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Case Report

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Surgical management of an isolated humeral trochlear fracture: a rare case report

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ABSTRACT

Isolated fractures of the humeral trochlea (Laugier's fracture) are extremely rare, with few cases documented in literature. We report the case of a 78-year-old man with diabetes, hypertension, and chronic kidney disease who sustained a displaced intra-articular trochlear fracture following a fall. Diagnosis was confirmed with CT after plain radiographs suggested a distal humeral fracture. Open reduction and internal fixation (ORIF) were performed using a Herbert screw through an anteromedial approach. The patient achieved good functional recovery with early mobilization. This case highlights the importance of CT in diagnosis, surgical planning, and the efficacy of headless screw fixation in restoring stability and function.

Keywords: Trochlear fracture, Laugier's fracture, ORIF, Herbert screw, Elbow injury, Case report

INTRODUCTION

The intricate anatomy of the distal humerus, where the trochlea is shielded by adjacent osseous structures and lacks direct tendon insertions, contributes to the exceptional rarity of isolated fractures at this site.[1] First described by Laugier in 1853, these fractures are often misdiagnosed as capitellar injuries on plain radiographs.[2] Advanced imaging, especially CT, is essential for accurate diagnosis.[3] Reported mechanisms include axial loading with the elbow in flexion, combined with varus stress.[4] Management typically requires ORIF to achieve anatomical reduction and restore joint congruity.[5]

CASE REPORT

A 78-year-old male with a history of type 2 diabetes mellitus, hypertension, and chronic kidney disease presented with pain and swelling in the right elbow following a fall on an outstretched hand. Examination revealed tenderness over the medial elbow with painful and restricted range of motion, though neurovascular status was intact.

Initial plain radiographs proved equivocal, demonstrating findings suggestive of a capitellar fracture. CT confirmed a displaced (1.6 cm) intra-articular trochlear fracture. Given the displacement and functional demands, surgical management was planned.

Figure 1: AP view of an irregularity of the medial joint space, lateral view shows an intra articular half-moon-shaped fragment that had moved up and forward (proximally and anteriorly).

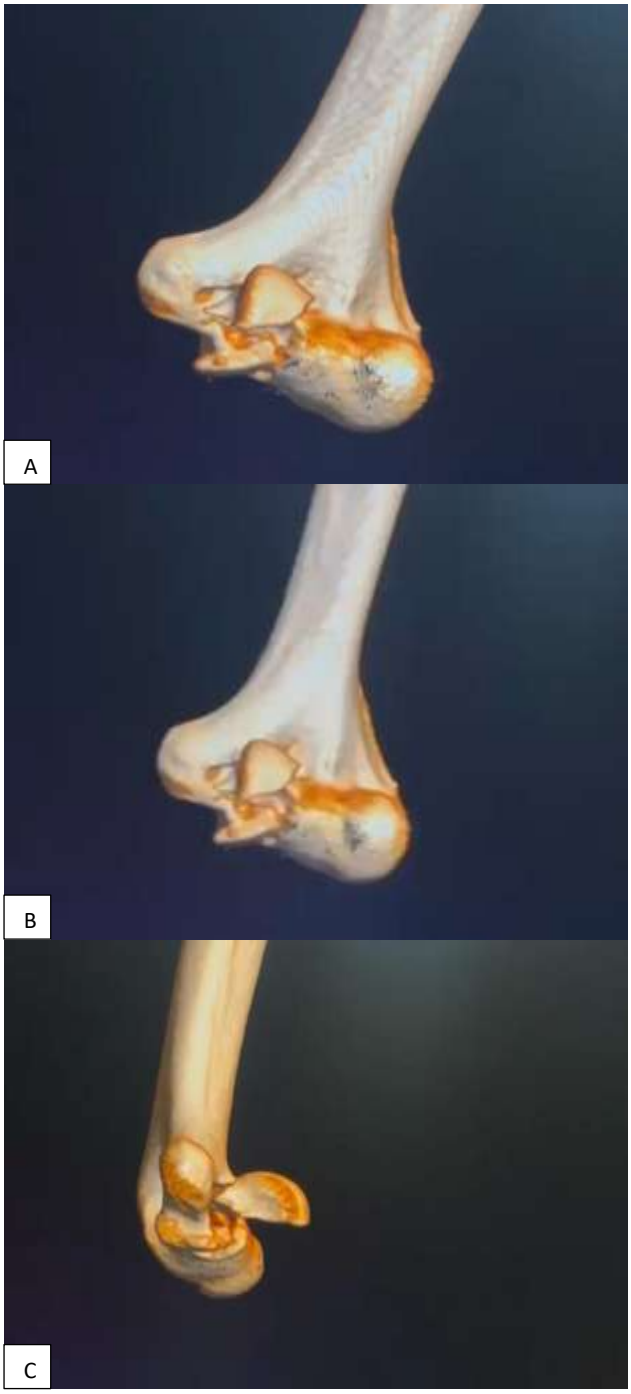

Figure 2 (A-C): CT left elbow shows displaced (maximum displacement of 1.6 cm), mildly comminuted fracture of the trochlea of the left humerus with intra-articular extension.

