

Case Report

Isolated trochlear shear fracture of the distal humerus: a case report

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Received: 24 July 2022

Accepted: 09 August 2022

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ABSTRACT

Laugier was the first to describe an isolated humeral trochlea fracture in 1853. We report the case of a patient with an isolated fracture of the trochlea and discuss the underlying mechanisms and the clinical, radiological features of this pathology and surgical management of this rare fracture. The elbow arthrotomy was done via an anteromedial approach, with the interval through the flexor-pronator muscles medially and the brachialis muscle laterally. The trochlea was temporarily fixed by two Kirschner wires, and the definitive fixation was obtained by two cannulated. Herbert screws from anterior to posterior. The elbow was immobilized and splinted in a flexed position (70 degrees) for two weeks to allow soft tissue healing and minimize pain. After cast removal, rehabilitation of elbow was established and actively assisted mobilization for three months. The isolated trochlea fracture is a rare injury and usually, it is associated with other injuries such as elbow dislocation. Few studies in the literature described such fracture and the anteromedial approach; most of these studies described the use of a direct medial approach to the elbow. Several fixation methods were described in the literature, including k-wires, AO compression screws, and headless compression screws. Isolated fracture of the trochlea is rare. The mechanisms causing this fracture are complex; the usual mechanism of isolated trochlear fractures is falling on the palm with the elbow extended and supinated. In our report, the patient disclosed that he felt directly on his flexed elbow. Trochlear fractures require open reduction and internal fixation to achieve anatomical reduction, with excision of the small osteochondral fragments that may be complicated by arthritic changes.

Keywords: Anteromedial elbow approach, Elbow stability, Herbert screws, Humerus, Trochlear fracture

INTRODUCTION

Laugier was the first to describe an isolated humeral trochlea fracture in 1853. As a result, the trochlea fracture is occasionally named Laugier's fracture.¹

Fracture of the trochlea is usually associated with elbow dislocation and capitellar or medial condylar fracture. Isolated trochlear fracture of the distal humerus is a rarely reported entity.²

We reported the case of a patient with an isolated fracture of the trochlea and discuss the underlying mechanisms and the clinical, radiological features of this pathology and surgical management of this rare fracture.

CASE REPORT

A 23-year-old male patient disclosed that he fell directly on his flexed elbow, the patient reported immediate elbow pain, and a physical exam demonstrated swelling, particularly on the medial part of his elbow, with restricted flexion-extension pronation and supination. An anteroposterior radiograph showed irregularity of the medial joint space with an intra-articular involvement, and a lateral radiograph showed an intra-articular half-moon-shaped fragment that had moved up and forward, raising the suspicion of a capitellar fracture (Figure 1). A computed tomography (CT) scan confirmed an isolated front-line fracture of the trochlea without having capitellum involvement (Figure 2).

Surgery was done under general anesthesia with the application of a tourniquet. The fracture was approached through an anteromedial approach, and the fragment was fixed with two cannulated 3.5 mm Herbert screws of 30 mm length from anterior to posterior. Elbow stability was tested intraoperatively, and the patient achieved a comparable range of motion to the contralateral elbow without a mechanical block. Elbow was splinted for two weeks, and the patient was initiated into a rehabilitation program. The neurological exam was normal pre and post-operatively.

The elbow arthrotomy was done via an anteromedial approach, with the interval through the flexor-pronator muscles medially and the brachialis muscle laterally. The brachial artery and median nerve were identified and protected (Figure 3).

The trochlea fragment was unstable, and the cartilage demonstrated no impaction or loss of cartilage substance, (Figure 4). The trochlea was temporally fixed by two Kirschner wires, and the definitive fixation was obtained by two cannulated Herbert screws of 30 mm length from anterior to posterior (Figure 4).

The elbow was immobilized and splinted in a flexed position (70 degrees) for two weeks to allow soft tissue healing and minimize pain. After cast removal, rehabilitation of elbow was established and actively assisted mobilization for three months.



Figure 1: Initial radiograph (A) anteroposterior view; and (B) lateral view.

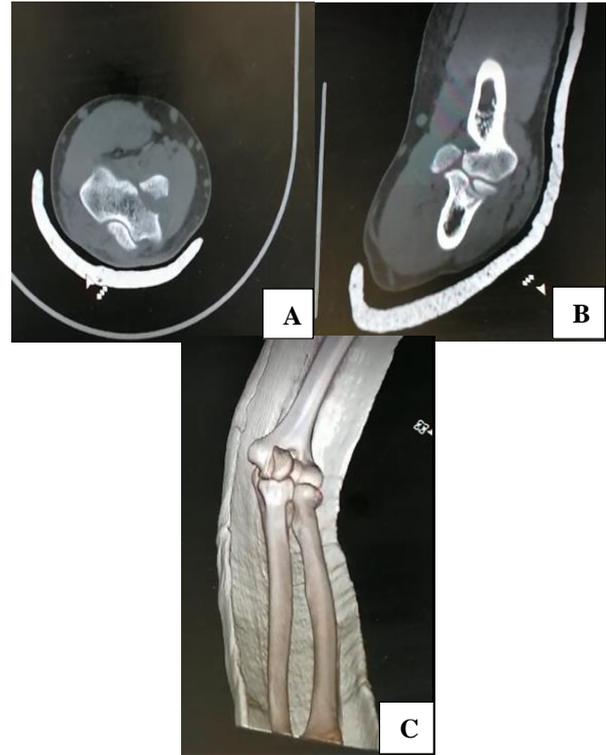


Figure 2: Computed tomography scan (A) axial view; (B) sagittal view; and (C) cut in 3D reconstruction.

DISCUSSION

The isolated trochlea fracture is a rare injury, and usually, it is associated with other injuries such as elbow dislocation. Few studies in the literature described such fracture and the anteromedial approach; most of these studies described the use of a direct medial approach to the elbow.

Several fixation methods were described in the literature, including k-wires, AO compression screws, and headless compression screws.

Worrell et al reported a case of trochlear fracture that was fixed by a single K-wire. At three months’ follow-ups, the patient regained 10-120° of elbow motion.³ Foulk et al had treated such a case using two cancellous screws through a direct medial approach.⁴ After five months, the patient regained full range of motion (0-135°).

Kwan et al described two rare cases fixed by Herbert screws using a direct medial approach without ulnar nerve transposition.⁵ Crossman et al described a delayed surgical intervention of an isolated trochlear fracture (three weeks after his injury), they used a posterior trans-olecranon approach, and the fracture was fixed using three headless compression screws from posterior to anterior.⁶

Finally, Kunal et al described using an anteromedial approach to reduce and fix isolated trochlear fracture using two Herbert screws from anterior to posterior.⁷

CONCLUSION

Isolated fracture of the trochlea is rare. The mechanisms causing this fracture are complex; the usual mechanism of isolated trochlear fractures is falling on the palm with the elbow extended and supinated. In our report, the patient disclosed that he fell directly on his flexed elbow. Trochlear fractures require open reduction and internal fixation to achieve anatomical reduction, with excision of the small osteochondral fragments that may be complicated by arthritic changes.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Mistarihi SM, Azam EH, Shari NF, Qasaimeh MMAA, Hawawsheh MJ. Isolated trochlear shear fracture of the distal humerus: a case report. *Int J Res Orthop* 2022;8:606-8.