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Rare case of ruptured pseudoaneurysm of the radial artery following coronary angiography

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ABSTRACT

The radial artery is currently the first-line approach for coronary angiography. Complications are rare. Radial artery pseudoaneurysm is an extremely rare but potentially serious complication given the risk of rupture. We report the case of a patient who presented with a radial artery pseudoaneurysm 15 days after a diagnostic coronary angiography. The clinical presentation and treatment options were discussed.

KEYWORDS :

pseudoaneurysm (PA); transradial approach, vascular complication, coronary artery interventions;

MAIN ARTICLE

INTRODUCTION:

The transradial approach has recently been recommended as the first choice to reduce access-site vascular complications during percutaneous coronary diagnostic and interventional procedures [1]

it may be preferred in anticoagulated patients to avoid those vascular complications associated with the femoral approach, which are compounded by systemic anticoagulation [2]

The radial artery pseudoaneurysm is an extremely rare complication associated with transradial access [1, 3, 4]. We report a case of radial artery pseudoaneurysm complicating diagnostic coronary angiography in a patient receiving therapeutic oral anticoagulation.

CASE PRESENTATION:

A 56-year-old woman with a history of hypertension, atrial fibrillation under chronic treatment with 4 mg ½ tablet of acenocoumarol per day, and recurrent angina since childhood.

The patient presented with stage III dyspnea that had progressively set in for more than 10 years.

ECG: atrial fibrillation with an average ventricular rate of 68 bpm.

Transthoracic Doppler Echocardiography: appearance of rheumatic mitral valve disease associated with severe mitral stenosis and moderate mitral regurgitation with preserved ejection fraction.

Before the valve replacement surgery, a diagnostic coronary angiography was performed from the right radial artery with a 5Fr introducer.

The procedure was performed after stopping acenocoumarol for 3 days. The international normalized ratio (INR) at the time of the angiography was 1,2.

The diagnostic angiography revealed no significant atherosclerosis in the coronary arteries. A bolus of 5000 IU of unfractionated heparin was administered through the sheath.

A J-shaped guidewire advanced without any difficulty through the radial artery. The vascular sheath was removed immediately after the procedure and a compressive dressing was applied.

The patient presented 15 days later with a painful swelling at the radial puncture site (Figure 1A) with bruises extending up to the arm (Figure 1B);

Figure 1A: a swelling at the radial puncture site

Figure 2A: bruises on the arm and forearm

Color Doppler ultrasound revealed a pseudoaneurysm of the radial artery with suspected rupture (Figure2).

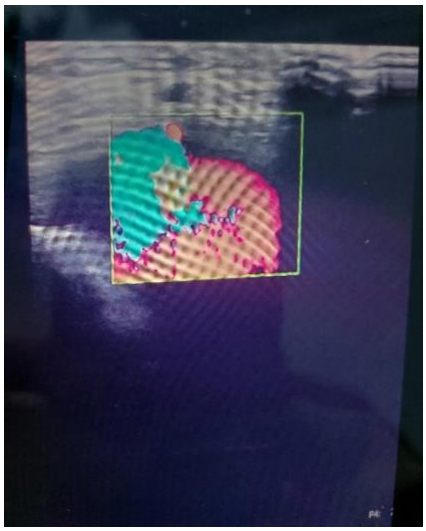

Figure 2: Color Doppler ultrasound revealed a pseudoaneurysm of the radial artery with suspected rupture

An upper limb CT angiography was performed the same day, which showed rupture of the pseudoaneurysm with active bleeding and a hematoma in the forearm (Figure 3).

Figure 3: Upper limb CT angiography (CTA) showing rupture of a radial artery pseudoaneurysm

The patient was immediately admitted to the operating theatre, where she underwent surgical excision of the pseudoaneurysm and suturing of the breach (Figure 4C), with drainage of a large hematoma, which was causing compression of the surrounding nerve structures. (Figures 4A and 4B)

Figure 4A: drainage of the forearm hematoma

Figure 4B : drained hematoma

Figure 4C: suture of the breach and exclusion of the false aneurysm

The patient attended follow-up appointments 15 days after the procedure and then again after 6 months, with preserved radial arterial pulse and no residual swelling.

