

# Radial artery pseudoaneurysm: Complex management

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## Introduction

Pseudoaneurysms (PSA) are a well-known complication of femoral arterial access. With growing use of radial arterial access for interventional procedures, radial artery pseudoaneurysms (RAP) are quite rare, but seen with increased frequency (0.05% for radial versus 1.5% for femoral access). Treatment guidelines and algorithms are not available for RAP. A few management options have been described in case reports and will be presented here, such as: expectant (with spontaneous thrombosis), pneumatic compression (TR band), ultrasound-guided compression, ultrasound-guided thrombin injection, endovascular (stent) or surgical repair. Even asymptomatic cases need to be treated due to the risk of nerve damage/compression or rupture.

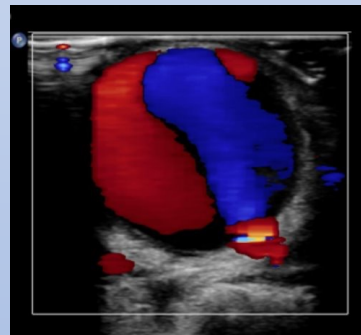


Figure 1. US Doppler view of radial artery pseudoaneurysm (RAP).

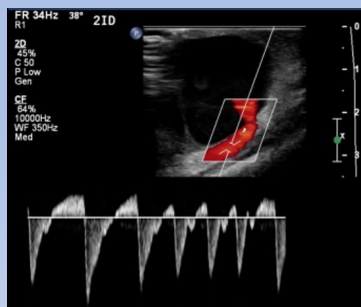


Figure 2. RAP neck Doppler flow.

## US-guided Thrombin Injection Pneumatic Compression (TR Band)

US-guided thrombin injection is a well-established treatment for femoral pseudoaneurysms. Unfortunately it does not perform as well in RAP with a higher recanalization rate.

**Case report:** 60 yo male, who underwent radial access cardiac cath, followed by quadruple coronary artery bypass graft. On POD 2 was found to have a right radial artery PSA measuring 1.8 x 1.4 x 1.3cm with a neck measuring 0.25cm. On POD 3 he underwent US-guided thrombin injection plus TR band placement for pneumatic compression. Follow up US on POD 4 showed no evidence of Doppler flow in the PSA. Patient returned on POD 11 complaining of wrist pain. US showed partial recanalization of the PSA measuring 1.1 cm. He then underwent surgery on POD 13 with resection of the PSA and suture of the arterial defect using 6-0 Prolene.

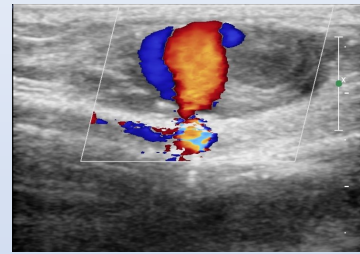


Figure 3. US view of initial RAP.

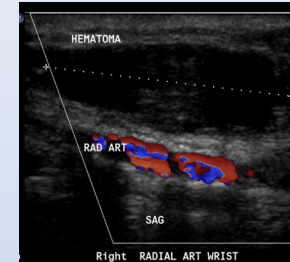


Figure 4. Thrombosed RAP after thrombin injection.

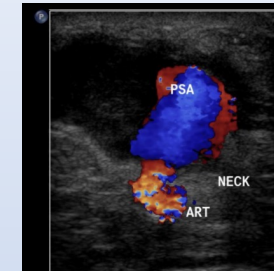


Figure 5. US showing RAP recurrence after thrombin injection with Doppler flow now seen within the hematoma.

