CASE REPORT

Secondary infection of haematoma following closed acromioclavicular joint dislocation

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SUMMARY

An unusual case of a patient presenting with a large infected haematoma following a traumatic grade II acromioclavicular joint dislocation is reported. Diagnosis of this rare complication, of an otherwise common self-limiting injury, was delayed until 19 days postinjury despite several presentations during this time with worsening swelling and pain. The patient was found to have significant tissue destruction by the time washout was performed and required multiple procedures to treat the infection. This case highlights the need for a high index of suspicion for complications, even following common self-limiting injuries, when patients present with symptoms that do not fit the usual natural history of the condition, particularly if they have risk factors for bleeding and infection.

BACKGROUND

An acromioclavicular joint dislocation is a common injury usually caused by a direct blow to the shoulder tip with the arm in adduction.^{1–3}

These injuries can be classified depending on the displacement of the distal end of the clavicle in relation to the acromion and coracoid linking this with the soft tissues that have been injured. The commonly used Rockwood classification grades injuries from type I to type VI with increasing severity of the injury going up through the classification.⁴

In 1989, Bannister *et al*⁵ conducted a prospective randomised control trial and found more severe AC joint dislocations had better results with early surgical intervention; but for non-severe (the majority) AC dislocations, conservative management allowed for earlier mobility, earlier return to work and sports, as well as fewer unsatisfactory results, than those treated surgically. Further literature and a systematic review in 2013 confirm the consensus for management of Rockwood type I and II AC joint dislocations is to treat non-operatively.^{2 3 6–8}

Septic arthritis of or around the acromioclavicular joint is a rare phenomenon. Cases reported in the literature consistently have risk factors for systemic infection such as immunosuppression, intravenous drug use, distant infection or risk factors for direct inoculation such as a recent history of intra-articular injections or surgery to the AC joint.^{9–18}

We believe this is the first reported case of an infected acromioclavicular joint haematoma following a non-operatively managed traumatic acromioclavicular joint injury. Acromioclavicular septic arthritis is often a rapidly destructive condition and, therefore, early identification and treatment is

essential. Although not a case of true AC joint septic arthritis, it has had the same devastating effects for this patient and, additionally, a 3-week hospital admission.

CASE PRESENTATION

A 42-year-old man presented to the accident and emergency department after a mechanical fall down four stairs during which he banged the tip of his left shoulder on the edge of a plug socket as he landed at the bottom. He had a medical history including a myocardial infarction, stroke resulting in mild left-sided weakness and type 2 diabetes mellitus, although he had been well in himself prior to the fall. His regular medications included low-dose aspirin, ticagrelor, metformin, sitagliptin, bisoprolol, atorvastatin and isosorbide mononitrate.

On examination, in the emergency department, the patient had tenderness with mild localised swelling over the acromioclavicular joint, but the skin was intact and there was no neurovascular deficit. Movements of the glenohumeral joint were possible but with pain over the acromioclavicular joint. A radiograph of the left shoulder was performed showing a Rockwood classification type II acromioclavicular joint dislocation. The patient was treated with a broad arm sling and analgesia, and discharged back to the general practitioner (GP) with a view of being re-referred to orthopaedics if needed.

The patient represented to his GP three times over the following weeks with increasing pain and swelling over the left shoulder. He initially remained systemically well and therefore the GP managed him symptomatically with analgesia. At the second consultation, as there was no improvement, the GP discussed the case with the on-call orthopaedic team, which advised continuing with analgesia and a sling for comfort, given the normally self-limiting progress of the condition.

However, at 19 days postinjury, the patient again presented to his GP, but this time he was generally unwell, with increased swelling and severe pain. He was therefore referred to the emergency department for further work up. On examination, he had a low-grade fever but otherwise satisfactory observations. He had an exquisitely tender swelling from the root of the neck, extending down the dorsal aspect of the scapula to its tip, and over the anterior aspect of the deltoid muscle, which was also erythematous. He was unable to significantly move the shoulder due to pain. He also reported of some earache on the left. He was admitted under the orthopaedic team for investigation and management.

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INVESTIGATIONS

Initial bloods tests revealed grossly elevated inflammatory markers (white cell count 19.8, C reactive protein 318). A radiograph of the left shoulder was repeated, which did not show any change from the initial radiograph taken at the first presentation (figure 1).

An ultrasound scan of the shoulder revealed a significant echogenic solid looking collection in the subacromial subdeltoid bursa, consistent with haematoma but potentially an abscess. There was a further complex solid looking collection around the supra-acromioclavicular joint tracking under and over the left trapezius.

Following the ultrasound scan, an aspiration was performed, obtaining 10 mL of thick green foul-smelling fluid from the subacromial subdeltoid bursa. This fluid was sent for Gram stain, culture and sensitivity testing. Gram positive cocci were found on the initial report.

As the patient was suffering from left-sided neck and ear pain, a CT scan was performed, which ruled out retropharyngeal extension of the abscess, but confirmed a very extensive multiloculated collection extended from the root of the neck to the acromioclavicular joint, down the left trapezius, anterior to scapula, across to the deltoid muscle and inferiorly reaching the tip of the scapula blade (figures 2 and 3). There was also some mild osteopaenia of the lateral left clavicle and a small breach in the cortex, raising the suspicion of underlying osteomyelitis.

A full septic screen was undertaken, including a chest radiograph, midstream urine dip and culture and blood cultures. No distant source for the infection was found.

