

## Delayed diagnosis of dorsal scapular artery pseudoaneurysm following blunt chest trauma

LongHai Jin <sup>\*</sup>, Ailene Fitzgerald

Trauma Service and General Surgery, The Canberra Hospital, Garran ACT 2605, Australia

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### ABSTRACT

Pseudoaneurysm is a well-recognised form of vascular injury following blunt trauma. Its diagnosis is often delayed due to late manifestation of signs and symptoms. Nonetheless, complications of pseudoaneurysm can be severe and even fatal. A 60-year-old man presented to our tertiary trauma centre with blunt chest trauma. His treatment was initially focused on the left clavicular fracture. He was eventually diagnosed with a dorsal scapular artery pseudoaneurysm and a large chest wall haematoma on computed tomography on his third hospital admission in two weeks. This pseudoaneurysm was treated with endovascular embolisation. This article highlights the value of meticulous clinical examination as well as judicious use of biochemistry and imaging in trauma management.

### Introduction

Meticulous clinical assessment is crucial during all stages of Advanced Trauma Life Support (ATLS), especially in the context of severe polytrauma with multiple distracting injuries. This approach is especially relevant for injuries that usually have delayed clinical manifestations, such as pseudoaneurysms. This article presents a case of delayed diagnosis of a rare dorsal scapular artery pseudoaneurysm following blunt chest trauma.

### Case

A 60-year-old man sustained blunt trauma to his left chest two weeks earlier from a motorised scooter crash at 20 km/h. He presented to our tertiary trauma centre at the time and only a set of x-ray plain films was completed in the Emergency Department. They showed a displaced fracture of the left clavicle. However, the left rib fractures on the plain films were not recognised. Consequently, he was referred only to Orthopaedics and not to the Trauma Service. He underwent an open reduction and internal fixation of the clavicular injury two days later and was discharged home on the same day of his operation. No blood test was taken during this admission.

He presented to our Emergency Department again a week later for worsening left shoulder pain and bruising. Once again, only a set of x-ray plain films was done that showed fixation failure of the left clavicle (Fig. 1). The left rib fractures remained unidentified. He was admitted under Orthopaedics again for a revision fixation of the left clavicle. He was discharged home again on the same day following his revision operation. His serum haemoglobin during this admission was 126 g/L.

<sup>\*</sup> Corresponding author at: Trauma Service and General Surgery, The Canberra Hospital, Yamba Drive, Garran ACT 2605, Australia.  
E-mail address: [longhaijin@gmail.com](mailto:longhaijin@gmail.com) (L. Jin).

Orthopaedics contacted the patient again two days later to return to the hospital for another admission for intravenous antibiotics to treat the *Staphylococcus aureus* that was cultured on an intraoperative swab taken from the surgical wound. His repeat serum haemoglobin upon re-admission was markedly reduced to 55 g/L. This quickly prompted further investigation with a computed tomography (CT) of the chest (Fig. 2). The scan revealed an extensive haematoma along the posterolateral left chest wall involving the levator scapulae, longissimus cervicis, serratus posterior and latissimus dorsi muscles. A 7 mm pseudoaneurysm of the distal left dorsal scapular artery was also identified adjacent to the comminuted left third rib fracture. There was no appreciable active haemorrhage. The displaced left rib fracture injuries encompassed the posterolateral third to sixth ribs. The Trauma Service was contacted at this point for advice on further management.

On review by the Trauma Service, the patient did not demonstrate signs of haemodynamic compromise. A large haematoma was clinically appreciable from the left axilla extending dependently to the left lateral iliac area. The Trauma Service advised for urgent resuscitation and consideration of endovascular embolisation. An angiogram was performed and confirmed the 7 mm left dorsal scapular artery pseudoaneurysm. Proximal and distal exclusion of the pseudoaneurysm was achieved with three 4x4mm VortX coils and Gelfoam (Fig. 3). After resuscitation and embolisation, the patient recovered with a favourable outcome.

