

Pathological Fracture of Clavicle Following Sub-Acromial Decompression-Infraclavicular Compartment Syndrome?

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ABSTRACT

A 34-year-old factory worker presented with pain and weakness of the left shoulder following a fall on ice on her left shoulder. An ultrasound scan of the shoulder taken 4 months after injury showed small partial articular surface tear of the supraspinatus tendon. Ten days following subacromial decompression she suffered a pathological fracture of her left clavicle. MRI, CT, and isotope bone scans showed no evidence of malignancy or infection but a collection of fluid was noted underlying the clavicle communicating to the acromioclavicular joint. Ultrasound scan guided aspiration of 20 millilitres of bloodstained fluid underlying the clavicle resulted in gradual recovery and adequate healing of the fracture.

Key Words:

Clavicle, Fracture, Subacromial, Decompression

CASE REPORT

A 34-year-old factory worker with right hand dominance experienced a direct fall on her left shoulder on ice directly in February 2007. Since that time, she was been unable to work and has experienced increasing pain; she was initially seen by the author 4 months after the fall. She also reports neck pain radiating down the arm with a feeling of pins and needles. There were no known specific aggravating factors. There was a past medical history of sciatica and also of dislocations of the left shoulder as a child, but there is no history of joint laxity and no significant family history. On clinical exam, a developing dowager's hump was noted, but there was neither wasting, nor winging of the scapulae and the shoulder was non-tender. There was 90° of forward flexion and 90° of abduction and full passive range of movement. Internal rotation was to T12 on both sides and there was full external rotation. There was grade 4 power in all rotator cuffs but this was difficult to examine on the left side due to pain. Neurology of the upper limbs was normal, but there was some objective sensory loss at C6 distribution. The patient did not exhibit signs of any joint instability or hyperlaxity. Radiographs of the shoulder confirmed some irregularity on the humeral head and decreased space in the subacromial region. The subacromial space was injected with

a Marcaine and Lidocaine mix and after 20 minutes she had quite a good response and her range of active movement increased about 30°. Physiotherapy was started at that time.

Following the injection she underwent an ultrasound scan of her left shoulder (4 months after injury) that showed a small partial articular surface tear of the supraspinatus tendon. Though she had improvement in her range of movement of left shoulder she was still complaining of pain.

She was then treated with arthroscopic subacromial decompression in November 2007. The left shoulder was approached with posterior and lateral portals. The push through sign was positive, there was no sign of synovitis, and the rotator cuff was intact. The subacromial space was cleared with eliminator and a large spur was noted anteriorly. The spur was debrided with coraco-acromial ligament (CAL) allowing adequate space to the deltoid. No other prominent calcific lesions were noted. Postoperatively, a shoulder cryocuff was applied and the shoulder was mobilised within a collar and cuff.

Ten days postoperatively, the patient presented to the emergency ward with sudden pain in left shoulder after just putting a pair of socks. Radiograph confirmed lytic changes in the left clavicle with midshaft fracture and erosion of the distal inferior cortex (Figure 1), leading to a strong suspicion of malignancy. There was suggestion of soft tissue mass on radiograph. She denied any history of weight loss and all blood work was within normal limits including CRP less than 3 mg/l, normal ESR, white cell count, myeloma screen and liver function tests.

The lesion was further investigated by MRI, CT and an isotope bone scan. The MRI showed a pathological fracture with cortical thickening along the inferior aspect. Inferior to the clavicle there was an insinuating soft tissue mass with a thick enhancing margin and non-enhancing centre - the signal characteristics on MRI suggested that this was a fluid or pus collection (Figure 2). This collection communicated with the acromioclavicular joint and the subacromial/subdeltoid space. Rather surprisingly there was very little marrow oedema within the clavicle. The CT essentially confirmed the plain film findings of permeative

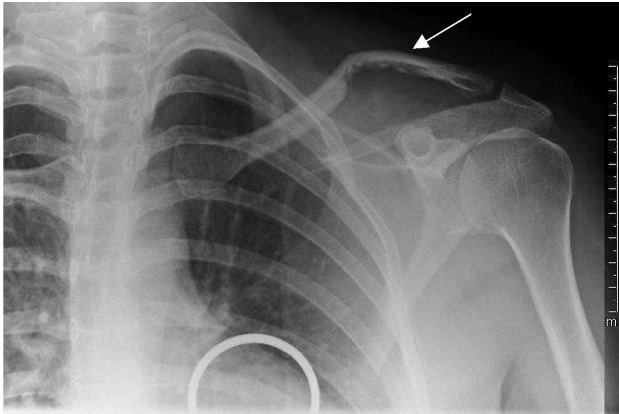


Fig. 1: Erosion (arrow) of clavicle as seen on plain radiograph.

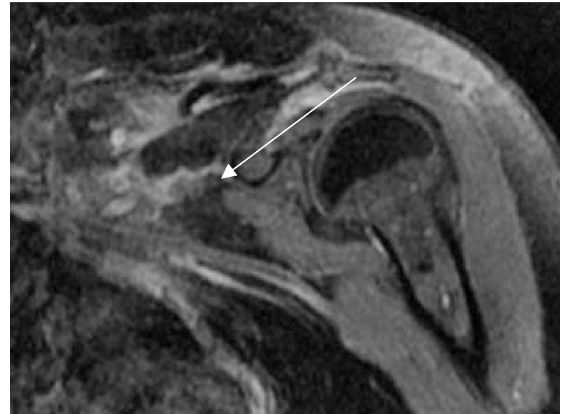


Fig. 2: Soft tissue collection as seen in MR image.

