

Multiple Carpometacarpal Fracture Dislocation of the Hand – An Uncommon Pattern of Injury Which is Often Missed: A Case Report with Review of Literature

YASIR SALAM SIDDIQUI, MOHAMMAD ZAHID, AAMIR BIN SABIR, JULFIQAR, GAURAV KUMAR

ABSTRACT

Carpometacarpal fracture dislocations of the hand are a relatively uncommon pattern of injury. The injury is difficult to diagnose because of the gross swelling of the hand. The diagnosis of this unusual form of injury requires a high index of suspicion, vigilant examination and high-quality radiography. Apart from the routine antero-posterior and oblique radiographs,

a lateral radiograph of the hand is essential for making a precise diagnosis in suspected cases of carpometacarpal fracture dislocations. In the case which is discussed here, the diagnosis of the fracture dislocation was missed by the treating doctor at the initial presentation itself, probably due to the gross swelling and ignorance about the entity.

Key Words: Carpometacarpal fracture dislocations; Missed diagnosis

INTRODUCTION

Fracture dislocations of the carpometacarpal (CMC) joints are high energy injuries which may occur with or without fracture. Knowing the high-energy nature of the contributory trauma, these injuries are quite often accompanied by more grave life threatening injuries that necessitate urgent attention. Carpometacarpal fracture dislocations of the hand are a relatively uncommon pattern of injury. These injuries account for less than 1% injuries of the hand and are frequently overlooked or missed [1]. Fractures in this area of the hand are hard to diagnose as the radiographical evidence is often subtle. Overlaps on the lateral X-rays may obscure the accurate delineation of the injury pattern. The diagnosis of this unusual form of injury requires a high index of suspicion, vigilant examination and high-quality radiography. Simultaneous CMC dislocations may be dorsal and volar. Dorsal dislocations are more frequent [2]. The reason why the dorsal dislocations are commoner, is that stronger static (dorsal ligaments) and dynamic (wrist extensors) restraints may cause the failure of bone dorsally, with the subsequent rupture of the volar ligaments [4]. The increased mobility on the ulnar side may predispose to the renowned greater frequency of the injury. The stability at the finger carpometacarpal joints is provided by a system of four ligaments, namely the dorsal metacarpal, the palmar metacarpal and the two sets of interosseous ligaments. The index metacarpal has a predominantly stable configuration through its wedge-shaped articulation with the trapezoid [3]. At the initial presentation, the diagnosis can be easily missed due to a gross swelling on the dorsum of the hand and its association with other serious life threatening injuries. These injuries are associated with a high risk of the compartment syndrome in the hand due to the gross swelling. An examination for the intactness of the ulnar nerve should be done, as damage to the deep branch of the ulnar nerve is associated with the dislocation of the fifth carpometacarpal joint. The disability of the hand is severe in untreated cases or in those in whom the treatment is delayed. Even though these injuries can be treated by different methods, better results are seen in open

reduction and internal fixation with K-wires. This will help in the accurate reduction of the fracture dislocations and an early functional recovery [1].

