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Case Report

Subcoracoid acromioclavicular joint dislocation (Rockwood type VI) sustained in motorcycle crash: A case report ^{☆,☆☆}

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ABSTRACT

We present the case of a young male who sustained a rare acromioclavicular joint (ACJ) injury during a road traffic accident. A left-sided ACJ injury was identified on plain radiographs fourteen days following a motorcycling accident during which significant distracting injuries were sustained. Owing to persistent shoulder pain during awake tertiary surveillance, repeat shoulder plain radiographs were obtained, along with re-examination of the patient's index computed tomography (CT) shoulder imaging, indicating a grade VI left-sided acromioclavicular subluxation.

The patient underwent operative management of the above injury at three weeks, with initial examination under anesthetic revealing a stiff shoulder joint significantly limited external rotation requiring extensive release of fibrosis. The left ACJ was reduced under anesthesia, being temporarily secured with Kirschner wire insertion. A Synthes locking distal tibial "L" plate was contoured and applied across the AC joint, and secured with locking screws. Intensive post-operative physiotherapy resulted in a significantly improved post-operative range of motion in the patient's left shoulder.

Acromioclavicular joint injuries, commonly shortened to ACJ injuries, are most regularly traumatic in etiology, ranging in severity from mild sprain to complete joint disruption.

ACJ injuries are classified according to the position of the clavicle with respect to the acromion and coracoid. The above case highlights the requirement for comprehensive tertiary surveillance of trauma patients both pre and posttubation, in order to identify such injuries that may require prompt surgical management in order to restore range of motion and function in affected joints.

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Introduction

Acromioclavicular (AC) joint dislocation, also known as “separated” shoulder, is a common type of shoulder injury [1]. Most injuries are traumatic in aetiology, ranging in severity from mild sprain to complete joint disruption [2]. The Rockwood classification (1998) is the most commonly used classification system for this type of injury and is derived according to the position of the clavicle with respect to the acromion and coracoid. The Rockwood classification ranges from type 1 through 6, with two subtypes existing for type 6 subtypes for type 6 ACJ dislocations (subacromial and subcoracoid) [3]. Type 6 ACJ dislocations are rare injury patterns, with inferior dislocation of the distal clavicle, lying either in a subacromial or subcoracoid position. Such pathologies are commonly associated with brachial plexus injuries, with viable non-operative and operative management options. In this case report, we report the case of a type 6 subcoracoid ACJ dislocation in a major trauma patient, outlining the surgical management of same and highlighting the requirement for thorough tertiary surveillance in this patient cohort.

Case report

A young male motorcycle driver was travelling at approximately 100km/h when he collided with the side of a moving car. The patient was ejected from his motorcycle, coming to a halt approximately 20 metres away. On initial roadside assessment, the patient had a Glasgow Coma Scale (GCS) of 6 and was subsequently intubated at the roadside and airlifted to a trauma unit in a Tertiary Centre.

The patient’s injuries included diffuse axonal injury, cerebral contusion, a right-sided lung laceration, bilateral pneumothoraces, pneumomediastinum, bilateral pulmonary contusions, a grade 3 splenic laceration, a right side renal infarct with an associated perinephric haematoma, and a cardiac contusion. He sustained significant orthopaedic injuries including C7, T1, T2 and T3 spinous process fracture, right-sided L3, L5 transverse process fractures, a right-sided acetabular fracture and a left-sided scapular fracture.

Limited left shoulder range of movement was noticed during secondary survey, limited by the ongoing intubation and significant distracting injuries as previously described. The patient remained intubated in an Intensive Care setting for 2 weeks following index trauma, with a slow progression to ventilation via tracheostomy, prior to ward based care. Persistent shoulder pain was noted during awake tertiary survey, prompting repeat radiographs of the patient’s left shoulder and re-examination of index CT imaging. A left-sided subcoracoid type 6 ACJ dislocation was identified at this juncture, 17 days following admission (see images below). The reason for the delayed diagnosis of the patient’s ACJ joint injury is likely multifactorial, including the presence of significant distracting life-threatening injuries and a failure to identify the injury on index imaging. Initial tertiary surveys were completed whilst limited by the patient being intubated and unresponsive in the early days of his admission Figs. 1–8.

