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Case Report

Simultaneous isolated avulsion fractures of the lesser tuberosities of the humeri: A rare occurrence secondary to alcohol withdrawal seizures [☆]

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ARTICLE INFO

Article history:

Received 7 May 2022

Revised 16 August 2022

Accepted 20 August 2022

Available online 20 September 2022

Keywords:

Isolated avulsion fracture

Lesser tuberosity

Seizure

Alcohol withdrawal

ABSTRACT

Fractures of the lesser tuberosity of the humerus are typically traumatic in nature, most commonly occurring in association with multi-part fractures of the humeral head, often in the setting of a posterior shoulder dislocation. Isolated fractures of the lesser tuberosity are considerably more rare and are difficult to diagnose on standard shoulder radiographs without an axillary view. These fractures have been associated with 3 main types of injury: acute abduction/external rotation injury, acute injury or repetitive stress injury in adolescent overhead or throwing athletes, and rarely as a seizure associated injury. The mechanism of injury in these cases has been posited to relate to the subscapularis tendon, either resisting forced abduction/external rotation in the setting of trauma, exerting chronic or acute avulsive traction in the setting of adolescent overhead or throwing athletes, or violently contracting and avulsing the lesser tuberosity in the setting of seizures. We present an unusual case of a 27-year-old male with a history of alcohol use disorder with bilateral shoulder pain after minor trauma and observed seizure-like activity. Clinical work-up revealed bilateral isolated avulsion fractures of the lesser tuberosities, which was thought to be on the basis of seizure-related violent contraction of the subscapularis muscles. The clinical relevance of this case is that a high clinical index of suspicion is needed in order to detect lesser tuberosity avulsion fractures and avoid the consequences of untreated injury such as instability or impingement.

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Introduction

Fractures of the lesser tuberosities are typically seen in conjunction with multipart fractures of the proximal humerus, often in the setting of posterior shoulder dislocation [1,2].

Isolated fracture of the lesser tuberosity (without other associated proximal humeral fractures) is a rare injury which has been reported in the setting of abduction/external rotation injury and with repetitive stress injury or acute injury in adolescent overhead or throwing athletes [3,4]. While proximal humeral fractures secondary to seizures have been

[☆] Competing Interests: None.

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<https://doi.org/10.1016/j.radcr.2022.08.074>

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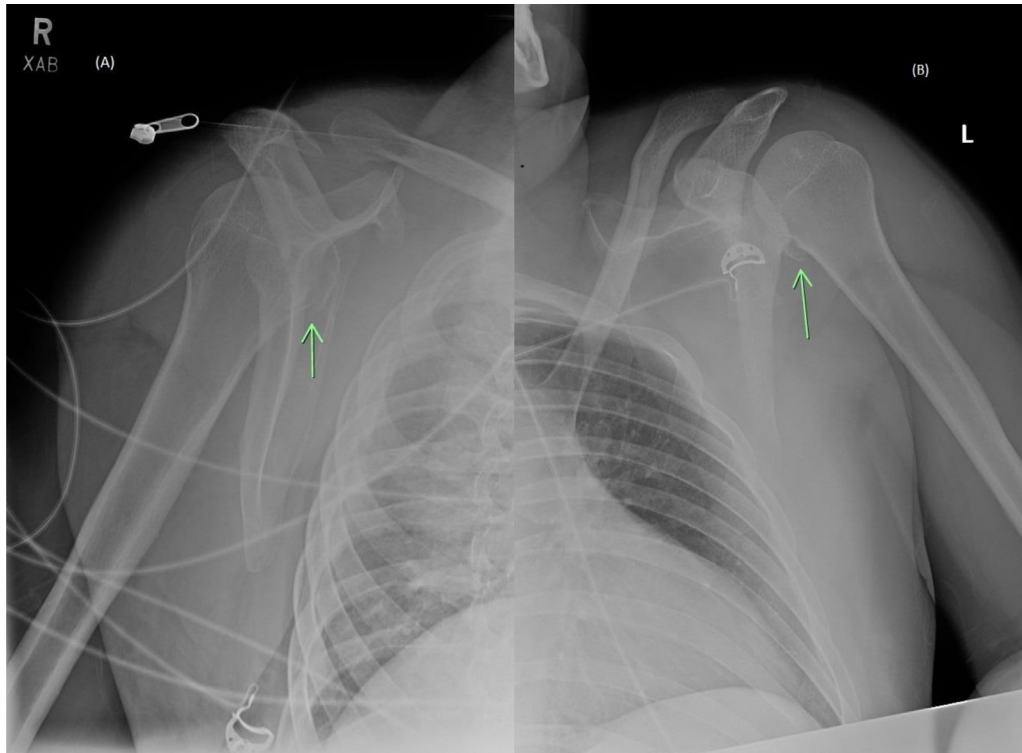


Fig. 1 – Scapular Y radiograph of right shoulder (A) and AP radiograph left shoulder (B) shoulder showing apparent fractures of the medial aspect of the humeral heads.

