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Case Report *P-ISSN: 2456-9321*

A Unique Case of Open Radiocarpal Fracture-Dislocation Defying Classification Norms

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ABSTRACT

Radiocarpal dislocation presents as loss of contact between articular surfaces of distal radius with the first carpal row at the wrist. It may be associated with fractures of dorsal or palmer rim of distal radius, radial styloid process and ulnar styloid process. These injuries are usually due to high energy trauma like the one presented here in our case report where injury occurred due to fall of tiles on the wrist. The common classifications which are used to classify these injuries are Dumontier's and Moneim's classification. Our case here could not be classified as per classifications mentioned in the literature. This case had fracture of radial styloid with dorsal lip distal radius fracture and perilunate dislocation with DRUJ dislocation associated with radiocarpal dislocation, which was defying any classification criteria. This was managed with closed reduction and percutaneous K-wires fixation and external fixation for maintaining reduction. Wound was managed with daily dressing. This case is highlighted here to create awareness about such a complicated pattern of presentation which can be managed successfully without extensive intervention.

KEY WORDS: Radius fracture, Perilunate dislocation, wrist injuries, radiocarpal dislocation

INTRODUCTION

Radiocarpal dislocations (RCD and fracture-dislocations (RCFD) are rare (0.2% of dislocations) but severe injuries that occur following significant wrist trauma [1], for which the treatment and outcomes are not well defined. They are characterized by a complete or partial loss of contact between the carpus and the distal articulating surface of the radius. Dorsal radiocarpal dislocations are more common than volar dislocations and account for 60% of cases.[2].

With regard to the mechanism of this injury, an association of hyperextension, ulnar deviation and hyperpronation exists i.e. this injury is predominantly caused by rotational force.

The classification system developed by Dumontier et al. [3] separates these injuries into two categories which helps in guiding the treatment too. Type 1 corresponds to a pure dislocation or a fracture-dislocation associated with fracture of the tip of the radial styloid process. Type 2 corresponds to a dislocation with a fracture detaching a larger fragment of the radial styloid, which passes through the scaphoid facet.

Dumontier's classification.

Type	Description
Type I	Pure radiocarpal dislocation or with only a fracture of the tip of the radial styloid process.
Type II	Radiocarpal dislocation and an associated fracture of the radial styloid process that involved more than one-third of the width of the scaphoid fossa.

The most feared complications are ulnar translation and wrist osteoarthritis.

KEY WORDS- radiocarpal dislocation, open injury, wrist injury, percutaneous k-wires

CASE REPORT

A 34 year old male presented in casualty with open wound in wrist and pain abdomen following fall of glass tiles on him from 3rd floor as he tried to catch them with the hand. On examination, there was an open wound type 3B with right wrist joint dislocation (fig. 1). There was bleeding & radial pulsation was present. Spo2 at right Upper limb was 95%. Finger movements were present but were sluggish. The diagnosis was confirmed with radiographs that showed wrist fracture dislocation as shown in figure 2 and 3.

Fig 1: Clinical picture showing the wrist dislocation

Fig 2: Radiograph showing wrist fracture -dislocation

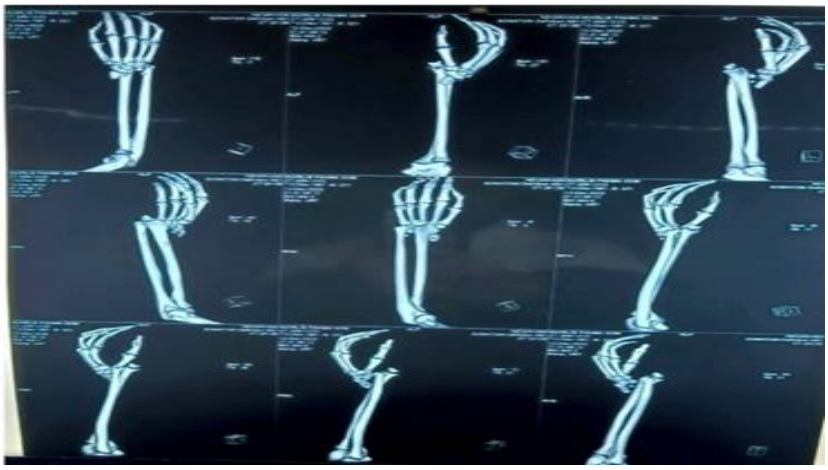

Fig 3: CT SCAN showing wrist fracture dislocation

TREATMENT:

The wound was thoroughly debrided with copious amount of normal saline. Closed reduction was performed under general anaesthesia by giving firm manual traction at hand and counter traction at the arm while digital pressure was applied at DRUJ and reduction was achieved. The stability of reduction was checked under C-arm, and was found satisfactory. To maintain the stability percutaneous k wire were passed across the radioulnar joint. The forearm and hand was then immobilised with an external fixator.

