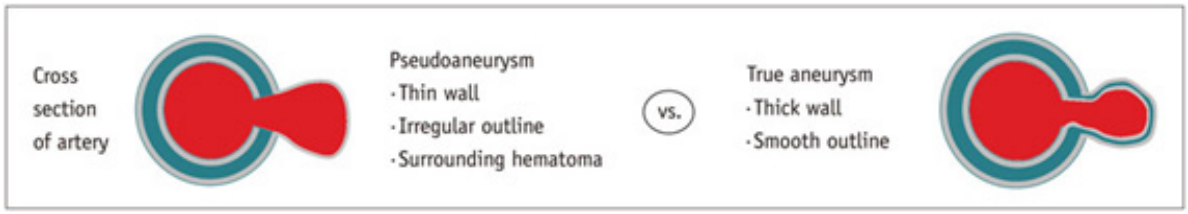

Figure 5. Schematic Diagram of Differences Between True Aneurysm and Pseudoaneurysm.[4]

Unlike a normal hematoma, a pseudoaneurysm may be pulsatile and produce an audible bruit. As pseudoaneurysms enlarge, they can cause symptoms such as a mass effect, ischemia, or nerve compression. Our patient experienced discomfort due to the swelling. Pseudoaneurysms rarely result in compression of veins or distal embolization due to microemboli. Additionally, there is a risk of complications associated with the rupture of arterial pseudoaneurysms, which can be caused by the thin fibrotic layer enveloping the aneurysm.[5]

Doppler ultrasonography is an essential tool that helps distinguish between various conditions, such as hematoma, abscess, or a genuine aneurysm. The 'yin-yang' indication on Doppler ultrasonography suggests bidirectional flow due to the swirling motion of blood inside the pseudoaneurysm.[6] Moreover, ultrasound aids in distinguishing a pseudoaneurysm from a simple cyst or abscess. Within an abscess, the wall is usually irregular, there is debris inside with posterior acoustic enhancement, and there is a "squish sign" when the probe is compressed. Cysts frequently manifest as circular, smooth, well-defined structures containing anechoic contents. On color Doppler, none of these lesions display a characteristic swirling flow pattern.[7] We discovered the classical yin-yang sign in this particular case, which supported the pseudoaneurysm diagnosis.

A conservative strategy, such as ultrasound-guided compression or minimally invasive thrombin injection, may be used in asymptomatic individuals with small pseudoaneurysms (i.e., <10 mm in diameter).[8] Nevertheless, the efficacy of applying pressure with a probe may vary depending on the user and may not always be effective in patients who are frequently using various antithrombotic medications. Additionally, pain has been associated with compression both during and after the procedure. In other cases, thrombin injection is a reasonable therapeutic option for narrow-neck pseudoaneurysms; however, radial pseudoaneurysm entails a risk of thrombin embolization to the digital arteries, potentially leading to necrosis and ischemia of the fingers. Furthermore, thrombin injection has occasionally resulted in arterial blockage, pseudoaneurysm rupture, and necessitating clot removal (thrombectomy). Apart from this risk, it does not address the bulk effect, extrinsic compression on nerve structures, or skin tension, all of which may have adverse consequences.[6]

Surgical intervention is recommended for pseudoaneurysms that are more than 10 mm in diameter, rapidly expanding, infected, or causing significant mass impact, such as hand ischemia, neuropathy, and soft tissue necrosis. Surgical intervention is also recommended when conservative therapy proves ineffective. Various proven surgical procedures exist, including radial artery ligation with pseudoaneurysm excision if there is no impairment of cubital artery perfusion and palmar arch, primary suture repair, end-to-end reconstruction, or graft interposition. Considering the extent of the pulmonary artery and the lack of success with conservative therapy, we opted for the resection and primary repair of the radial artery defect.[9]

To reduce the risk of complications during the transradial approach for cardiac treatments, certain protocols are suggested,[4] such as a single puncture and adequate compression. It is crucial to perform close monitoring and make an early diagnosis of pseudoaneurysms in order to prevent significant consequences.

Conclusion

Radial pseudoaneurysms are infrequent although potentially detrimental consequences. To prevent and early detection of this consequence, it is essential to identify possible high-risk patients, ensure compression in these patients, and maintain careful surveillance even after the hemostatic device is removed. The treatment approach for the PA may be either conservative or surgical, depending on the morphological features and accompanying symptoms.

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