

CASE REPORT

Malunited Isolated Intra-articular Fracture of Ulnar Head

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ABSTRACT

Fractures of distal ulna are often associated with fracture distal radius. Isolated intra-articular fractures of ulnar head have very rarely been reported in the literature. Displaced intra-articular fractures of ulna head should be treated properly so that the distal radio ulnar joint congruence is maintained. I am reporting a case of malunited isolated intra-articular fracture of ulnar head in young girl which was treated by open reduction and internal fixation. Logan and Lindau in their review of literature and recommendations for treatment of distal ulna fractures in adults found only few case reports. All those reported cases were treated soon after the injury. This case has been presented not only for its rarity but also to recognize the importance of managing the intra-articular fractures properly even in distal ulna.

Keywords: Intra-articular fracture, Malunited, Ulna head.

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INTRODUCTION

Fractures of distal ulna are often associated with fracture distal radius.¹ Isolated intra-articular fractures of ulnar head have very rarely been reported in the literature.¹⁻⁵ Congruence of ulnar head is important in maintaining the movement of distal radioulnar joint. Hence, any displaced intra-articular fracture of ulnar head should be treated properly. I am reporting a case of malunited isolated intra-articular fracture of ulnar head in a young girl which was treated by open reduction and internal fixation.

CASE DESCRIPTION

An 18-year-old female presented with complaints of restricted rotational movement in her left forearm. She had a fall from a two-wheeler where she was a pillion rider 6 months ago. She was diagnosed to have a depressed fracture of nasal bone and a displaced isolated intra-articular fracture of ulnar head (Fig. 1). She was treated elsewhere. Nasal bone fracture was treated surgically, and a short arm cast was applied for fractured ulnar head for 4 weeks. After the cast removal, she noticed restriction of forearm movements. She was advised mobilization exercises. She found no significant improvement till she presented to me 6 months following the injury. On examination, there were no swelling or bony tenderness in her left wrist. She had full pronation, but the terminal 30° of supination was restricted in her left forearm (Fig. 2). Computed tomography (CT) scan showed malunited intra-articular fracture of ulnar head, which mechanically blocked the radius in supination (Fig. 3). She was given the options of either excision of the fractured fragment or corrective osteotomy and internal fixation with the risk of non-union and osteonecrosis. She chose the latter.

Through a dorsal approach, the ulna head was exposed. The defect was cleared off the fibrous tissues (Fig. 4). The malunited fragment was osteotomized after making few drill holes with 1 mm K wire along the line of original fracture. Fragment was reduced and fixed with a single 2.5 mm headless cannulated compression screw (Synthes) (Figs 5 and 6). Range of movement was checked and found to be full. Her left upper limb was immobilized in a long-arm cast with forearm in full supination for 3 weeks (Figs 7 and 8). Then, the cast was removed and mobilization was started. She developed pain

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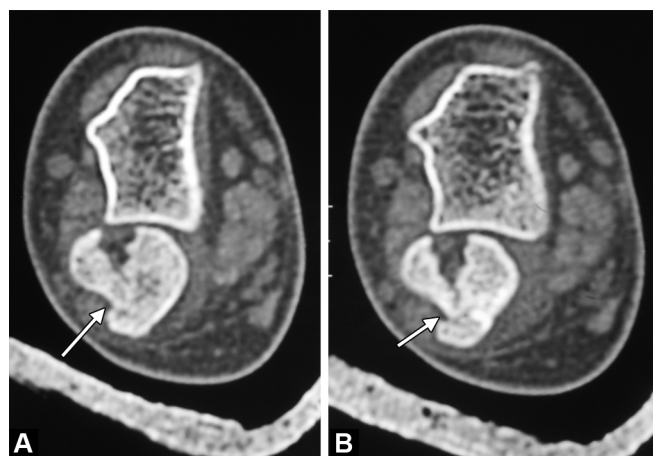
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as the screw became prominent. After 10 weeks, once radiological union was confirmed, the screw removal was planned (Fig. 9). Through the same incision, ulna head was exposed. Cartilage degeneration was noted around the screw making it prominent. Fracture was found united, and the screw was removed. She was encouraged range-of-motion exercises. At final follow-up 2 years since index surgery, there was no pain and the range of movement was full with good fracture union (Figs 10 to 13).



