Repair of a thrombosed pseudoaneurysm that developed after puncture for an arterial blood gas using a vein graft

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ABSTRACT

Pseudoaneurysms involving the leakage of blood between the arterial wall and the peripheral parenchyma can occur as a result of an artery’s perforation. In this case report, we present a repair, using a vein graft, of a thrombosed pseudoaneurysm that developed in a radial artery after a single puncture to obtain a sample for the determination of arterial blood gases. A 56-year-old female patient was admitted with a mass in her left wrist on the radial side. Upon examination, a sensitive and mobile mass was detected by palpation. The patient had no fever or any other symptoms of inflammation. Her detailed anamnesis revealed that the mass had developed after a puncture to obtain a blood sample for an arterial blood gas measurement. By using magnetic resonance imaging the mass was determined to be a thrombosed pseudoaneurysm. The mass was excised and the gap that had developed in the radial artery was repaired with a vein graft obtained from the forearm. Magnetic resonance angiography imaging after 1 month confirmed the vein graft’s patency. Cannulations for blood monitoring, blood gas analysis and interventional radiological procedures are indispensable processes used in medicine; however, they are not risk-free. Following these procedures, thromboses and pseudoaneurysms can develop. A number of treatment options exist, including bandaging, percutaneous thrombin injections, and surgical treatment for complicated cases. For pseudoaneurysms that create a mass effect, as in our case, surgery is needed. Such complications after interventional procedures involving the radial artery should be kept in mind.

Key words: Pseudoaneurysm, radial artery

Introduction

The radial artery in the distal forearm is the most utilized artery for arterial blood pressure monitoring and interventional radiological and cardiac procedures. Due to these procedures, pseudoaneurysms can develop in this part of the radial artery, although rarely [1,2]. However, development of a pseudoaneurysm after only a single puncture for blood gas analysis is extremely rare. In this paper, a radial artery pseudoaneurysm case is presented after only one arterial blood puncture.

Case Report

A 56-year-old female patient was admitted to our clinic with a sensitive mass in her right wrist. She had no known diseases, such as haemophilia, and was not receiving any medicines, such as anticoagulants or anti-thrombotics. In her detailed anamnesis, it was discovered that she had experienced a puncture with a needle on this wrist to verify the initial diagnosis of a chronic obstructive pulmonary disease exacerbation 2 months ago and a small dressing had been applied at the inlet.
orifice of the puncture. This blood gas analysis was the only arterial intervention she had until now. One week after this puncture, a mass developed in her wrist. Upon physical examination, a sensitive, pulsatile, mobile mass was identified in the volar side of her right wrist. The patient had no fever or any other symptoms of inflammation.

A superficial tissue ultrasound, Doppler ultrasonography and magnetic resonance imaging were interpreted in favor of a thrombotic pseudoaneurysm and there was no blood flow in the radial artery (Figure 1). Surgery was therefore planned for the patient.

Under a pneumatic tourniquet and via a lazy-s incision, the mass was dissected from the surrounding tissue. The radial artery segment between 1 cm proximal and 1 cm distal from the mass was totally resected (Figure 2). The nearly 3-cm arterial defect was repaired microscopically using a graft that was obtained from a superficial vein of the forearm. After removing the tourniquet, blood flow was confirmed in the radial artery. Postoperatively, the patient was given 5000 IU/24 hours of heparin for 2 days. The patient was discharged postoperatively on the third day with anticoagulant therapy.

One month after surgery, a magnetic resonance angiography was performed; blood flow was verified and graft patency was confirmed (Figure 3).

**Discussion**

Pseudoaneurysms occur when blood leaks from a perforated artery into the surrounding tissue, leading to
the formation of a pseudosac due to the infiltration of inflammatory cells and fibroblasts [3].

Cannulations for blood pressure monitoring and repetitive blood gas analyses are indispensable procedures in medicine; however, they are not totally risk-free. Arterial thrombosis and pseudoaneurysms can be observed after these types of invasive arterial procedures. Although the radial artery is the most preferred artery in these types of procedures, radial artery pseudoaneurysms are rare, with a reported rate of 0.048% [4]. The pseudoaneurysm in our case was a very rare occurrence because it developed not only in the radial artery but also after a single puncture to obtain a sample for a blood gases analysis. We only found one case of a radial artery pseudoaneurysm after a single puncture. Leone et al. prevented the formation of a pseudoaneurysm with short-term compression after puncturing [5]. The application of a small wound dressing and the lack of using compression after the puncturing of the artery can explain the formation of the pseudoaneurysm found in our case.

A haemophilia presence in patients [5] and antithrombotic and anticoagulant therapies are risk factors for pseudoaneurysms after interventional procedures that may cause a vascular injury. In our case, there was no haemophilia or history of anticoagulant and antithrombotic drug use.

Treatments of pseudoaneurysms include not only thrombin injections, endoluminal interventions and compression therapies, but also surgical interventions [6]. Surgical options include bypass arterial ligation and partial or total excisions [7]. Whether or not the pseudoaneurysm creates ischemia, pain or mass effect for the surrounding tissue, the treatment modality should be surgical [6]. In our case, surgical excision was preferred because the mass caused pain in the surrounding tissues.

After surgical excision, if there is a vascular gap, anastomosis with vein grafts provides good results [5]. Due to the formation of an arterial gap in our case after the excision of the mass, we used vena comitans as a vein graft and repaired the radial artery in order to restore blood flow.

In conclusion, radial artery pseudoaneurysms are rare but significant masses. It is crucial to question the patient about having haemophilia and using antithrombotic agents before performing an arterial cannulation. It is also critical to remove the cannula as soon as possible from the peripheral artery and to apply pressure on this region for the appropriate amount of time after removing the cannula. We recommend conducting a detailed anamnesis while keeping pseudoaneurysms in mind with a patient who is referred to the clinic with a mass on peripheral arteries.

Conflict of interest statement

The authors have no conflicts of interest to declare.

References