DISCUSSION

The transradial approach for percutaneous coronary interventionssurely offers advantages, in terms of accesssite vascular complications. although uncommon, these complications may not be trivial as some of them may cause serious clinical consequences such as hand ischemia, compartment syndrome and arterial rupture [4]. On physical examination, a radial artery pseudoaneurysm may present as a pulsatile mass, associated with local pain and hand edema. Neuropathy or ischemia of the hand might be present, depending on dimension of the mass [5]. Doppler ultrasonography is a fundamental tool to aid the differential diagnosis with other pathologies, such hematoma, abscess or a true aneurysm. On Doppler ultrasound, the 'yin-yang' sign indicates bidirectional flow because of the swirling of blood within the pseudoaneurysm.

previous meta-analysis found up to 1.0% rate of radial access site complications including major haemorrhages and a 65% to 80% rate reduction over the transfemoral access [6, 7]. in previous large single centre series, radial artery access clinically relevant vascular complications were around 0.4% [8, 9].

Infection may play a role in the development of infectious aneurysms. Arteriovenous fistulas, aneurysms, and arterial dissections are rare occurrences. Post-catheterisation radial aneurysms are very rare, occurring in 0.05% of radial catheterisations, most often associated with a local or general infection [10]

Predisposing factors include age, length of pre-monitoring hospitalisation, duration of catheterisation, and Staphylococcus aureus infection [10]

among the patients who underwent transradial procedures in the radial versus femoral access for coronary angiography and intervention in patients with acute coronary syndromes(riVal) trial, the only major non hemorrhagic complication was pseudoaneurysm necessitating closure with a 0.2% incidence [7]. pseudoaneurysm as a transradial access complication is found in the literature with a rate of 0% to 0.5%. in the largest series up to now, this kind of complication has been reported with an incidence of 0.04% [8].The radial pseudoaneurysm is clearly uncommon when compared to transfemoral access, with less significant morbidity.

It was suggested that ongoing systemic anticoagulation may predispose to radial artery pseudoaneurysm formation [1]. Furthermore, the development of radial artery pseudoaneurysm may be related to inadequate compression post procedure or alternatively to delayed bleeding complicating anticoagulation [1].as reported previously, our patient

presented with a typically painful swelling at the site of the radial access. Our patient' inr at the time of the coronary angiography was 1.2 but she received ongoing therapeutic anticoagulation just after the diagnostic procedure.

Thereby, delayed bleeding and inadequate compression, may be the potential contributing factors of pseudoaneurysm constitution in this case. The diagnosis of such complication may be done immediately after the procedure or later.in this present example, the patient presented local symptoms 15 days after the procedure. A surgical intervention was required. in fact, the late diagnostic of the radial artery pseudoaneurysm is significantly associated with the need for surgical correction [4].

The management of this complication includes compression with a view to thrombosis of the false aneurysm, thrombin injection and surgical closure [11, 12]. although, the surgical treatment is relatively simple as compared to the femoral artery pseudoaneurysm, a prompt diagnosis may decrease significantly the need for surgery [1, 4].

Thrombin injection is a valid option for the treatment of narrow neck PA in other locations; however, radial PA carries the risk of embolizing thrombin to the digital arteries leading to ischemia of the fingers and necrosis. Beyond this risk it does note eliminate the mass effect and extrinsic compression on nervous structures, nor skin tension which may ultimately lead to deleterious effects. Regarding endovascular techniques, embolization or endovascular exclusion of the PA with covered stent (by brachial approach) followed by decompression with a syringe is an option that has already been successfully described, but needs further studies [13].

Surgical treatment is suggested for large PA (>10 mm in diameter), fast-growing PA, infected PA or in cases of significant mass effect, such as ischemia of the hand, neuropathy and soft tissue necrosis. Surgical repair is also indicated when conservative treatment fails. There are several validated surgical techniques, such as radial artery ligation with PA resection if cubital artery perfusion and palmar arch are not impaired, primary suture repair, end-to-end reconstruction or graft interposition.

In the case described, the resection and primary repair of the radial artery defect was chosen taking into account; that the pseudoaneurysm has ruptured the size of the PA and the mass effect produced along with the relatively restricted arterial wall lesion.

CONCLUSION

Because of increased transradial approach in coronary procedures, radial PA are becoming more frequent. Close surveillance and early diagnosis of PA's are essential to avoid serious complications. Treatment may be conservative or surgical depending on the morphological characteristics and associated symptoms of the PA.

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The authors declare that they have no conflicts of interest.

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