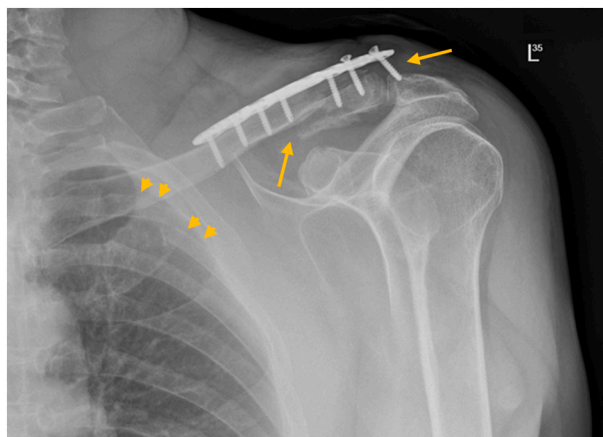
## Discussion

Pseudoaneurysm, also known as false aneurysm, is defined by the presence of blood flow external to the normal layers of an arterial wall, bounded often by only the tunica adventitia [1]. Pseudoaneurysm is a well-recognised complication of blunt trauma. Disruption of the vessel wall is typically caused by a combination of the primary blunt traumatic force and the secondary inflammatory response resulting in vascular fragility. A common theme in the diagnosis of pseudoaneurysm following trauma is the delay between the injury and the eventual detection. Nonetheless, pseudoaneurysms can have significant complications which sometimes can be even fatal. Advances in radiological imaging with superior sensitivity have allowed improved diagnosis of symptomatic and asymptomatic pseudoaneurysms [2]. Current practice guidelines recommend treatment of symptomatic pseudoaneurysms [2]. In contrast, management of asymptomatic pseudoaneurysms remains controversial – they may be either treated or monitored based on an array of factors, such as their cause, anatomical location, size, progression rate, as well as patient comorbidities [2].

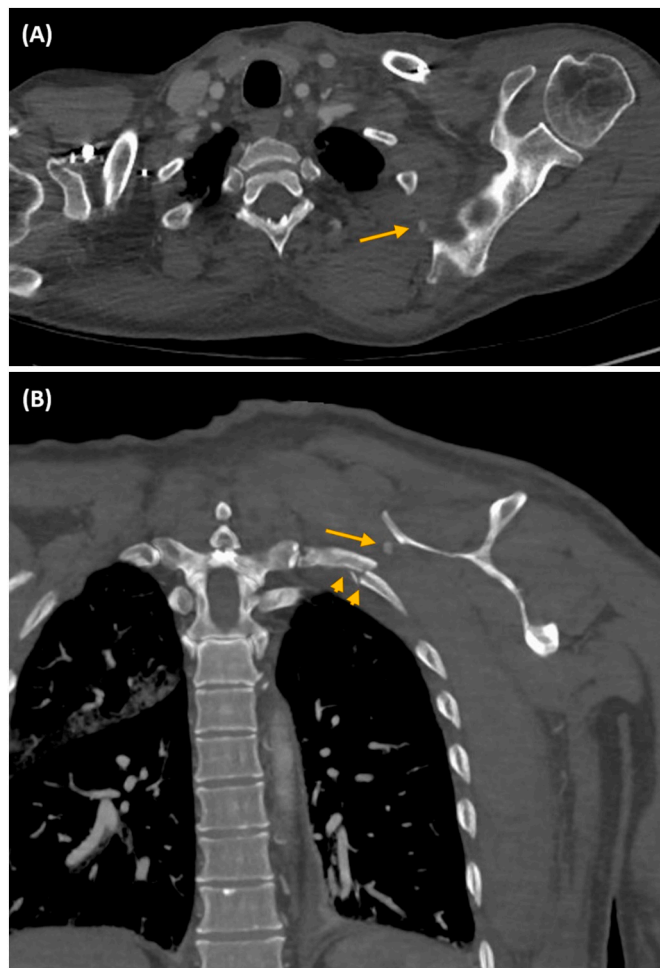
Dorsal scapular artery originates from either the subclavian artery directly (typically from the third part; or very infrequently from the second part) or the transverse cervical artery (a branch of the thyrocervical trunk, which in turn is a branch of the first part of the subclavian artery). Anatomical variations of the dorsal scapular artery have been previously studied – subclavian artery origin was favoured in one [3] and transverse cervical artery origin was favoured in another [4]. Distal to its origin, the dorsal scapular artery initially takes a lateral course through the brachial plexus anterior to the scalenus medius. The artery is then accompanied by the dorsal scapular nerve as it runs down the vertebral border of the scapula to its inferior angle, deep to the levator scapulae and rhomboid muscles. It perfuses these muscles and contributes to the scapular arterial anastomosis (with the suprascapular artery, subscapular artery and its circumflex scapular branch) [5].