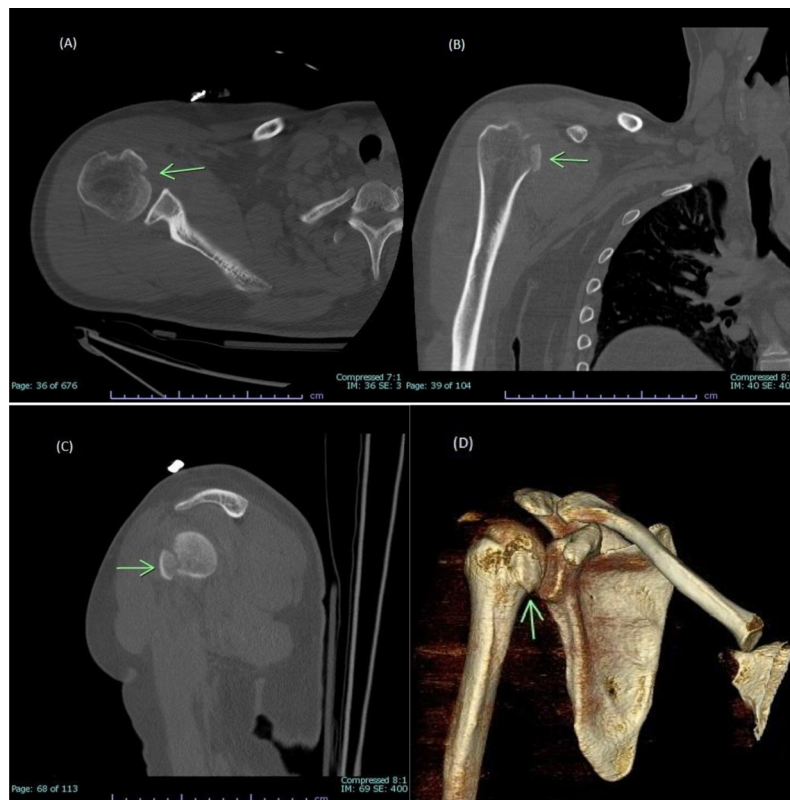


Fig. 2 – Right shoulder axial (A), coronal (B), sagittal (C), 3D volume-rendered (D) CT images showing an acute mildly displaced fracture of the lesser tuberosity.