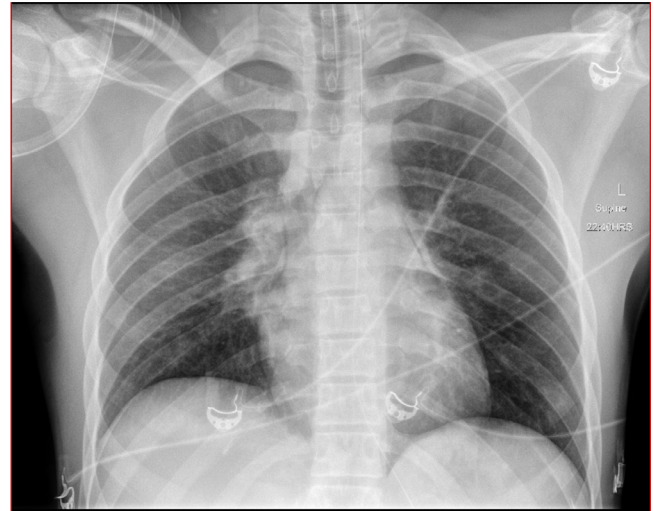


Fig. 1 – Chest Radiograph on admission in Emergency Department.



Fig. 2 – Left sided Type VI Subcoracoid Acromioclavicular Joint (ACJ) dislocation on plain radiograph of the patient’s left shoulder (2 weeks post injury).

The patient underwent operative management at 3 weeks after initial injury, following extubation, transferring out of the Intensive Care Unit and successful treatment of his initial traumatic life-threatening injuries. Examination under anaesthesia revealed a significant stiffness of the left shoulder with greatly impaired passive abduction of the left shoulder.

A distal clavicular incision with extensive clearance of fibrosis was used to access the patient’s ACJ injury, with the distal clavicle located inferior to the coracoid process. The ACJ was successfully reduced and held using temporary Kirschner wires. Initial attempts to hold the acquired reduction us-

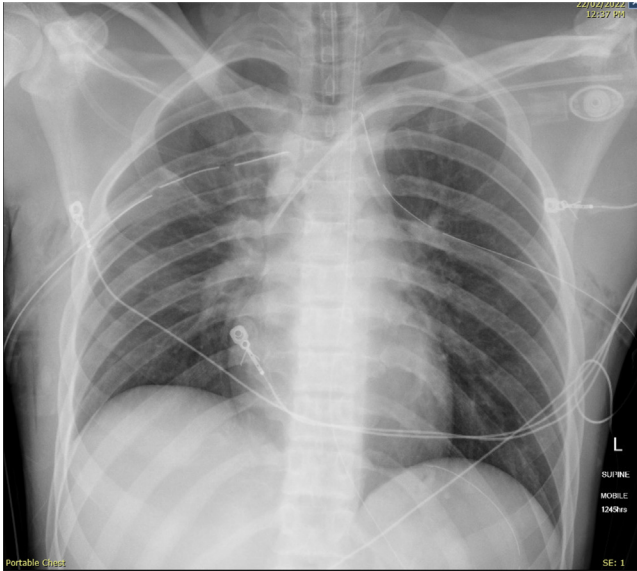


Fig. 3 – Portable chest radiograph in Intensive Care Unit.

