

Case Report Article

Conservative treatment of isolated avulsion fracture of the lesser tuberosity of the humerus: A case report

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Abstract

The fractures of the lesser tuberosity of the humerus commonly present with fracture of the head of the humerus and/or posterior dislocation of the shoulder. We report a case of a 58 year old female that sustained an isolated avulsion fracture of the lesser tuberosity following a fall which is extremely rare. Furthermore, the tendon of the biceps was not displaced and subsequently conservative rehabilitation management was followed with excellent results.

Keywords: Lesser tuberosity, Isolated fracture, Humerus, Conservative treatment

Introduction

Although the incidence of the fractures of the proximal humerus is relatively high, the isolated fracture of the lesser tuberosity occurs rarely and is most commonly neglected. In most of the cases it presents with a posterior dislocation of the shoulder or with a 2 or 3 segment fracture of the humerus¹. It occurs usually in the younger population as a result of a fall as in our case, epileptic crises, in athletes with an incidence of 0.46/100000 per year (Robinson et al), but epidemiological data are limited¹⁻³.

Case Report

A 58 year old female sustained an isolated avulsion fracture of the lesser tuberosity following a fall on her back from a ladder from an approximate height of 2 metres. Her right upper limb touched the ground with the shoulder in abduction and external rotation with the elbow and wrist extended, which is the typical mechanism of injury in similar cases⁴⁻⁶.

The patient did not have any history of osteoporosis or other metabolic bone disease and was not on any medication on a regular basis. She has never suffered from any other fracture nor did she have any DXA scanning test prior to injury.

The clinical examination post injury revealed limitation of both active and passive range of motion, oedema and bruising of the shoulder. The pain was reported to be severe and corresponded to 8 in the Numeric Analogue Scale (NAS=8). There was no additional nerve or vascular injury of the traumatised upper limb.

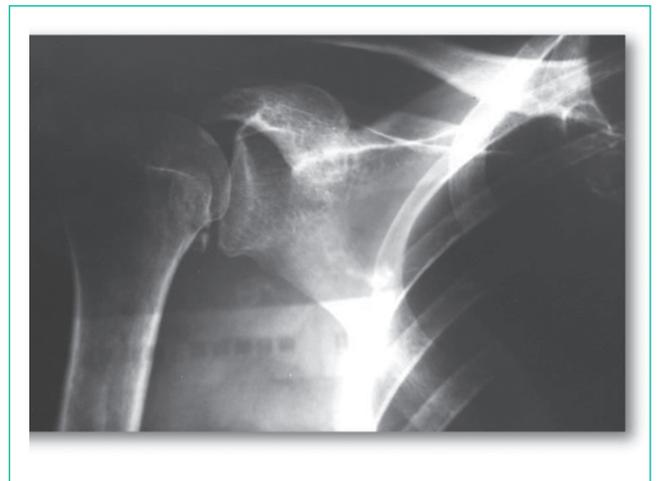


Figure 1. Anteroposterior X-ray of the right shoulder.

The authors have no conflict of interest.

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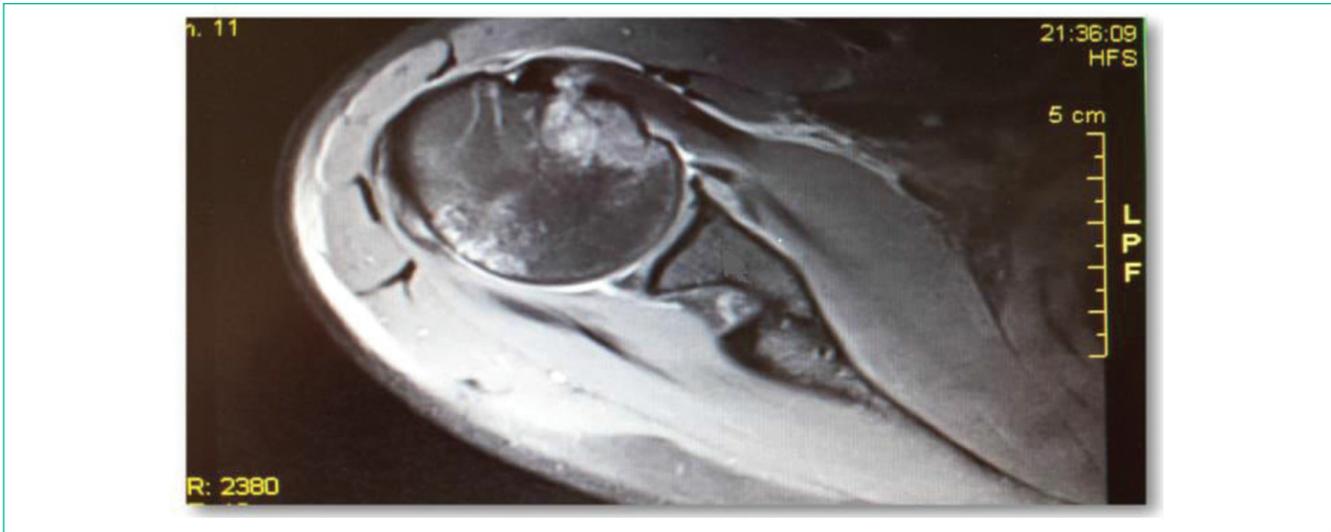