Surgical technique

The patient underwent ORIF through an anteromedial approach. The flexor-pronator mass was elevated to expose the trochlea. Under fluoroscopic guidance, anatomical reduction was achieved and secured with a headless Herbert screw. Stability was confirmed intraoperatively. A posterior slab was applied postoperatively.

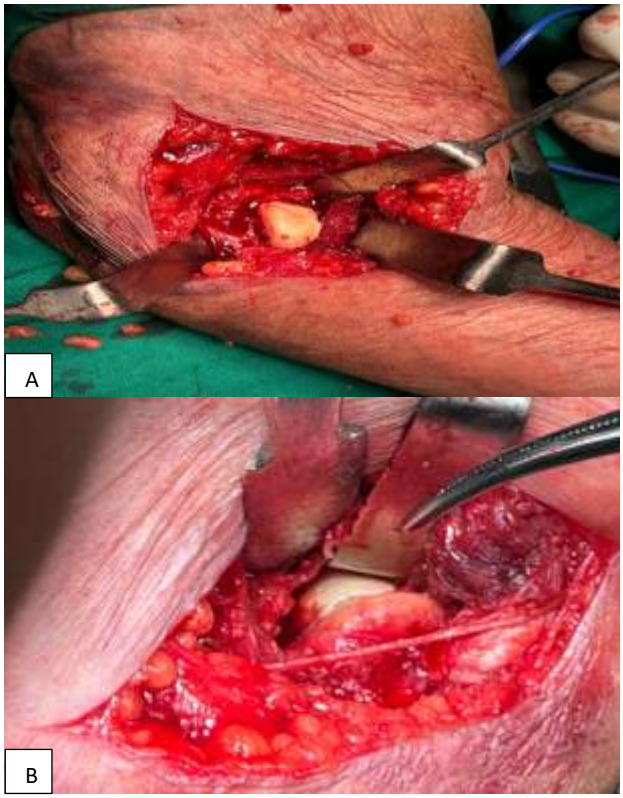

Figure 3 (A and B): Anteromedial approach with flexor pronator mass detachment, fracture was manually reduced and fixed with single headless Herbert screw (3.5×45 mm) (from medial to lateral).

Postoperative course

Postoperative radiographs confirmed satisfactory fixation. The patient was started on gentle passive range-of-motion exercises at two weeks. At two months, he had achieved a functional arc of motion (30-130°) without pain or instability. No postoperative complications were noted.

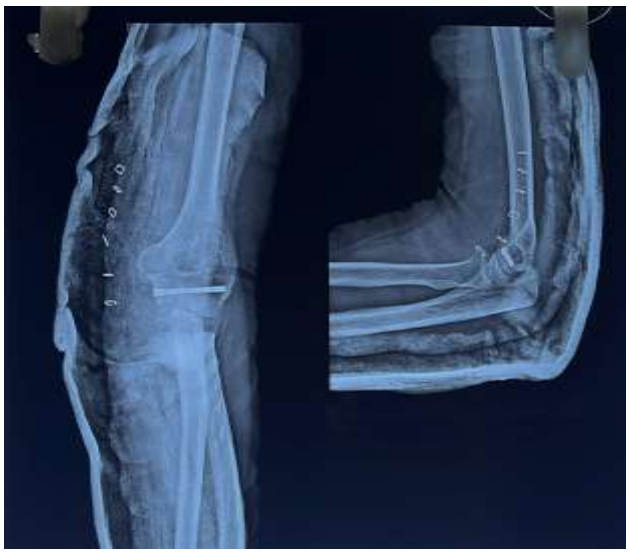

Figure 4: AP and lateral view of left elbow fixed with headless Herbert screw.

Figure 5 (A and B): Post operative passive ROM (30-130 degree) at 2 months.

DISCUSSION

Isolated trochlear fractures are uncommon due to the trochlea's deep position and lack of direct muscular insertions.[11] They are frequently misdiagnosed as capitellar fractures on X-rays. Computed tomography (CT) is therefore indispensable, providing the detailed visualization required for a definitive diagnosis and for formulating a precise surgical plan.[12]

The likely mechanism involves axial load transmission through the ulna with the elbow flexed, producing shearing and varus stress forces on the trochlea. Several fixation methods have been reported, including K-wires, screws, and headless compression screws. The use of headless compression screws, such as the Herbert screw, offers the advantage of stable interfragmentary compression while being buried beneath the articular surface, thereby facilitating early joint mobilization-a critical factor for achieving optimal functional recovery.

The anteromedial approach offers direct access and visualization of the fracture, while preserving the olecranon and minimizing risk to vascular supply compared to osteotomy-based exposures. Our case aligns with the excellent outcomes reported by Bilsel et al and Sen et al following ORIF with headless compression screws for isolated trochlear fractures.[4,5]

CONCLUSION

Isolated trochlear fractures are rare injuries that can be easily overlooked. CT imaging is essential to confirm diagnosis and guide management. ORIF with Herbert screws through an anteromedial approach provides stable fixation, enabling early mobilization and favorable functional outcomes.

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