Figs 1A and B: Immediate post-injury computed tomography showing displaced intra-articular fracture of ulnar head



Fig. 2: Clinical picture showing restriction of supination of the left forearm

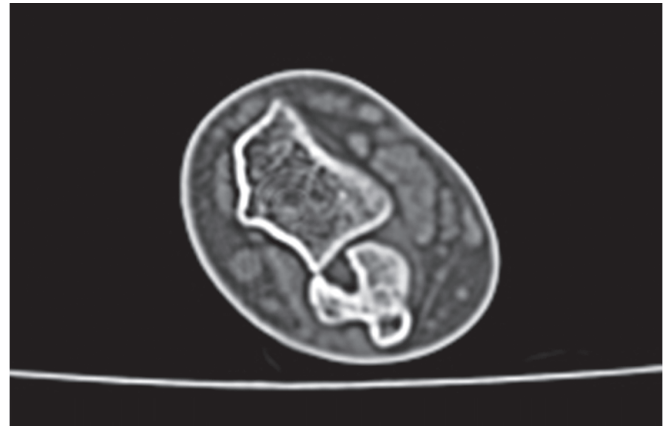


Fig. 3: Computed tomography scan showing malunited intra-articular fracture of ulnar head, which mechanically blocked the radius in supination

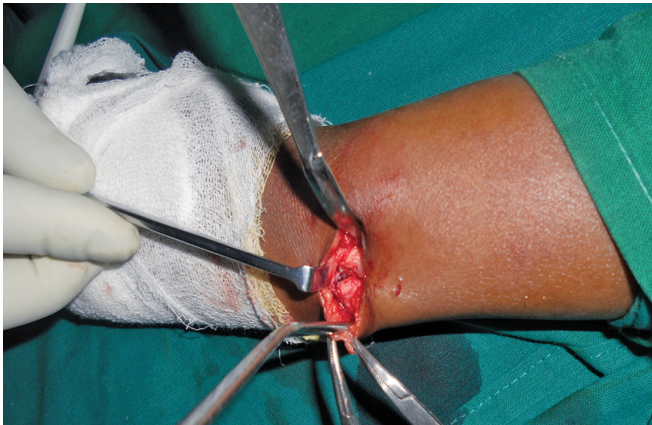


Fig. 4: Peroperative picture showing malunited intra-articular fracture of ulnar head with a defect

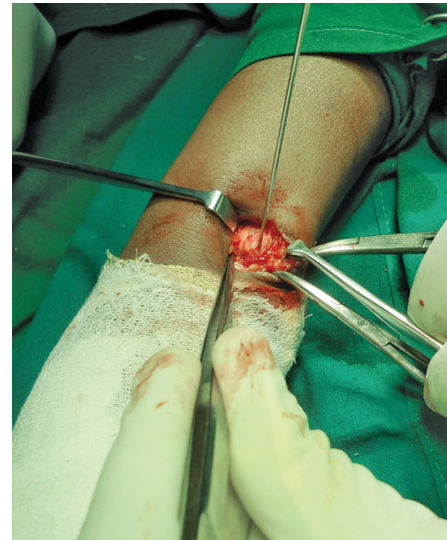


Fig. 5: Peroperative picture showing reduced fracture provisionally fixed with a K wire



Fig. 6: Peroperative picture showing reduced fracture fixed with a cannulated headless compression screw



Fig. 7: Clinical picture showing the left forearm immobilized in full supination



Fig. 8: Immediate postoperative X-ray left wrist anteroposterior (in supination) and lateral view showing fracture fixation