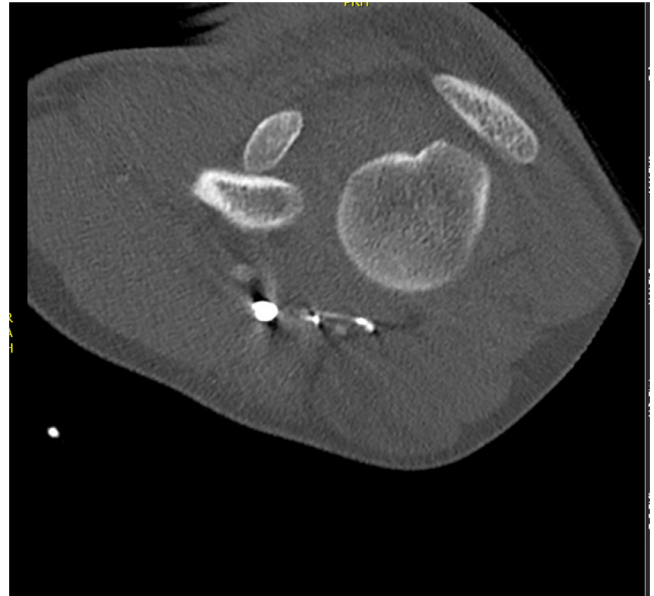


Fig. 5 – CT Left Shoulder Sagittal View.

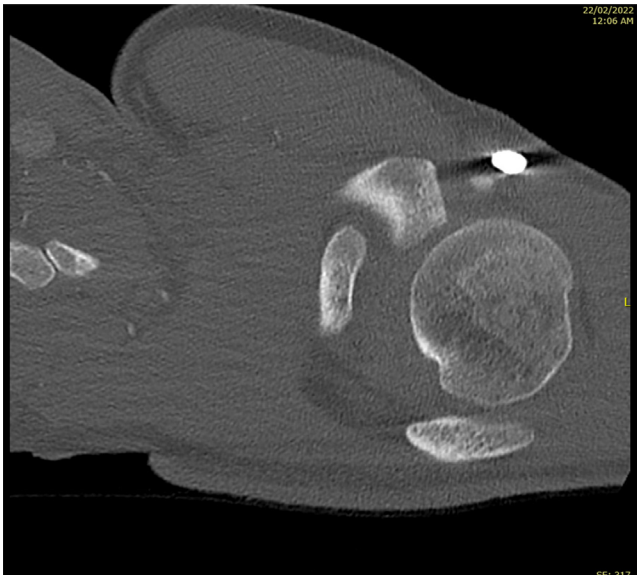


Fig. 4 – CT scan left shoulder axial view.

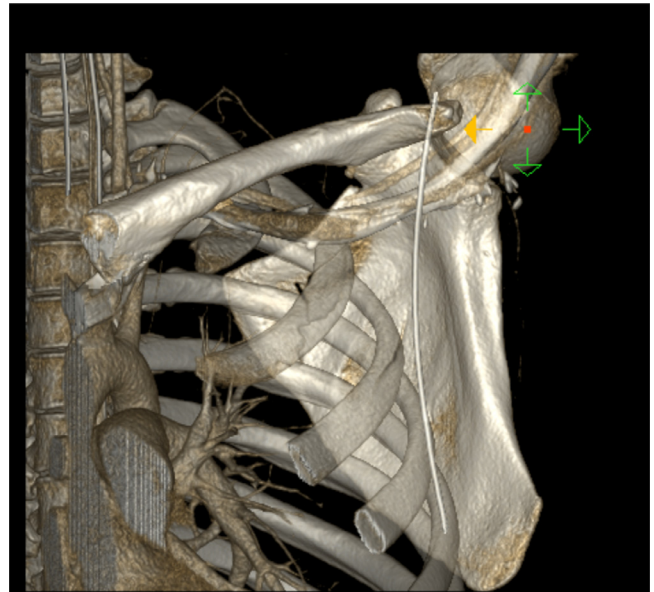


Fig. 6 – Left sided Type VI Subcoracoid Acromioclavicular Joint (ACJ) dislocation as seen on reconstructed CT imaging of the patient's left shoulder.

ing a traditional Hookplate were unsuccessful. A Synthes tibial

"L" plate was successfully inserted to do so, with four locking screws inserted into the acromion and three such screws in the distal clavicle. Washout was performed and layered closure was performed. The patient underwent a long course of intensive physiotherapy, with planned removal of the inserted metalwork being successfully performed at six months post-operatively. No brachial plexus injury was identified following injury/operative interventions. The AC joint remains clinically reduced at six month follow-up [Fig. 9](#).

