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Case report

Presentation of a large pseudoaneurysm of the brachial artery: A case report

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ABSTRACT

Brachial artery pseudoaneurysms (PSA) are considered uncommon, but they can be limb and life threatening. Most etiologies are related to iatrogenic injury or following a fracture. Here we present a 37-year-old male complaining of a large swelling in his right upper arm that was gradually increasing in size for the last 7 months. It started with a sudden onset of pain while lifting heavy boxes at his daily job. Ultrasound and MRA showed a pseudoaneurysm of the right brachial artery. Resection of the PSA was performed with a vein interposition graft. This case illustrates the significance of considering PSA as a differential diagnosis in patients presenting with upper arm swelling without history of obvious trauma.

1. Introduction

A pseudoaneurysm or false aneurysm is a pulsatile haematoma secondary to bleeding into the soft tissue, with fibrous encapsulation and a persistent communication between the vessel and the fluid space [1]. Brachial artery aneurysms rarely present as true and usually as a PSA [2]. We report a case of brachial artery PSA and discuss its diagnostic modalities and treatments at an academic tertiary care center. This work has been reported in line with the SCARE guidelines criteria [3].

2. Case presentation

A 37-year-old gentleman working as a store manager presented to our emergency department with right upper arm swelling with pulsatile sensation of 7-month duration. The patient suffered a sudden onset of pain at his right upper arm while lifting heavy boxes at work. It started with pain and mild swelling without redness. The swelling gradually increased in size over the past seven months. The motor function of his right upper arm was not affected, but he experienced constant numbness in the first three fingers: thumb, index, and middle finger. Physical examination revealed a right upper limb pulsatile warm mass with systolic bruit on auscultation, the swelling was 12 × 10 × 6 associated with redness and blackish discoloration at the tip of the swelling that appeared 3 days before presentation. Distal pulses were intact, with normal capillary refill time and no pallor or cyanosis (Fig. 1). Right upper arm radiography showed normal bones but a hyper-dense soft tissue swelling separate from the bone was evident anteriorly (Fig. 2) while ultrasound revealed 9 × 8.5 × 7.5 cm hypoechoic cystic mass with peripheral hypoechoic rim due to thrombus and a central turbulent flow. Colored Doppler ultrasonography flow within the lesion (yin–yang sign) and "to-and fro" waveform at spectral Doppler ultrasonography (Fig. 3A, B) were seen, findings which are diagnostic for PSA of the lower part of the right brachial artery. MRI disclosed the mass with heterogeneous intensity, peripheral organized thrombus, and miss-registration artifact (Fig. 4A) highly suggestive of PSA, while MRA with intra-venous contrast bring to light the PSA at the lower part of the right brachial artery with distinct contrast leak into the PSA cavity (Fig. 4B). The patient underwent surgical repair with interposition of a great saphenous vein graft. The patient had an uneventful recovery. He was discharged 2 days postoperatively and was scheduled for physiotherapy. The patient gave consent to publish the case details and images.

3. Discussion

An aneurysm is defined as a localized ballooning or dilation that is an increase of at least 50 % in the artery's expected normal diameter. It's classified into two categories: true and false. An aneurysm is considered true when the dilatation involves the three layers of the arterial wall (intima, media, adventitia). PSA, also known as a false aneurysm, is defined as a blood collection that is formed between the two outer layers

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Fig. 1. Photograph shows right upper limb swelling.

Fig. 2. Lateral right arm radiography showing hyperdense soft tissue swelling (star) separate from bone.

of an artery [4]. Aneurysms may often present late by months or years. They can happen at any age and in any site but the incidence of PSA in the upper limbs is much less than that of lower limbs [5,6]. Therefore, upper limb aneurysms are uncommon and many of them have been case reports [7]. Brachial artery aneurysms rarely present as true and usually as a PSA [2].

