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Post-Traumatic False Aneurysm of the Left Subclavian Artery in a 17-Year-Old: A Rare Case Report

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Abstract **Case Report**

We report the case of a 17-year-old male who presented with a left supraclavicular mass, seven months after sustaining a stab wound to the base of the neck. Doppler ultrasound and computed tomography angiography (CTA) revealed a pseudoaneurysm of the proximal segment of the left subclavian artery. Endovascular repair using a 6 mm × 50 mm covered stent was performed successfully. The postoperative course was uneventful, with complete exclusion of the pseudoaneurysm and preserved patency of the arterial lumen. This case highlights the importance of suspecting vascular injury in cases of penetrating trauma and discusses the increasing role of endovascular therapy in managing subclavian artery lesions.

Keywords: Subclavian artery pseudoaneurysm, Penetrating trauma, Endovascular repair, Covered stent, Delayed presentation.

INTRODUCTION

Pseudoaneurysms of the subclavian artery secondary to penetrating trauma are rare but potentially life-threatening vascular complications. These lesions result from a disruption of the arterial wall, allowing blood to escape into the surrounding tissues while remaining confined by the adventitia or adjacent structures [1]. They often present with delayed clinical manifestations, making diagnosis challenging. The subclavian artery's anatomical location within the thoracic outlet, surrounded by vital neurovascular structures, further complicates surgical access and treatment. Traditionally managed by open surgery, subclavian artery pseudoaneurysms are increasingly being treated with endovascular techniques, especially in hemodynamically stable patients [2]. We report a case of delayed post-traumatic pseudoaneurysm of the left subclavian artery in an adolescent patient successfully treated with a covered stent, and discuss the therapeutic approach with a focus on the advantages and limitations of endovascular repair in comparison with open surgery.

CASE REPORT

A 17-year-old male with no notable medical history presented to our vascular surgery department at the CHU de Rabat for evaluation of a progressively enlarging left supraclavicular mass. The mass had been initially small and asymptomatic, but over the past two months, the patient noted a rapid increase in volume, although it remained painless and non-inflammatory. There were no associated neurological symptoms or signs of vascular insufficiency.

His history was notable for a penetrating trauma seven months earlier, resulting from a stab wound to the left base of the neck, which was initially managed conservatively at a peripheral health center without vascular imaging or surgical exploration. The patient remained asymptomatic until the recent enlargement of the mass. He sought medical advice from a general practitioner, who noted a firm, pulsatile swelling and ordered a Doppler ultrasound, which revealed a vascular lesion consistent with a pseudoaneurysm of the subclavian artery. He was referred urgently to our service for further management.

Clinical examination revealed a pulsatile, non-tender mass approximately 5 cm in diameter in the left supraclavicular fossa (Fig1). The overlying skin was normal, with no bruit or thrill. The peripheral pulses of the left upper limb were present and symmetric. Color Doppler ultrasound confirmed a pseudoaneurysm with turbulent flow, communicating with the subclavian

artery. CT angiography showed a 4.2 cm pseudoaneurysm involving the first portion of the left subclavian artery, proximal to the vertebral artery origin, without thrombosis or distal embolization. (Fig 2,3)

Given the lesion's size and progressive growth, urgent repair was indicated. In view of the lesion's location and the patient's stable condition, an endovascular approach was preferred. Under general anesthesia, access was obtained via the right femoral artery, and a 6 mm × 50 mm covered stent was deployed across the neck of the pseudoaneurysm. (Fig 4) Control angiography confirmed complete exclusion of the aneurysmal sac with restoration of arterial flow. (Fig 5)

The patient was discharged on the second postoperative day under dual antiplatelet therapy (aspirin and clopidogrel). At the 1- and 3-month follow-ups, duplex ultrasound confirmed stent patency and thrombosis of the pseudoaneurysm, with regression of the mass and no complications.

DISCUSSION

Subclavian artery pseudoaneurysms are rare vascular complications, comprising less than 1% of all arterial aneurysms [1]. Trauma remains the leading cause, particularly penetrating injuries such as stab wounds to the base of the neck [2]. In this case, the pseudoaneurysm developed seven months after the initial injury, highlighting the often delayed and insidious presentation of these lesions. The lesion was clinically silent for several months, only becoming evident when it rapidly enlarged over the last two months — a pattern that has been documented in similar post-traumatic cases [3].

Pseudoaneurysms can present with pulsatile masses, thrills, bruits, or compressive symptoms, but many remain asymptomatic for long periods [4]. Imaging modalities such as color Doppler ultrasound and CT angiography are essential for diagnosis and treatment planning [5,6]. CT angiography, in particular, allows detailed anatomical visualization and helps evaluate the relation to nearby branches, such as the vertebral artery [7].

Traditionally, open surgical repair was the mainstay of treatment. However, this approach is technically demanding, due to the deep and protected location of the subclavian artery beneath the clavicle and first rib, adjacent to the brachial plexus, pleura, and lung apex [8]. Approaches like median sternotomy, supraclavicular incision, or claviculectomy may be required, exposing the patient to substantial surgical trauma, infection risk, nerve injury, and longer recovery time [9].

Over the last two decades, endovascular techniques have emerged as a safer and equally effective alternative in carefully selected patients. Covered stents can exclude the pseudoaneurysm while preserving arterial flow, and the procedures are typically associated with less morbidity, shorter operative time, and faster recovery [10]. Several series have demonstrated technical success rates above 90%, with low perioperative complication rates [11]. Furthermore, endovascular treatment is particularly advantageous in hemodynamically stable patients, where there is time for imaging and planning.

