J Orthop Spine Trauma. 2023 March; 9(1): 38-40. DOI: 10.18502/jost.v9i1.12571

Case Report

Isolated Trochlea Fracture: A Rare Case Report

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Received: 08 May 2022; **Revised:** 13 July 2022; **Accepted:** 10 August 2022

Abstract

Background: Trochlea fracture usually happens with other fractures such as capitellum fracture or medial or lateral condyle fracture and isolated trochlea fracture is very rare because of its location and there are only a few cases of isolated trochlea fracture that have been reported.
Case Report: We present here a 40-year-old man who suffered from an isolated trochlea fracture due to falling from three meters height on his flexed left elbow. After examination, imaging, and setting up a plan for surgery, the patient's fragment was fixed with two Herbert screws through anterior approach and after five years of follow-up which was the longest follow-up that had been reported, the patient's elbow range of motion was 5° to full flexion with Mayo Elbow Performance Index (MEPI) of 85/100 and Disabilities of Arm, Shoulder, and Hand (DASH) score of 13.6/100.
Conclusion: Isolated trochlea fracture is very rare, and it is best treated with open reduction and secure internal fixation using anterior or medial approaches.

Keywords: Elbow; Ulna; Humeral Fractures

Citation: Abdoli A, Salmani A. **Isolated Trochlea Fracture: A Rare Case Report.** *J Orthop Spine Trauma* 2023; 9(1): 38-40.

Background

Isolated trochlea fracture is a very rare fracture reported first by Laugier in 1853. Passing these so many years, the exact mechanism of this fracture is unclear.

Among many different classifications of distal humerus fractures, only the orthopedic trauma association classification involved isolated trochlea fracture as type 13-B3.2, which is not practical (1).

Trochlea fracture is usually associated with fracture of the capitellum or medial or lateral condyle of the humerus, ligament injury, and elbow dislocation. Isolated trochlea fracture is very rare because of its location deep into the joint and no muscular or ligamentous attachment, and it is not susceptible to direct trauma (2). This kind of fracture could be treated with open reduction and internal fixation (ORIF) using screws or Kirschner wire (K-wire) or removal of the fragment lesion could be used like a few case reports from the 90s (2). In order to openly reduce and internally fix the fragment, we could use three approaches such as anterior, posterior, and medial (3). As far as we knew, only a few cases were reported with isolated trochlea fracture.

This report describes a case of isolated displaced trochlea fracture treated with open reduction through anterior approach and internally fixed with Herbert screws.

Case Report

A 40-year-old man fell from three meters height while climbing the ladder and landed on his left elbow while the elbow was flexed. Immediately patient experienced pain and restricted movement on his left elbow. The patient went to the local hospital in his city, and the physical examination revealed ecchymosis and edema on the medial part of the elbow and restricted elbow movement with neurovascular intact. An X-ray of his left elbow was taken, and after being diagnosed with a distal humerus fracture, he was referred to our institution (a grade three referral hospital) for further treatment.

The lateral view of the elbow X-ray showed a half-moon-shaped fragment with irregularity on the anterior-posterior view, and a computed tomography (CT) scan of his elbow showed a displaced isolated trochlea fracture (Figure 1). We treated the patient with ORIF using the anterior approach.

Figure 1. Pre-operative X-ray and computed tomography (CT) scan

Surgery was performed a day after admission. The skin was opened with a transverse incision, then the bicipital aponeurosis was cut, the brachial artery was transferred to the lateral and the median nerve to the medial, and the trochlea was identified. After reduction,

the fragment was fixed with two Herbert screws from the anterior to the posterior.

After surgery, the elbow was immobilized with a long arm splint for less than a week, and after splint and dressing removal, he began physiotherapy to gain back the full range of motion.

The final follow-up was five years after surgery which the elbow range of motion was 5° to full flexion, and the X-ray of his left elbow showed no complications; the only complaint of the patient was mild pain in his elbow after heavy long manual work. The Mayo Elbow Performance Index (MEPI) of his left elbow was 85/100, and the quick Disabilities of Arm, Shoulder, and Hand (DASH) score was 13.6/100 (Figure 2).

Figure 2. Post-operative X-rays and range of motion

Discussion

Goncalves and Ring suggested three types of isolated trochlea fracture, type one coronal shear fracture of the trochlea, type two medial rim fracture of the trochlea, and type three epicondylus-trochlear fracture (4). The first two types have been reported in other case reports, but the last type only involved their case, and we did not find any similar reports of that type of fracture. Our patient's fracture was a coronal shear fracture that only involved the anterior part of the trochlea with the posterior part intact (type I).

The exact mechanism of our patient's fracture was that the force was applied through axial load while the elbow was flexed, and the lateral part of the humerus was intact causing the coronal shear fracture of the trochlea. For the first time, Worrell suggested the mechanism of this type of fracture as the force applied to the palm and passed through the ulna to the trochlea when the patient fell on his outstretched hand while the elbow was extended (5). In other reports, the mechanism of this type of fracture has been reported as either axial load while the elbow is flexed or extended or direct trauma to the elbow, but the connection between the mechanism and the fracture type has not been mentioned anywhere (2).

Diagnosis on X-ray can be difficult as an anteroposterior X-ray may seem normal, but usually there is a half-moon-shaped fragment or a crescentic shadow on the lateral view of the elbow X-ray that suggests the trochlea fracture. For further information, such as the size of the fragment, orientation of the displaced fragment, or differentiation of trochlea fracture from capitellar fracture, a CT scan could be useful (6).

Different treatments have been reported for isolated trochlea fracture, such as resection of the fragment, which was the choice of treatment for Coues (7) and caused limitation of the elbow movement and grating in the joint. ORIF was the most common choice of treatment in cases that had been reported.

The trochlear fragment can be reached through medial or anterior approaches. The medial approach was the most common one among all of the cases that had been reported (8-12), and there have not been any reports about which approach is better for any type of isolated trochlea fracture. We used the anterior approach, which had a good vision of the fragment and did not damage the posterior vascular network - one of the three blood supplies for the distal humeral epiphysis, which could increase avascular necrosis risk (13).

There are different choices for the fixation, such as 4.00 mm screw, headless screw, or K-wire (3). We used two anterior-posterior Herbert screws to fix the fragment.

Secure fixation with Herbert screws using the anterior approach with very good vision on fragment reduction caused our case to have a near-normal elbow function after five years of follow-up. To our knowledge, it is the longest period of follow-up in this kind of fracture in all cases reported with isolated trochlea fracture.

This study helped to understand that using ORIF and the medial approach is one of the best treatment choices we could have and what kind of hints from examination and X-rays should be aware of to keep this rare fracture in mind and do not miss it.

Conclusion

Isolated trochlea fracture is very rare, and it is best treated with open reduction and secure internal fixation using anterior or medial approaches.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgements

None.

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