TREATMENT

Once a fluid sample was obtained the patient was started on intravenous clindamycin (penicillin allergic).

Twenty days following the initial injury, the patient was taken to theatre for incision and drainage of the abscess. A suprascapular incision was made through the trapezius and 400 mL of frank pus was drained from the cavity. The cavity was washed out with 4 L of saline.

Cultures taken during surgery grew *Staphylococcus aureus*, which was sensitive to clindamycin, and therefore this treatment continued.

The patient returned to theatre 72 h later for a second wash out via the same incision. Further pus was found along with necrotic subcutaneous fat, which was debrided, and, following thorough irrigation, the wound was packed with alginate. The distal end of the clavicle was also packed due to the changes suspicious of osteomyelitis on the CT scan.

Figure 1 Radiograph of left shoulder at 19 days postinjury shows grade II acromioclavicular injury.

Figure 2 Scout CT reveals an obvious gross swelling over the left shoulder extending up into the root of the neck.

A third washout was performed a further 72 h later and, due to further recollection of pus, three more incisions were made—posterior to lateral clavicle, at the angle of the scapula and over the posterior aspect of the deltoid.

An MRI scan was performed at this stage, which showed a significant fluid collection (likely abscess) over most of the infraspinatus and teres minor muscles ($10.0 \times 1.5 \times 5.0$ cm). There was also significant myositis within the infraspinatus and part of the teres minor (figure 4).

A fourth and final washout was performed a further 72 h later through a new horizontal incision under the scapular spine and a negative-pressure wound therapy (NPWT) vacuum dressing was applied. The other incisions were packed. The VAC dressing was removed at 72 h, as the volume of discharge from the wounds appeared to be settling. Intravenous antibiotics continued and regular wound pack changes were performed on the ward until it was felt that the wounds could be managed by the district nurses in the community.

The patient was discharged 22 days after admission, with a 4-week course of oral clindamycin.

OUTCOME AND FOLLOW-UP

The patient was reviewed regularly in the outpatient clinic following discharge. At 12 weeks postdischarge, the patient's wounds had healed by secondary intention and he had regained some range of movement at the shoulder joint (60° of active abduction and forward elevation, 40° external rotation and internal rotation to his trouser belt). He had ongoing pain in

Figure 3 CT scan at level C7: extensive multiloculated collection evident.

Figure 4 MRI shows large collection and myositis in the infraspinatus and part of the teres minor.

the shoulder particularly at the distal end of the clavicle and was referred to physiotherapy to try to improve the range of motion further.

A final MRI scan was performed at 16 weeks postdischarge, which showed no recurrence of the abscess (figure 5).

DISCUSSION

We believe that this is the first reported case of a super-infection of a haematoma following an acromioclavicular joint (ACJ) dislocation managed non-operatively. Septic arthritis itself of or around the acromioclavicular joint is rare. Previously reported cases of septic arthritis have been associated with systemic infection, immunosuppression, intravenous drug use, a distant infective focus or pre-existing joint disease. Cases have also been linked with direct inoculation via intra-articular injections or following surgery to the AC joint.^{9–18} Type 2 diabetes rendered this patient high risk for developing secondary infection, however, he had no other risk factors for seeding, such as other systemic infection, ongoing distant infection or immunosuppression.

The question is raised as to why such an extensive haematoma developed in the first instance. Bleeding can occur from the deltoid fascia following ACJ injuries, but this does not usually occur with low-grade ACJ dislocations. Horizontal instability in ACJ injuries has been reported and Rockwood type IV injuries (the clavicle displaces posteriorly at the ACJ) have been misdiagnosed.^{19–20} This raises the potential that what appeared to be a low-grade injury on initial X-rays was in fact a higher energy injury leading to greater than anticipated soft tissue damage. While this should be considered, horizontal instability with posterior displacement of the clavicle was not

Figure 5 MRI scan images at 16 weeks postinjury show no recurrence of the abscess and no periscapular myositis.

identified on clinical examination, repeat plain radiographs or CT imaging. What is more likely in this case is that a low-grade injury had produced more bleeding than is usual due to a pre-disposition to bleeding from combined pharmacotherapy with ticagrelor, a platelet aggregation inhibitor, and aspirin. Bleeding will not only have occurred from the ACJ injury itself but also the contusion of the surrounding tissues as a result of the direct impact.

This patient was treated with multiple washouts followed by negative pressure wound therapy (VAC). Ultimately, his condition responded to this management but he underwent four general anaesthetics in the process, which, given the patient's comorbidities, was not desirable. Evidence has been published demonstrating the success of negative pressure wound therapy with instillation of antibiotics/antiseptic solutions.²¹ Such a technique could be considered in future in similar cases, with the aim of avoiding the multiple operations required in this case.

Learning points

- ▶ Although rare, low-grade acromioclavicular joint injuries can cause large haematomas, particularly in patients on antiaggregant or blood-thinning medications.
- ▶ Secondary infection of a haematoma should be considered early if it is increasing in size or becoming more painful.
- ▶ A high index of suspicion for complications, even following common self-limiting injuries, should be applied when a patient represents with symptoms that do not fit the usual natural history of the condition. Patients with risk factors should be treated with a high index of suspicion early in the course of ensuing complications.
- ▶ Negative pressure wound therapy with instillation of antibiotics/antiseptic solutions should be considered for the management of open infected wounds to reduce the need for repeat anaesthetics and surgery.

Competing interests None declared.

Patient consent Obtained.

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