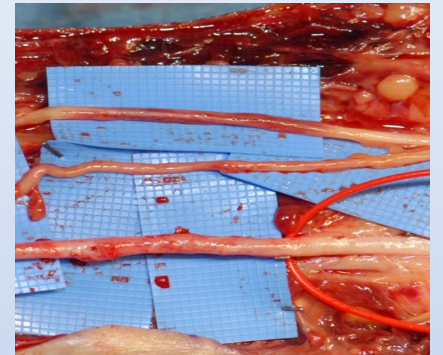


Figure 13. Arterial and nerve exposure and repair

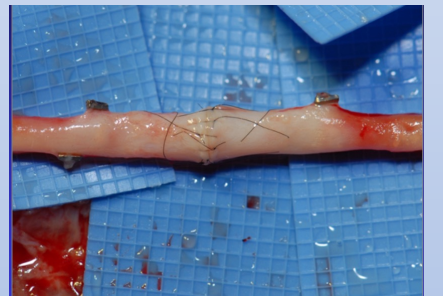


Figure 14. Primary arterial repair

## Endovascular / Stent graft

This treatment consists of PSA exclusion through the insertion of a stent graft in the radial artery, covering the PSA neck.

**Case report:** 86 yo female with ESRD on hemodialysis via AV fistula presenting with pain after needle cannulation in hemodialysis. Doppler US imaging demonstrated a RAP, successfully treated with US-guided thrombin injection. A follow-up US showed RAP recanalization and enlargement. Then, the patient underwent a radial arteriogram via AV fistula access. Stent graft placement across the radial artery defect was performed leading to successful exclusion of the RAP.

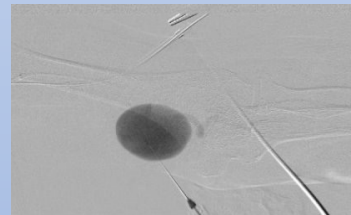


Figure 6. Initial puncture with direct contrast injection into the PSA demonstrated its communication with the radial artery.



Figure 7. Radial arteriogram after US-guided thrombin injection.



Figure 8. Recurrence of RAP.

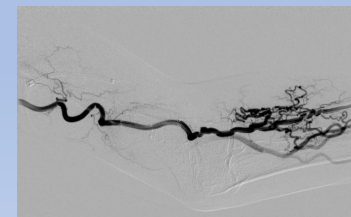


Figure 9. RAP excluded after endovascular stent graft placement in the radial artery.

## Surgical Repair

This treatment consists of suture of the arterial wall defect, sometimes with segmental excision, and primary repair of the RAP area.

**Case report:** 87 yo female with PMH of HTN, CAD, Afib on apixaban, s/p remote LAD stent placement on aspirin, underwent elective coronary angiogram due to increasing SOB. During the procedure, she received 5000U of heparin bolus, with no significant findings and subsequent hemostasis using StatSeal and TR Band. On POD 10 presented to the ED with progressive forearm edema and pain. US showed a 3.4 x 2.8 x 2.6 cm RAP with a 1x1 cm neck. Patient was treated with US-guided thrombin injection. On POD 17 she re-presented to the ED with bleeding from the RAP, skin erosion and numbness at the radial nerve distribution. US demonstrated recurrence of the PSA.

Surgical treatment consisted of:

1. Excisional debridement of skin, subcutaneous and fascia
2. Evacuation of hematoma
3. Segmental excision and primary arterial repair with microscope
4. Microscopic neurolysis, superficial radial nerve with application of a nerve wrap.
5. Local tissue rearrangement 20 x 8cm.



Figure 10. Needle injection of thrombin into the PSA (POD 10).



Figure 11. RAP recurrence on POD 17 with bleeding and skin erosion.

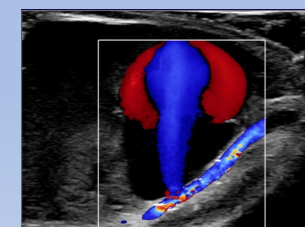


Figure 12. US on POD 17 showed partial flow recanalization in the PSA.

## Conclusion

Radial artery pseudoaneurysms are a rare complication of radial arterial access for endovascular procedures. Due to its low frequency, it has not been studied outside of case reports.

It tends to have a higher recurrence rate than femoral pseudoaneurysms, and its management can be complex as presented above.