

Ruptured axillary artery pseudoaneurysm following an anterior glenohumeral dislocation: A case report

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Abstract

Vascular injuries following anterior shoulder dislocations are rare, with an estimated incidence of 1-2%. The formation of an axillary artery pseudoaneurysm secondary to vascular trauma is a possible late complication and frequently underdiagnosed since it may remain asymptomatic for many years. A rupture of a pseudoaneurysm may occur either from the dislocation itself or after forceful reduction attempts. A ruptured pseudoaneurysm of the axillary artery is a medical emergency and may result in significant upper-limb morbidity or even patient mortality. Nowadays, endovascular techniques have progressively gained ground for the treatment of such lesion, especially in an emergency context. In the present article, the authors present the case of a 77-years-old male patient with a rupture of a pseudoaneurysm of the left axillary artery after repeated forceful reductions of an anterior glenohumeral dislocation and its treatment with percutaneous endovascular stenting.

Introduction

The shoulder is the most commonly dislocated joint in the body, accounting for almost 50% of all major dislocations.¹⁻³ The anterior dislocation is the most frequent type,

representing 95-96% of the cases (overall incidence of 1.7%/year). Several complications of anterior shoulder dislocation have been reported, with rates as high as 30%.⁴ However, vascular injuries following anterior shoulder dislocations are rare, with an estimated incidence of 1-2%.¹⁻³ An axillary artery pseudoaneurysm (false aneurysm) is a serious complication, with only a few reports in the literature.

Case Report

The authors present the case of a 77-years-old male patient, referred to the emergency department of a Level II Trauma Center. The patient had a history of recurrent anterior left shoulder dislocations. Upon admission to the emergency department the patient was diagnosed with an anterior glenohumeral dislocation resulting from a fall from standing height (Figure 1).

There were no immediate neurovascular complications. After forceful attempts at closed reduction, an hematoma of the axillary region became evident, with associated hand pallor, absence of ipsilateral radial pulse and hypotension and acute anemia (hemoglobin 6 g/dL); blood transfusion and compressive bandage in the axillary region were performed. A computed tomography angiography (CT angiography) was obtained and revealed a ruptured pseudoaneurysm of the left axillary artery with active bleeding. The glenohumeral joint was properly reduced (Figure 2).

The patient was immediately transferred to a Level III Trauma Center for Vascular Surgery evaluation. On admission the patient presented with clinical signs of acute arterial compromise of the left upper limb (no palpable or audible distal pulses on Doppler ultrasound and the local temperature significantly reduced). Neurological examination did not reveal any injury to the brachial plexus. The patient remained hemodynamically stable.

An angiogram was performed and contrast extravasation originating in a pseudoaneurysm of the axillary artery was confirmed (Figure 3).

Two self-expandable covered stents were deployed in the intended position (8x60 mm, Fluency® - Bard Medical) through a percutaneous brachial artery approach, with immediate exclusion of the false aneurysm (Figure 4).

No complications were documented during the procedure. Radial pulse was palpable immediately after the procedure. No lesion of the brachial plexus was found after stenting.

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A post-stenting CT angiography was undertaken which revealed a hematoma in the axillary region. The stent was well positioned and permeable (Figure 5).

The patient was transferred for to the original hospital for post-operative care, including shoulder immobilization for 3 weeks and single anti-aggregation with low dose aspirin (150mg).

Discussion

Traumatic vascular injuries of the upper extremity are uncommon.^{1,2} Most case reports describe the isolated lesion of the axillary artery either as a complication of either the dislocation itself or after the reduction maneuver. Additional concomitant lesion of the brachial plexus should always be ruled out given its proximity to the artery.^{2,4} When damage to the axillary artery occurs, it usually leads to tearing of the intimal layer.³ Rarely, the artery might be entrapped within the fracture callus from a humeral head fracture or create a pseudoaneurysm.³

The pathogenesis of pseudoaneurysm is still poorly understood. It is more common

in older individuals, partly due to loss of arterial elasticity secondary to the aging process and concomitant atherosclerosis. Additionally, an anterior shoulder dislocation may predispose to pseudoaneurysm formation due to the location of the axillary artery between the humeral circumflex arteries and the scapular arteries, the compression of the artery against the pectoralis minor during dislocation or any specific anatomical variations of the arteries' course. Recurrent dislocations and forceful joint reduction also contribute to pseudoaneurysm formation.^{2,3,5,6}

Axillary artery pseudoaneurysms are considered a late vascular complication of the anterior gleno-umeral dislocation, since they tend to present insidiously and signs and symptoms may be either slight or absent, in part due to the collateral circulation of the upper extremity.^{1,3-5,7}

An axillary artery pseudoaneurysm may become symptomatic with neurological deficits of the upper limb due to compression of the brachial plexus or it may become symptomatic after its rupture, manifested as absent or diminished distal pulses, profuse axillary hematoma, a cold, pale or cyanotic hand, delayed peripheral capillary filling or, in more severe cases, hemorrhagic shock.^{3,5,7}