CASE REPORT

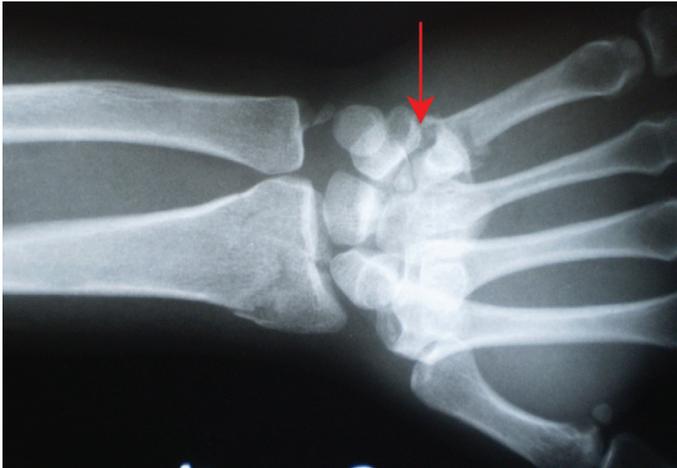
A 30 years old lady presented to the orthopaedic Out Patient's Department with complaints of relentless pain and discomfort in her right hand, 3 days after having applied an above elbow plaster slab elsewhere for the fracture around the wrist, as she was told by the treating doctor. She sustained injury to her right hand and wrist following a fall from a running motor cycle. The patient was unable to recall the exact mechanism of the injury. After the removal of the slab, the gross swelling on the dorsum of her right hand and wrist was noted [Table/Fig-1]. The antero-posterior diameter of the hand seemed to be augmented. The proximal ends of the metacarpals were not palpable due to a gross swelling over the hand and wrist. The movements of the hand and wrist were painfully restricted, except for a limited passive finger flexion. No neurovascular compromise was noted. The X-rays of



[Table/Fig-1]: Clinical photograph showing diffuse swelling over dorsum of hand with increased antero-posterior diameter of the hand.

the hand including those of the antero-posterior and lateral views of the wrist were ordered for, in order to detect any pathology at the carpometacarpal joints. The X-rays revealed a fracture of the base of the 4th and 5th metacarpals along with the dorsal dislocation of the 2nd, 3rd, 4th and 5th carpometacarpal joints [Table/Fig-2&3]. Associated injuries included an ipsilateral fracture at the distal end of the radius and the fracture of the ulnar styloid. CT-scan also showed a fracture dislocation at the carpometacarpal joints [Table/Fig-4&5]. An attempt of closed reduction was made, which failed. The patient was planned for surgery and open reduction. An internal fixation with multiple Kirschner wires was done [Table/Fig-6&7] and a below the elbow cast was given. The associated fracture of the radius was managed with two percutaneous K-wires. After six weeks, the K-wires and the cast were removed and

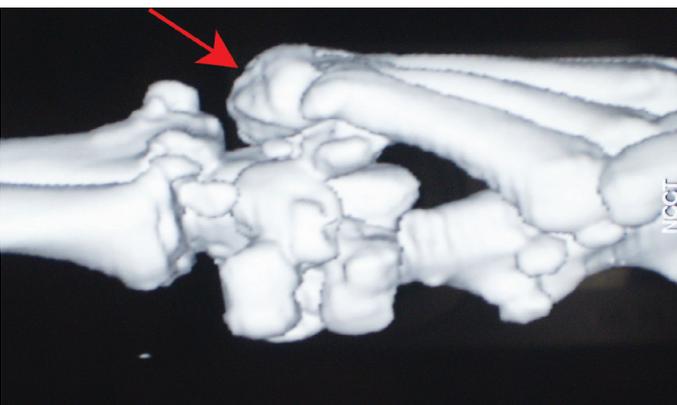
vigorous active physiotherapy of the wrist and hand was started. A reasonably good range of movements was achieved at the time of the last follow up. The X-rays at the latest follow-up showed a complete healing of the fractures and a normal alignment at the carpometacarpal joints [Table/Fig-8&9].