Figure 2. MRI of the shoulder (R).



Figure 3. Anteroposterior X-ray 3 months post injury.

The fracture was not easily recognised by plain X-rays (Figure 1) and the patient underwent an MRI (Figure 2) of her shoulder to determine any other possible fractures and if there was any pathology or dislocation of the rotator cuff and mainly of the long head of the biceps tendon⁷. The MRI scan revealed the avulsion fracture (Figure 2) without dislocation of the long head of the biceps.

A Computed Tomography is the preferred radiological modality for revealing bone fractures and other formation, but in our case the clinical suspicion of an isolated fracture of the lesser tuberosity of the humerus required an MRI of the shoulder to explore the position of the biceps tendon. A

surgical treatment is mandatory in case of dislocation, but if not then conservative treatment shows similar results in previous reviews of the literature⁸⁻¹¹.

The patient commenced on rehabilitation immediately without previous period of immobilisation of the upper limb, a sling was used upon diagnosis and for the first 2 weeks to support the arm and oral pain medication was prescribed as well. The rehabilitation programme included local application of physical modalities for pain control and oedema treatment and passive range of motion exercises in flexion-extension and internal-external rotation for the first 2 weeks. Gradually, as pain was diminishing active range of motion exercises were introduced. Finally, strengthening exercises especially of subscapularis were performed as they are of major importance for the rehabilitation and the stability of the shoulder joint. Maintaining the shoulder joint strong and stable is essential for keeping pain free the patient and preventing from future injury. Elastic stretch bands with gradual increased resistance were used for this purpose. After a total of 3 months the patient was pain free (NAS=0) and restored full range of motion. She reported complete independence in all activities of daily living. The bone healing process was remarkable (Figure 3).

Discussion

Isolated fractures of the lesser tuberosity of the humerus are extremely rare. The main mechanism of the injury is the forceful contraction of the subscapularis usually after a fall as in our patient. It involves a high energy transfer in most of the cases reported^{3,10}. The subscapularis muscle restricts rapidly and with great force and results in the avulsion of the lesser tuberosity. It normally provokes a fracture of the

proximal humerus as well, but that was not the case in our patient^{4,5}.

The Neer classification of the proximal humeral fractures is probably the most frequently used. It includes four segments (greater tuberosity, lesser tuberosity, humeral shaft, articular surface) and a fracture is considered to be displaced when there is more than 1 cm of separation and 45° of angulation. Lesser tuberosity fractures are classified as Neer type V fractures and can be two-part if only the lesser tuberosity is involved; three-part when there is also displaced fracture of the surgical neck and four-part if the surgical neck and both tuberosities are involved^{1,2}.

Patients with avulsion isolated lesser tuberosity fractures present with pain, tenderness and limited range of motion. Although osteonecrosis, vascular and nerve injury are the commonest complications in proximal humeral fractures, that is not the case in two-part lesser tuberosity ones. The outcome is determined by the functional limitation and the ability of the patient to perform activities of daily living. Epidemiological data are limited as these type of fractures are often neglected¹⁻³.

There are only case reports in the literature and uncertainty whether the outcome would be optimised if an open reduction and internal fixation has been chosen. Ogawa et al compared 6 patients treated surgically with 4 patient treated conservatively and did not find any significant difference between the groups. The sample size is small as the condition is extremely rare thus there is a genuine uncertainty with regards to the optimal intervention⁸.

Surgical fixation is highly suggested by many authors, only for severe fractures of the lesser tuberosity humerus (Neer V type) or when there is a concurrent displacement of the long head of biceps tendon^{3,7}. Thus, an MRI of the shoulder could be the investigation of choice in order to opt for the non-surgical treatment and to avoid unnecessary and costly surgical procedures with higher risk of complications.

Conclusion

The conservative treatment may be an effective alternative to open reduction and internal fixation, even in acute cases of isolated lesser tuberosity fractures as long as the long head of the biceps tendon is not dislocated. Early imaging with MRI is essential in order physicians to select the less invasive treatment.

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