Discussion

The aetiology of ACJ dislocations is largely owing to direct trauma to the acromion or distal clavicle with the arm in an adducted position, often in the setting of sporting injuries [1]. Functionally, the AC ligaments are implicated in horizontal ACJ stability, whilst the coraco-clavicular ligaments play a major role in vertical ACJ stability [2]. The classification of such injuries is most often performed using the Rockwood classification, wherein ACJ dislocations range from

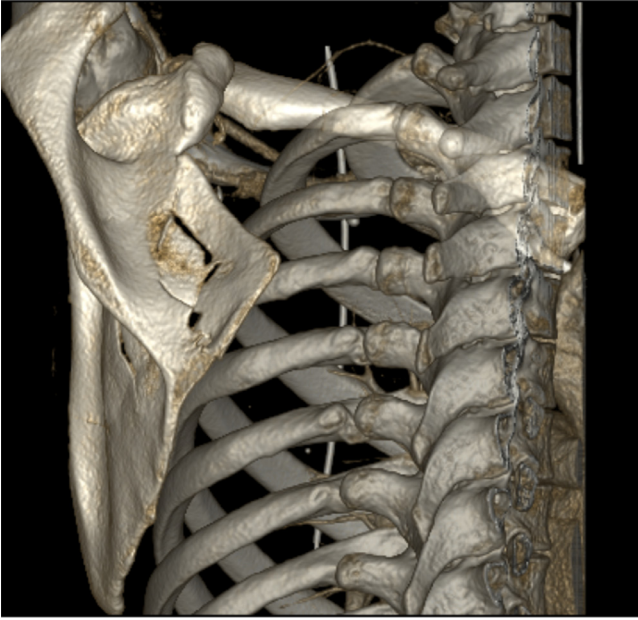


Fig. 7 – Left sided Type VI Subcoracoid Acromioclavicular Joint (ACJ) dislocation as seen on reconstructed CT imaging of the patient’s left shoulder.

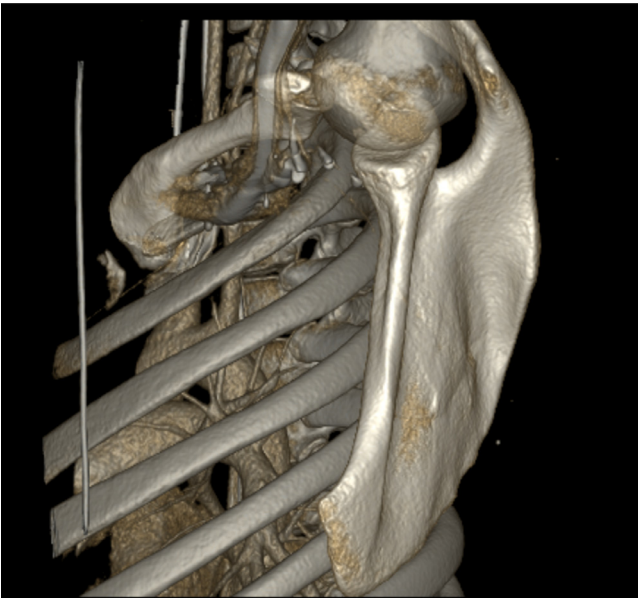


Fig. 8 – Left sided Type VI Subcoracoid Acromioclavicular Joint (ACJ) dislocation as seen on reconstructed CT imaging of the patient’s left shoulder.

grade I (sprain of the ACJ) to grade VI (subacromial or subcoracoid displacement of the clavicle) [3].