Fig 4: Intra operative clinical image after fixation with percutaneous k wires

Fig 5: Intra operative clinical image after fixation with percutaneous k wires

Fig 6: Intra operative clinical image after External fixator application

Fig 7: Intra operative clinical image after Ex- fixator application

Fig 8: Intra operative c-arm AP view after fixation with k wires

Fig 9: Intra operative c-arm lateral view after fixation with k wires

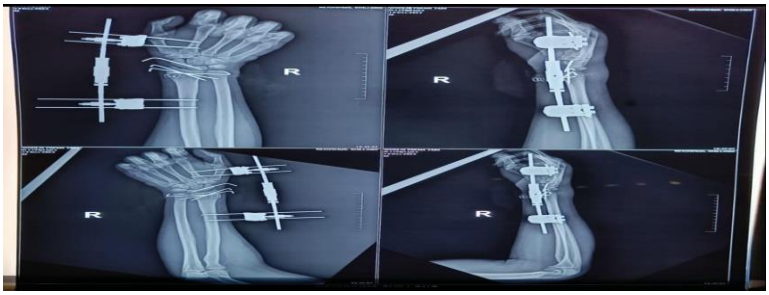

Fig 10: Post operative xrays on day 3

Fig11: Post operative Clinical image at 4weeks

Fig 12: Post operative clinical image at 4weeks

Fig 13: Post operative xray AP view at 4 weeks

Fig 14: Post operative xray Lateral view at 4 weeks

RESULTS

The patient underwent postoperative follow-up with X-rays, routine pin tract dressing, and demonstrated satisfactory progress during the course of treatment.

DISCUSSION

Radiocarpal fracture-dislocation is a complex injury characterized by dislocation of the radiocarpal joint, associated with avulsion of the dorsal or palmar cortical margin of the distal radius. Fractures of the radial and ulnar styloid processes are common.

The mechanism of injury includes hyperextension, ulnar deviation and hyperpronation. RCFD are rare injuries following a high energy trauma in young adults [3, 4].

It can lead to serious functional impairment of wrist due to complex capsulo-ligamentous insult with intra-carpal involvement, neurovascular compromise, and median nerve palsy. Graham in his study, described the mechanism of this injury based on the transition forces which occurs from lateral to medial aspect of the radius surface [5, 6]. Pure ligaments disruption seldom occurs, and these injuries are often associated with fracture of the radial styloid or distal radial dorsal or volar margins [7]. Two types of fracture patterns were described; a large fragment type and a small fragment type. The large radial styloid fracture runs obliquely from the area of the physeal scar near the crest separating the scaphoid and lunate fossa. The small fragment type represents either avulsion by the stout extrinsic volar ligaments or impaction from the sub luxating carpus against the dorsal or volar margin of the radius [8].

Perilunate injuries and lunate dislocations involves damage to the ligaments, bones, or both. Purely ligamentous injuries are defined as lesser arc injuries, and those with bony involvement are defined as greater arc injuries, i.e., fracture-dislocations [9].

Dumontier *et al.* classified radiocarpal dislocations into two- Type I injuries which are purely ligamentous or have a radial styloid fracture which is less than one-third of the radioscaphoid articulation. Type II injuries have a styloid fracture that is greater than one third of the radioscaphoid articulation, representing an avulsion of the critical extrinsic volar ligamentous stabilizers [10].

Treatment of type I injuries includes volar approach with open reduction of the carpus and capsulo- ligamentous repair, and K-wire fixation of the lunate under the radius. In type I injuries involving a tip of radial styloid fracture, the volar radiocarpal ligaments should be directly repaired to the volar lip of the intact radial styloid. Various ways to repair the capsular and ligamentous elements, including suture anchors and/or tendon grafts have been described. Additional radiocarpal stabilization in the form of K-wires, a dorsal spanning plate, or an external fixator should be considered to augment the ligamentous repair.

For type II injuries dorsal approach with K-wire fixation of the distal radius via styloid pinning is undertaken. Routine volar approach is not required as bony fixation will restore wrist stability as the volar ligamentous stabilizers are usually intact and attached to the styloid fragment.

It is recommended to retain the K-wire (fixing the lunate to the distal radius) in type I injuries for at least 2 months, along with immobilization in the form of a cast or external fixator for 6 weeks in type II injuries. The other known complication that can affect outcomes is the development of post-traumatic radiocarpal arthritis.

The dreaded complication (particularly in type I injuries where the volar radiocarpal ligamentous complex has been disrupted) is ulnar and volar translation of the carpus, which can be prevented by the K-wire fixation of the lunate into the distal radius, which is retained for 2 months post-operatively.

CONCLUSION

A good understanding of this injury can be based on a rationale classification which

may lead to a better treatment and outcomes with an anatomical repair and stable fixation assuring satisfactory functional results. This fracture dislocation is a very rare and unique as none of the classification available in literature like Dumontier's or Moniem or distal end radius fracture etc can appropriately classify the injury under one class, so its worth reporting for the benefit of the medical fraternity.

Declaration by Authors

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