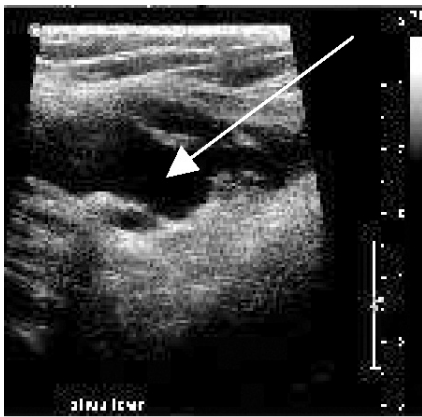


Fig. 3: Longitudinal ultrasound image showing infraclavicular hypoechoic collection (arrow).

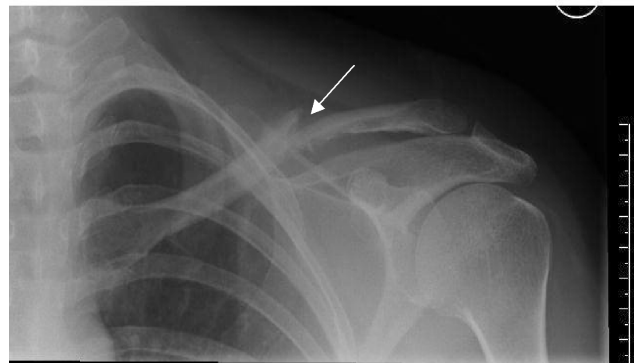


Fig. 4: Evidence of callus formation and healing of clavicle (arrow).

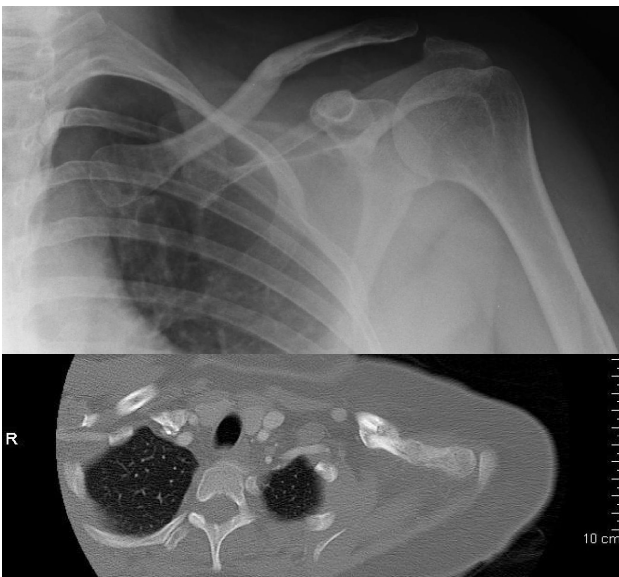


Fig. 5: Completely healed clavicular fracture in recent follow-up with radiograph and CT scan.

resorption of the inferior aspect of the distal third of the clavicle with a pathological fracture and an infraclavicular collection. Ultrasound demonstrated a lobular fluid collection, and aspiration yielded approximately 25 ml of thin blood stained fluid (Figure 3).

An isotope bone scan performed 7 days post-aspiration showed increased uptake involving left clavicle with no evidence of metastatic bone disease. Films were reviewed at the regional soft tissue tumour unit, and following their recommendation, a follow up ultrasound scan was arranged for two weeks following this first postoperative scan showed callus surrounding the fracture of the distal clavicle. The previously drained haematoma has not recurred. A plain radiograph performed one month later showed adequate healing of the bone with good bone formation (Figure 4). The patient remained asymptomatic and scans/films were clean at on year follow-up (Figure 5).

DISCUSSION

This was a case of pathological fracture of the clavicle subsequent to pressure from a collection of irrigation fluid in a post-operative arthroscopic sub-acromial decompression^{1,2,3}. There was no suggestive history of previous clavicular pathology and there was no specific history of trauma. There was no history of shoulder problems besides a dislocation in childhood. The fact that the clavicle started to heal quickly as described above suggests the acute nature of the condition and hence it was important that the regional specialist tumour unit ruled out any infective/malignant possibilities.

Apparently, the irrigating fluid from the arthroscopically performed sub-acromial decompression collected in the tight subacromial space postoperatively and caused an increase in compartmental pressure resulting in the gradual erosion of the bone. During subacromial decompression infraclavicular space can be reached anteriorly if there is any tear following coraco-clavicular debridement.

In this case, the clavicle went through a phase of lysis, which recovered spontaneously. Lysis of bone from extrinsic pressure such as aneurysm, benign or malignant tumours can cause bone erosion^{2,3}. Such extrinsic pressure in the infraclavicular space is possible only if pressure in that closed fascial space has increased by any means- essentially

chronic compartment syndrome. As this is an extremely rare and previously unexplained condition, it was not possible to measure the compartment pressure as we do in lower or upper limb. In fact, a literature search in PubMed resulted in no findings for 'pathological fracture AND clavicle AND subacromial decompression' yielded no results. Thus, such a condition can only be hypothesized. Future case reports or clinical studies are needed to further support the analysis of this condition.

The clavipectoral fascia may be a site for increased pressure, which may give rise to conditions like compartment syndrome and lead to permeative erosion of the clavicle mimicking malignant change in the bone. This kind of complication, not previously noted in the literature can increase unexpected postoperative morbidity.

CONCLUSION

Enclosed space in clavipectoral fascia may be a site for increased pressure which may give rise to conditions like compartment syndrome and lead to permeative erosion of clavicle which may mimic malignant change in the bone. This kind of complication which was never described before can add to unexpected post-operative morbidity.

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