The choice between open and endovascular repair must take into account patient stability, anatomical considerations, and available resources. For example, injuries to the proximal subclavian artery, like in our case, are well suited for endovascular access, while distal lesions involving branches or mobile joints may still require surgery [12]. In this case, the pseudoaneurysm was proximal to the vertebral artery, with a sufficient landing zone to deploy a 6 mm × 50 mm covered stent. This configuration allowed for complete exclusion of the pseudoaneurysm while preserving perfusion to the vertebral artery and upper limb.

Despite its benefits, endovascular therapy is not without risks. Long-term concerns include stent migration, fracture, restenosis, and thrombosis, particularly in young, active patients due to repetitive shoulder movement and compression at the thoracic outlet [13]. Close imaging follow-up and adherence to dual antiplatelet therapy are crucial for maintaining stent patency. In our patient, follow-up Doppler studies showed good results up to 3 months, but long-term surveillance remains mandatory.

In the literature, multiple authors have emphasized the importance of follow-up protocols. Oderich et al. recommend at least annual imaging for 2–3 years, while others suggest closer intervals in younger patients or when the stent crosses mobile joints [11,13].

Lastly, it is important to stress that any penetrating trauma to the neck or thoracic outlet should prompt consideration of vascular injury, even in the absence of initial symptoms. Missed arterial lesions can evolve into life-threatening complications, such as rupture, thrombosis, or embolization [14]. Early use of non-invasive imaging such as Doppler and CTA can prevent delayed diagnoses and improve outcomes.

Fig 1: Left subclavicular mass

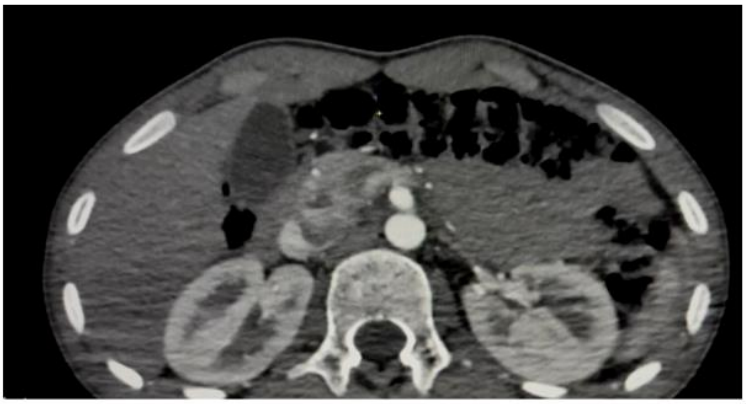

Fig 2: pseudoaneurysm involving the first portion of the left subclavian artery

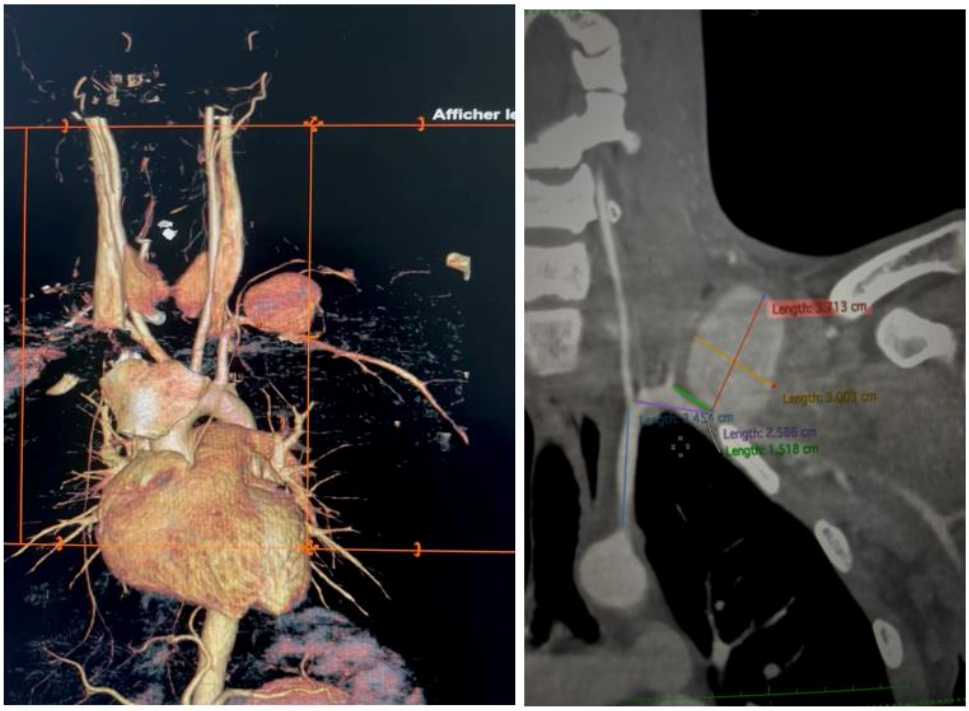

Fig 3: reconstruction showing the pseudoaneurysm

Fig 4: A covered stent was deployed across the neck of the pseudoaneurysm

Fig 5: A complete exclusion of the aneurysmal sac with restoration of arterial flow

CONCLUSION

Delayed pseudoaneurysm of the subclavian artery following penetrating trauma can evolve silently and pose significant diagnostic and therapeutic challenges. Endovascular repair with a covered stent represents a safe and effective alternative to open surgery in selected patients, offering reduced morbidity, shorter hospitalization, and excellent early outcomes. However, long-term surveillance is necessary, especially in young patients, to detect potential complications. This case supports the growing preference for endovascular solutions in the management of subclavian artery injuries, provided that anatomical and institutional conditions are favorable.

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