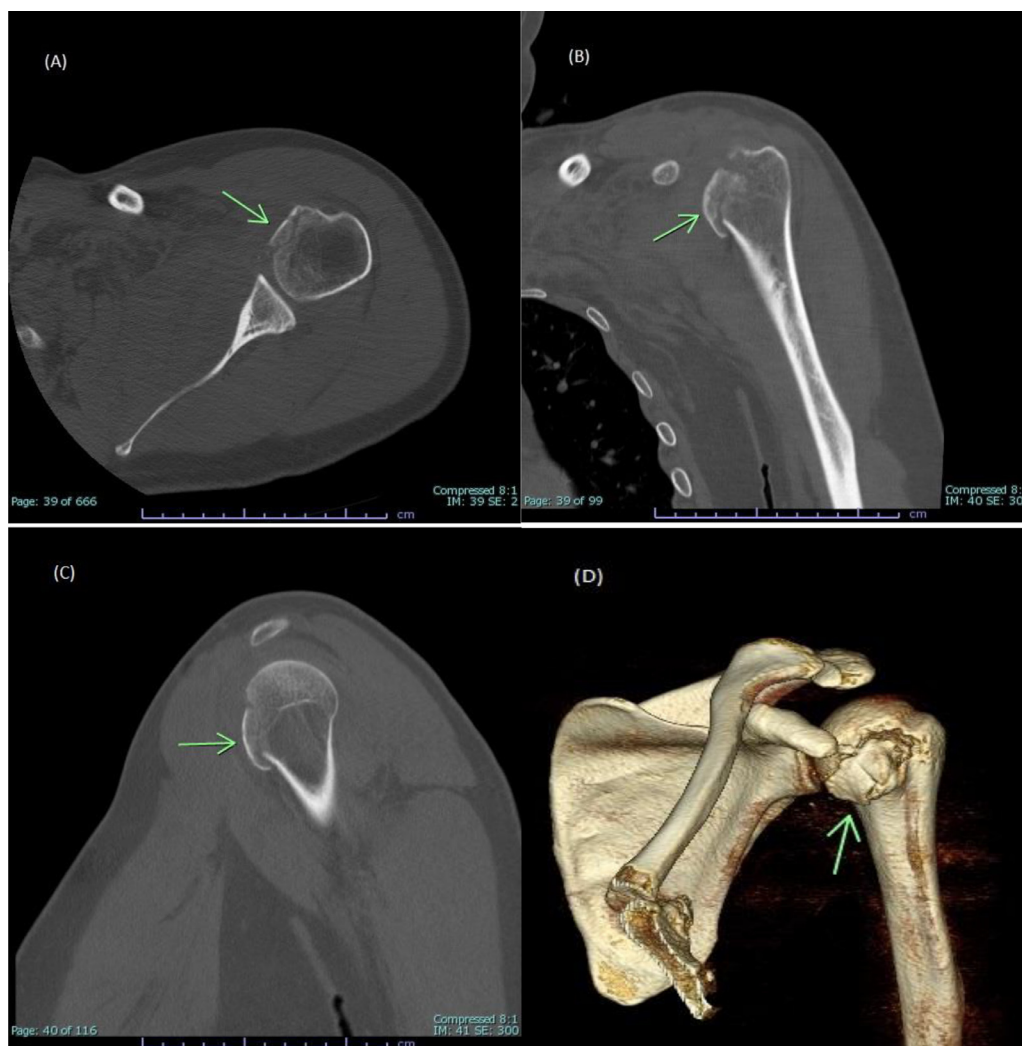


Fig. 3 – Left shoulder axial (A), coronal (B), sagittal (C), 3D volume-rendered (D) CT images showing an acute mildly displaced fracture of the lesser tuberosity.

reported, these are most often posterior fracture dislocations and less often anterior fracture dislocations [5]. Seizure-related isolated avulsion fracture of the lesser tuberosity has been described in only a single case report to our knowledge [6], in that case as a unilateral finding. We describe the highly unusual occurrence of simultaneous bilateral isolated lesser tuberosity fractures due to alcohol withdrawal seizures.

Case report

A 27-year-old male with a past medical history of alcohol use disorder presented to the emergency room after a witnessed fall from a 2-foot stone wall onto grass. The fall was followed by 3-4 minutes of loss of consciousness with reported “seizure-like” activity. The patient reported daily drinking, but had not had alcohol for 2 days prior to the event. The urine ethanol level was undetectable. The patient underwent CT of the Head, C-spine, Chest, Abdomen, and Pelvis, all neg-

ative for acute findings. The patient reported persistent bilateral shoulder pain and bilateral AP and scapular Y shoulder radiographs were then obtained (without axillary views, Fig. 1) which showed possible acute fractures along the medial aspects of the humeral heads. Subsequently, bilateral shoulder CT with 3-D reformatting was performed (Figs. 2 and 3), demonstrating acute mildly displaced fractures of the bilateral lesser tuberosities without humeral head dislocation or other injury. The subscapularis muscles and tendons were grossly intact, within limits of CT assessment. MRI was not obtained. Orthopedic surgery was consulted and the decision was made to treat the fractures conservatively.

Discussion

Fractures of the lesser tuberosity of the humerus frequently occur in association with multi-part fractures of the humeral head and neck, often in the setting of dislocation [1–4].

Isolated fractures of the lesser tuberosity are more rare injuries, with an estimated incidence of 0.46 per 100,000 population per year [3]. These have been described in 3 main types of injury: acute abduction/external rotation injury, chronic stress injury or acute injury in throwing or overhead adolescent athletes, and rarely acute injury on the basis of seizures (often in the setting of posterior fracture dislocation) [3–9]. The mechanism of injury in these cases has been thought to relate to traction effects of the subscapularis insertion upon the lesser tuberosity, either in resisting forced abduction/external rotation in acute trauma, exerting chronic or acute avulsive traction in the setting of adolescent overhead or throwing athletes, or undergoing violent contraction in the setting of seizures. In our patient, a fall from a very low height was witnessed without evidence of abduction/external rotation injury of either arm. In addition, loss of consciousness with 3–4 minutes of seizure-like activity was observed, making it likely that the patient's bilateral lesser tuberosity fractures were secondary to seizure-related contraction of the subscapularis muscles (due to alcohol withdrawal in this case) and not on the basis of trauma. Although seizure-associated fractures have been described at multiple sites in the literature, to our knowledge only a single case report describes an isolated lesser tuberosity fracture due to seizures [8], which in that case was a unilateral injury. Our case adds to the literature on this topic as it describes the unusual occurrence of bilateral acute isolated lesser tuberosity avulsion fractures secondary to seizures.

Isolated lesser tuberosity fractures are rare injuries that may be difficult to diagnose unless there is a high index of suspicion. Routine AP and scapular Y views often fail to demonstrate these fractures and an axillary view should be obtained to increase fracture detection. Often, CT or MR is needed for definitive diagnosis. It is clinically important to make the diagnosis of lesser tuberosity fracture in a timely manner, as there are effective operative and non-operative treatments and delayed diagnosis may lead to instability or impingement [10–12].

Conclusion

Isolated lesser tuberosity fracture is a rare injury that requires a high index of suspicion to detect. It may occur in throwing adolescents or in the adult population in the setting of either abduction/external rotation injury or seizures. Failure to detect this injury may lead to shoulder instability or impingement.

Patient consent

Written informed consent regarding publication of this case report was obtained from the patient.

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