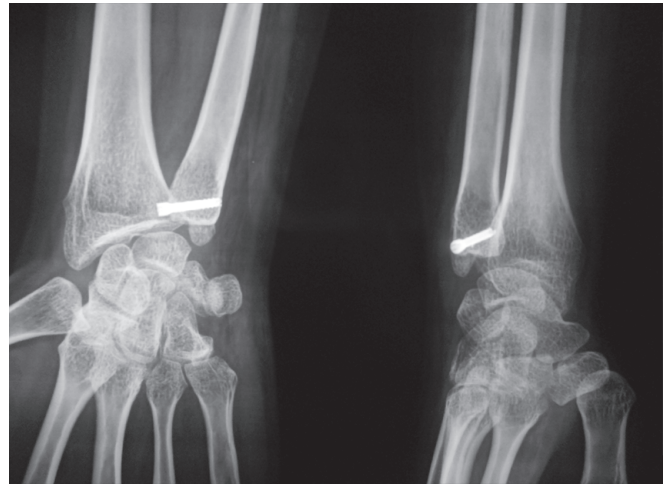


Fig. 9: Ten weeks postoperative X-ray left wrist posteroanterior (in pronation) and lateral view showing fracture union



Fig. 10: Two-year follow-up clinical picture showing full pronation and supination of left forearm



Fig. 11: Two-year follow-up clinical picture showing full pronation and supination of left forearm

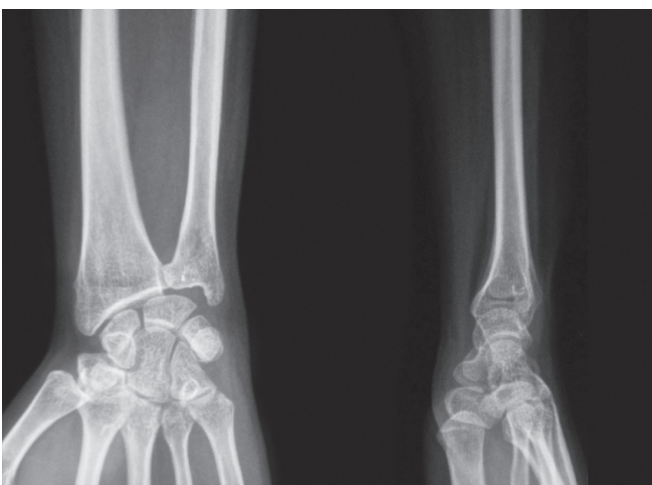
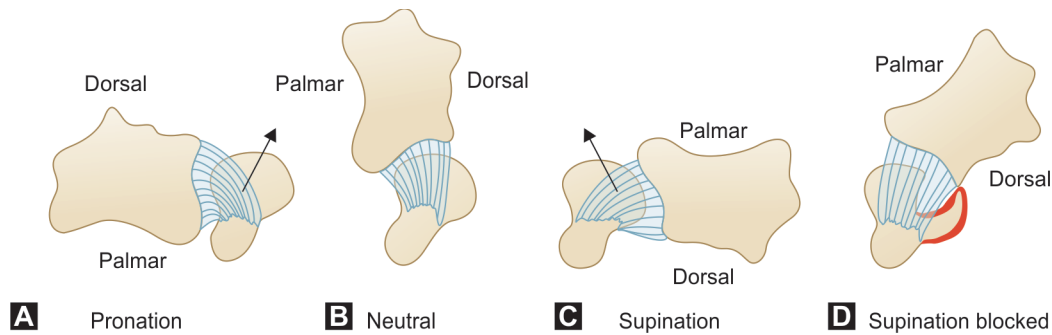


Fig. 12: Two-year follow-up X-ray left wrist posteroanterior view (in full pronation) and lateral view showing good fracture union



Fig. 13: Two-year follow-up X-ray left wrist anteroposterior view (in full supination) showing good fracture union



