CASE REPORT

Isolated avulsion fracture of the lesser tuberosity of the humerus associated with delayed axillary nerve neuropraxia

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Introduction

We report a patient with an avulsion fracture of the lesser tuberosity of the humerus, associated with a delayed axillary nerve neuropraxia. Isolated avulsion fractures of the lesser tuberosity are rare and have been reported, but, to our knowledge, there are no previous reports of this injury associated with an axillary nerve palsy. The avulsion fracture was treated with open reduction and internal fixation of the fragment, which led to complete resolution of the axillary nerve neuropraxia. We emphasise having a high index of suspicion, and prompt fixation of the fracture, when identified to prevent development of an axillary neuropraxia.

Case report

A 43 year old, right hand dominant male presented to the accident and emergency department in our hospital, with pain and difficulty in moving his left shoulder, following a stumble down a flight of stairs, whilst at work. On initial examination, there was limitation of movements in all directions due to pain. No signs or symptoms of axillary nerve injury were noted. Antero-posterior and axillary lateral radiographs of the left shoulder revealed an avulsion fracture of the lesser tuberosity of the Humerus (Fig. 1). He was referred on to the orthopaedic department for further management and a computerised tomography (CT) scan was arranged to delineate the fracture fragments and to rule out any other injuries around the shoulder joint. When assessed 3 weeks later by the specialist shoulder team, active internal rotation at the shoulder was painful and limited in range. There was also weakness of internal rotation and the patient was unable to lift the dorsum of hand off the lower back. Gerber and Krushell described this test, and the inability to perform this manoeuvre reflects weakness of the subscapularis muscle (the lift-off test). The gleno-humeral joint was stable on application of stress. There was marked paraesthesia along the axillary nerve distribution. The deltoid had grade three power, but with contraction palpable in all three parts. The patient clearly reported the onset of axillary nerve symptoms to 3 weeks after injury. The scan report confirmed an isolated avulsion fracture of the lesser tuberosity of the humerus associated with delayed axillary nerve neuropraxia.
fracture of the lesser tuberosity with the fracture fragment displaced anteriorly and inferiorly. The gleno-humeral joint was found to be intact.

The patient underwent surgery for fixation of the avulsed lesser tuberosity fragment. On examination under anaesthesia, no instability was detected. An anterior delto-pectoral approach was used, the axillary nerve was found to be tented under the subscapularis tendon, which was attached to the avulsed fragment. The displaced lesser tuberosity fragment was reduced and fixed with a single fully threaded cancellous screw and a bony anchor, to its anatomical bed (Fig. 2).

Post-operatively, the shoulder was supported in a sling and passive assisted pendulum exercises were commenced, with restriction on external rotation and active internal rotation. At 2 weeks, post surgery, the axillary neuropraxia had improved and at 6 weeks, the neuropraxia had completely resolved. The patient was then commenced on active resistance exercises for strengthening internal rotation of the shoulder. No complications were noted.

Discussion

Fracture of the lesser tuberosity of the humerus is usually associated with either proximal humerus fractures or shoulder dislocations. Isolated avulsion fractures of the lesser tuberosity of the Humerus are exceptionally rare. This entity has been reported in patients as young as twelve to those at the age of fifty-four. Fracture of the lesser tuberosity associated with a delayed axillary neuropraxia has not been reported in literature to our knowledge. The axillary nerve arises from the posterior cord of the brachial plexus and winds around the inferior border of the belly of subscapularis. The delayed neuropraxia, we believe was due to the gradual pull of the tendon of subscapularis along with the avulsed lesser tuberosity fragment, thus causing an increasing stretch on the axillary nerve (Fig. 3). Nerve injuries associated with fractures around the proximal humerus recover well but they prolong recovery and also restoration of function after such fractures. The mechanism of injury, as stated by Haas, occurs when a strong external rotatory and abduction force is applied while the arm is in the position of maximum external rotation and about 60° of abduction. This force causes an avulsion of the subscapularis with a frag-
ment of the lesser tuberosity. Although, standard antero-posterior radiographs show large fragment, axillary lateral view may be required to demonstrate a smaller fragment. A computerised tomographic scan (CT) may be required to rule out any associated injuries around the shoulder. Delayed diagnosis, of more than a year, of an isolated avulsion fracture of the lesser tuberosity and successful treatment with osteotomy and realignment of the displaced fragment has been reported, but these were not associated with any nerve injury.

Fracture of the lesser tuberosity of the Humerus can easily be missed on a plain antero-posterior radiograph and hence we emphasise having a high index of suspicion and highlight the role of an axillary lateral radiograph as a standard post trauma series of the shoulder. A CT scan can help to show the displacement of the fracture fragment. A displaced fragment can not only limit the shoulder function but can also cause stretching of the axillary nerve, as demonstrated in our report. We recommend prompt fixation of the fracture fragment, this allows return of function and can prevent complications such as the one in our case report.

References