To our knowledge, there is only one other case of traumatic dorsal scapular artery pseudoaneurysm reported in the current literature. Gorospe and colleagues published on an 83-year-old woman with delayed rupture of a dorsal scapular artery pseudoaneurysm two months after her blunt chest injury [6]. Prater and colleagues had a similar case of symptomatic suprascapular artery pseudoaneurysm that was diagnosed in 40-year-old man two years following his motor vehicle crash [7]. Both cases were successfully treated with endovascular embolisation.

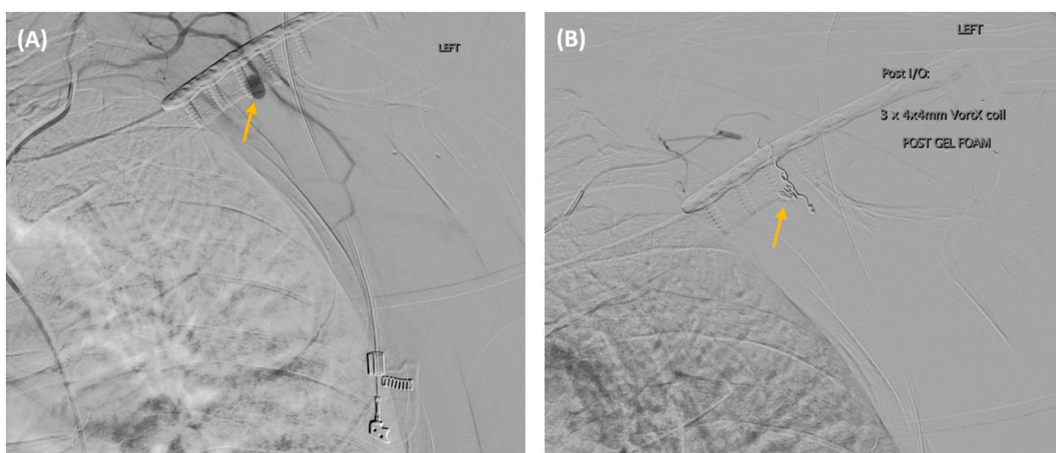
Our case also highlights the need for meticulous clinical examination in trauma, for primary, secondary as well as tertiary surveys. It is particularly imperative to approach tertiary surveys with increased vigilance for delayed or previously unrecognised injuries, especially in the presence of distracting injuries. The traumatic pseudoaneurysm in our patient was only identified on his third



**Fig. 1.** X-ray plain film of the chest showing the left clavicle fixation failure (arrow) and the unrecognised displaced left third rib fracture (arrow heads).



**Fig. 2.** Axial (A) and coronal (B) computed tomography images showing the left dorsal scapular artery pseudoaneurysm (arrow) with surrounding intramuscular haematoma adjacent to the displaced left third rib fracture (arrow heads).



**Fig. 3.** Angiogram images showing the left dorsal scapular artery pseudoaneurysm (arrow) pre-embolisation (A) and post-embolisation (B) with three VortX coils and Gelfoam.

admission to hospital when he had a markedly reduced serum haemoglobin level, despite already reporting significant pain and bruising during his second admission two days earlier. The large left chest wall haematoma could have developed from a herald bleed from the dorsal scapular artery pseudoaneurysm that subsequently tamponaded. Therefore, judicious use of clinical biochemistry and diagnostic imaging can provide crucial information towards optimal patient care in trauma. Our case also reinforces the value of adopting a multidisciplinary approach to trauma management and having a dedicated trauma service, especially in a tertiary trauma institution.

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#### **Declaration of competing interest**

None.

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