The etiologies of brachial PSA are classified into: congenital [8] PSA, PSA associated with a systematic disease, and PSA as a consequence of a trauma – the most common etiology [7] which includes: iatrogenic interventions during brachial puncture in arterial blood gas sampling or catheterization [6,9–11], blunt trauma that mostly results from falls [12], fractures which can be humeral [13,14] or supracondylar [13,15], and other traumatic causes such as missile injury [13,16] and drug abuse [13,17]. Delayed presentation is more often associated with blunt injuries than penetrating injuries [18]. The significance of aneurysms is in their risk of rupture or thrombosis that could lead to a limb or life threatening condition [19]. Complications could be avoided by early diagnosis and management [20]. There has been significant improvement in the last 20 years in the management of brachial artery injuries and a decline in the amputation rate down to 3.1 %–3.4 %. This could be attributed to the better management of shock and surgical techniques advancement. Imaging investigations are essential in assessing PSA, and different imaging modalities can be used such as Doppler ultrasonography, magnetic resonance angiography, and CT angiography [7].

The management of PSA differs according to the size, site, and accessibility. For small PSAs, noninvasive procedures like ultrasound-guided compression can be enough. Disadvantages of this procedure are pain, failure, and high recurrence rate [6,9]. Additionally, success rate as high as 90 % can be achieved using percutaneous thrombin injection [2,6,9].

On the contrary, larger PSAs need an invasive approach including direct closure or a patch angioplasty which can be enough for a small arterial defect [6,9]. However, if this is impractical, other alternatives are PSA excision with vein interposition or graft bypass [2].

In conclusion, brachial PSAs are rare but early diagnosis is essential. This case illustrates the significance of considering pseudo aneurysm as a differential diagnosis in any case presenting with upper arm swelling, without history of a significant trauma.

CRediT authorship contribution statement

Mansour: Writing – review & editing, visualization.
Bani Hani: Project administration, diagnosis and treatment.
Al-Ajlouni: Diagnosis and treatment.
Hadidy: Resources, investigation.
Al-Akily: Writing – original draft.

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Ethical approval

Ethical approval is exempted for case reports at this institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. Furthermore, no personal information regarding the patient is present in this study. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Declaration of competing interest

The authors declare no conflicts of interests.

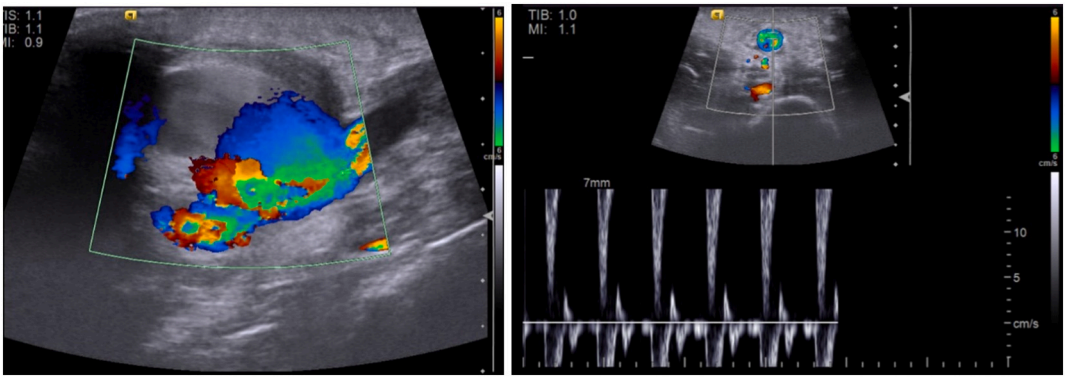

Fig. 3. A (left), B (right).
Colored Doppler ultrasonography (panel A) showing flow within the lesion (yin–yang sign) and "to-and fro" waveform on spectral Doppler ultrasonography (panel B). The "to" represents arterial blood going to PSA in systole, and "fro" is blood exiting in diastole.

Fig. 4. A (left), B (right).
Sagittal MRI T1WI of the right arm (panel A) showing heterogeneous intensity mass (star) with peripheral organized thrombus (arrowhead) and miss-registration artifact (arrows), while phase contrast (PC) right brachial artery MRA with intravenous contrast (panel B) showing PSA of the lower part of right brachial artery with distinct contrast leak (star) into the PSA cavity.

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