A ruptured pseudoaneurysm of the axillary artery is a medical emergency. Misdiagnosis or delayed diagnosis may result in significant upper-limb morbidity or even death. If vascular injury is suspected immediately after anterior glenohumeral

dislocation or after reduction maneuver arises, a CT angiography is mandatory.^{2,6,8}

In the presence of a ruptured pseudoaneurysm of the axillary artery the open supraclavicular approach has classically been used either with direct repair of the lesion or with a bypass graft after resection of the pseudoaneurysm.^{2,7} However, this technique proved to be

invasive, complex, with high blood loss. Moreover, the results of simple suture in elderly patient have been disappointing probably due to poor collateral circulation and arteriosclerotic vascular disease.² With the improvement of endovascular techniques, nowadays, percutaneous endovascular stenting arose as a good alternative for the treatment of such lesions,

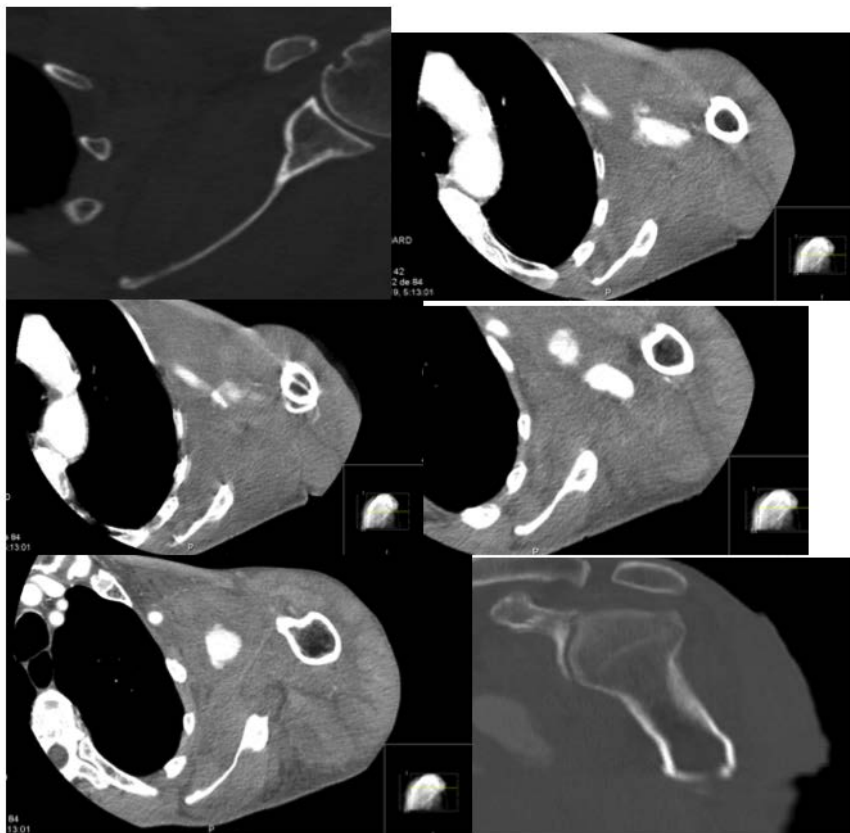


Figure 2. CT angiography with confirming dislocation reduction and revealing extravasation of contrast (blue arrow) from a pseudoaneurysm of the left axillary artery (yellow arrow).

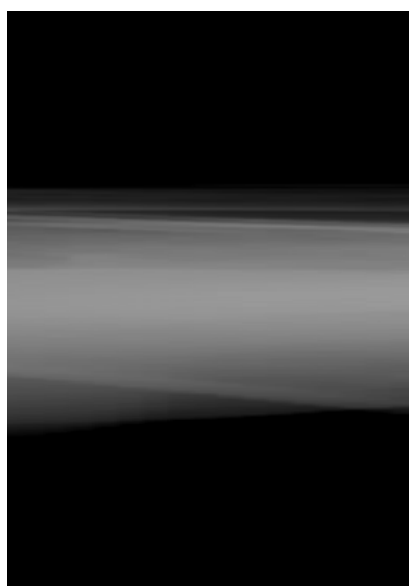


Figure 1. X-ray of the left shoulder revealing an anterior glenohumeral dislocation.