Figs 14A to D: (A) Normal relationship of sigmoid notch of radius to ulna head in pronation, with ulna head tending to translate dorsally (indicated by arrow); (B) Normal relationship of sigmoid notch of radius to ulna head in neutral rotation; (C) Normal relationship of sigmoid notch of radius to ulna head in supination, with ulna head tending to translate palmar (indicated by arrow); (D) Relationship of sigmoid notch of radius to ulna head in fracture ulna head, showing restriction of supination by a bony block

DISCUSSION

Biomechanics of Distal Radioulnar Joint

Pronation and supination are rotational motions that exist exclusively in the forearm. The mechanical bases for these movements are the existence of two forearm bones and the presence of two coupled trochoid joints—the proximal and distal radioulnar joints (PRUJ and DRUJ). The DRUJ consists of two parts: the radioulnar articulation and the ulnoligamentous articulation. The border between these two components is defined as the ulnar extension of a line along the subchondral bone of the distal radius. The sigmoid notch of the distal radius faces the hub of ulna head. The radius rotates around the ulnar head about a longitudinal axis that passes roughly through the center of the radial head at the PRUJ at the elbow to the fovea of the ulnar head at the level of the wrist.⁶

Fractures of the distal ulna have potentially important functional implications for the wrist. Fractures of the ulnar head can disrupt the congruency and/or stability of the DRUJ and limit pain-free forearm rotation and hand positioning.⁷ The risk of disabling complications in ulna head fracture is unlikely to be DRUJ instability. The attachments of the triangular fibrocartilage complex usually remain undisturbed.⁷ The ulna tends to translate dorsally in pronation and palmar in supination. This translation is due to slight incongruity between the sigmoid notch and the ulnar head.⁸ Relationship of radius to ulna head at radioulnar articulation in pronation, neutral, and supination is represented in this figure (Figs 14A to C). In our case, there is no disruption of ulnoligamentous complex. But because of the malunited fracture of ulna head, there is a mechanical restriction to supination of terminal 30° (Fig. 14D).

The significance of distal ulnar fractures is often not appreciated and results in inadequate treatment in comparison to its larger counterpart, the radius.¹ Fracture distal ulna can be classified according to the position of the fracture (Table 1).⁹

The intra-articular type Q4 is very rare and often associated with distal radius fracture. Isolated intra-articular fractures of ulnar head are still rarer. Logan and Lindau in their review of literature and recommendations for treatment of distal ulna fractures in adults found only few case reports.¹

Jakab et al. reported an isolated intra-articular fracture of ulna head in an adult male following a fall from a horse which was internally fixed with Herbert's screw.² Solan et al. reported another case in which the fracture morphology is very similar to our case. He demonstrated mechanical block to supination after infiltrating local anesthetic into the fracture site. And the fracture was treated by

Table 1: Comprehensive classification of fractures with an associated Q modifier⁹

Type	Position of fracture
Q 1	Ulna styloid
Q 2	Ulna neck
Q 3	Comminuted ulna neck
Q 4	Intra articular fracture (ulna head)
Q 5	Head and neck combination
Q 6	Ulna shaft

open reduction and internal fixation with a cannulated compression screw.³

An isolated intra-articular and adjacent shaft fracture of distal ulna due to airbag deployment was reported by Xabier et al. The fracture was fixed with multiple cannulated compression screws.⁴ Tamura et al. described two cases of ulna head fracture in association with dislocation of distal radio ulnar joint.⁵

The principles of treating intra-articular fracture, to achieve and maintain the articular congruity, are as important in distal ulna as in any other bone. When the fracture fragment is large enough, it has to be fixed with headless compression screw and if it is smaller in size fixation with a K wire or excision of the fragment are the options. The principles do not differ even in a malunited fracture when the symptoms are of a concern.

In all the reported cases, the fracture was treated soon after the injury. There had been no report of malunited isolated intra-articular fracture ulnar head in the English literature so far. In our case despite taking the computed tomography scan at the time of injury and diagnosed a displaced intra-articular fracture, since the principles were not adhered to it resulted in a symptomatic malunion. This case has been presented not only for its rarity but also to recognize the importance of managing the intra-articular fractures properly even in ulna head which is often taken for granted.

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