Management of grade I and II injuries is largely conservative, with a lack of consensus as to the optimal management of grade III injuries. Patients presenting with Rockwood grade IV-VI ACJ injuries commonly undergo operative management [4]. Plain radiographs are typically the initial imaging modality used for suspected AC pathologies [5,6]. The acromioclav-

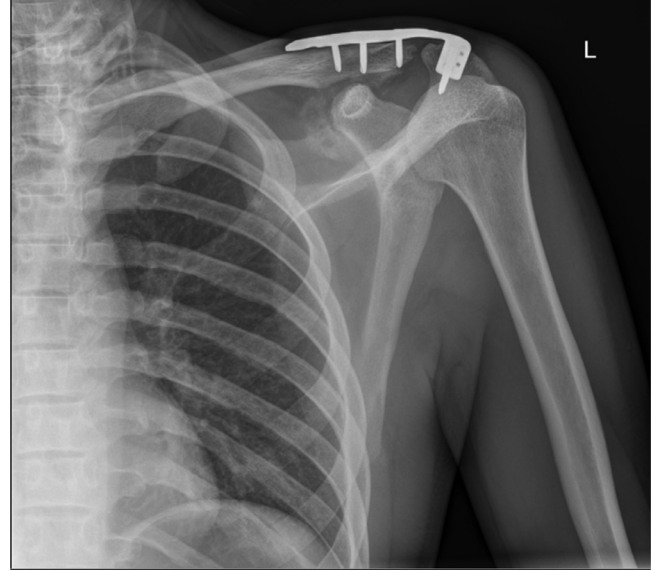


Fig. 9 – Postoperative radiographs of the left shoulder reveal the insertion of a tibial L' plate to the left acromioclavicular joint. This was removed six months post-operatively.

icular joint can be seen on standard AP shoulder radiographs, however there it is often overpenetration and can be variably angulated [7]. Additional projections such as axillary and lateral views can be used to assess the stability of the horizontal plane.

In acute trauma, index chest radiograph and bilateral shoulder views can demonstrate comparative views for the normal articular joint configuration, acromio-clavicular and coraco-clavicular distances [8]. A CT shoulder is useful in the assessment of fractures post trauma and was used in our case to rule out fractures and further characterize the injury for operative planning. An MRI shoulder was not performed but can be used to accurately assess the rotator cuff, neurovascular structures and joint articulation [5,9]. Direct trauma to superior acromion when the arm is adducted is the most common mechanism of injury for ACJ injuries [10,11]. The patient in this case was ejected from his motor bike after impact with another motor vehicle. It is unclear the exact landing mechanism after ejection but it is suggested in that a severe blow to the superior clavicle, with the arm abducted and scapula retracted is required for this rare and severe injury [10].

Tertiary survey has been shown to improve trauma care by increasing detection of missed injuries on primary and secondary survey [12] with complete review of imaging required to ensure no missed injuries are subsequently noted on finalized reporting. The positive impact that tertiary survey has is clearly demonstrated in our multi-trauma patient. We believe it is important to also complete an “awake” tertiary survey post extubation and wean off sedation in such patients to better access pathologies with patient cooperation and direction, even if it is at longer interval from index trauma. Clinically significant diagnosed injuries can lead to significant morbidity and even mortality if not treated.

The goal in management of this rare injury was to restore range of motion and strength to enable a return to regular activity for this young male. The patient is still requiring physiotherapy for joint stiffness but was regained suitable range of movement to perform regular activity. Luckily there was no associated brachial plexus injury in this case with good operative outcomes for a severe injury.

Patient consent

That the patient in this case report has expressly given both their written and verbal consent for inclusion in this study, including imaging and discussion of injuries.

The patient gave informed consent for participation in this study.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2022.12.041](https://doi.org/10.1016/j.radcr.2022.12.041).

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