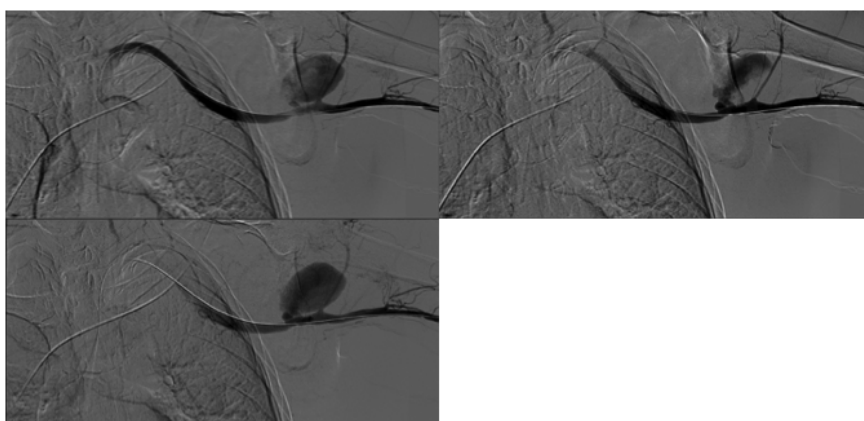


Figure 3. Ruptured pseudoaneurysm of the left axillary artery on angiogram.

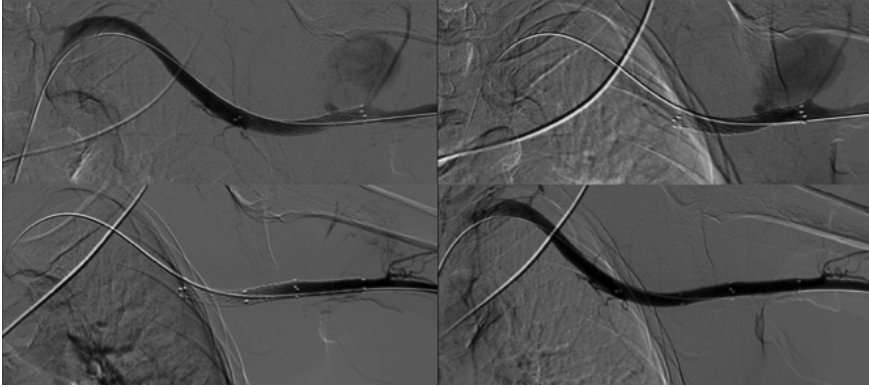


Figure 4. Stenting of the ruptured pseudoaneurysm.

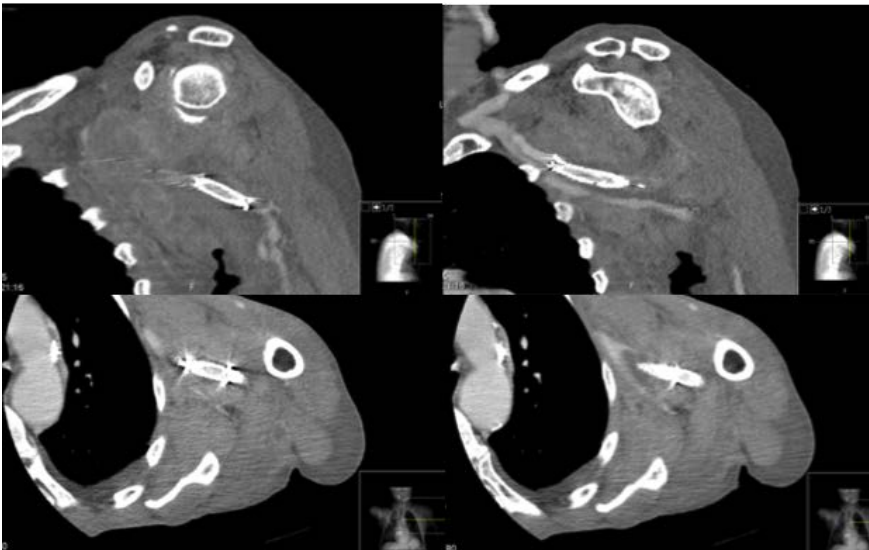


Figure 5. CT angiography after stenting.

especially in an emergency context.^{2,6,7} It closes the laceration site and prevents further enlargement with minimal invasiveness. However, the pseudoaneurysm diameter and a residual hematoma may persist and compress the brachial plexus.^{6,8} This situation requires surgical drainage. Therefore, the patient must be carefully evaluated for sensitive and motor upper limb impairment after stenting and during the course of the rehabilitation. In-stent re-

stenosis, covering of arterial side-branches, stent fracture and stent thrombosis/occlusion are other described complications.^{2,7}

Given the age and frailty of our patient and the massive hemorrhage from the ruptured pseudoaneurysm, we opted for percutaneous stenting, which proved to be a fast, minimal invasive and effective procedure with no immediate complications.

In conclusion, despite its rarity, a pseudoaneurysm of the axillary artery after

recurrent anterior glenohumeral dislocation in the elderly patient is a complication that should be considered. The presence of a ruptured pseudoaneurysm is a limb and life-threatening situation that requires emergent treatment. If there is a high index of suspicion, a CT angiography and a vascular consultation must be requested in order to improve the patient's outcomes.

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