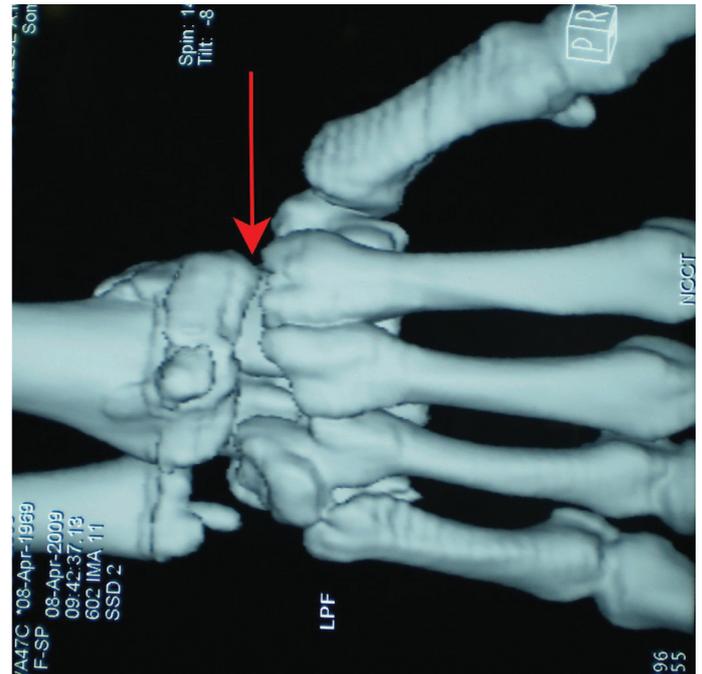
[Table/Fig-2]: Preoperative antero-posterior radiograph of wrist and hand showing overlap of bases of all ulnar side metacarpals with loss of joint space (arrow head). Note also the fracture of bases of 4th and 5th metacarpals, distal radius and ulnar styloid.



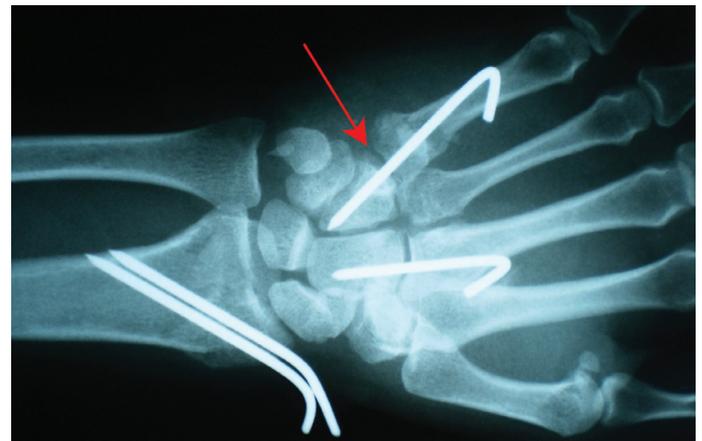
[Table/Fig-3]: Preoperative lateral radiograph of wrist and hand showing dorsal dislocation of four ulnar side metacarpals (arrow head).



[Table/Fig-4]: CT-scan showing dorsal carpometacarpal fracture dislocation involving all four ulnar metacarpals (arrow head).



[Table/Fig-5]: CT-scan showing other view



[Table/Fig-6]: Postoperative AP radiographs of the wrist and hand showing reduced carpometacarpal fracture dislocation, fixed with K-wires. Note that the overlap between bases of metacarpals and second row of carpus is corrected and joint space is clearly visible (arrow head).



[Table/Fig-7]: Postoperative lateral radiographs of the wrist



[Table/Fig-8]: 1 year postoperative AP radiographs of the wrist and hand showing maintained reduction and alignment at carpometacarpal joints with complete healing of fractures.



[Table/Fig-9]: 1 year postoperative lateral radiographs of the wrist

DISCUSSION

There is relatively little information in the literature regarding carpometacarpal fracture dislocations. The early recognition of these injuries is vital for satisfactory outcomes. A late diagnosis occurs either in cases of multiple injuries or where a lateral radiograph of the wrist was not taken in suspicious cases of carpometacarpal injuries [4,5,6]. A delay in their recognition is likely to result in morbidity which is associated with these types of injuries. The key to a radiographical diagnosis lies in the subtle loss of joint space and the loss of the parallel articular surfaces of the CMC joints, which are seen on the antero-posterior projections. After dislocation, this parallelism is lost and there is an overlap, and possibly an offset of the base of the fifth metacarpal (Fisher, Rogers and Hendrix 1983) [7]. There are diverse opinions regarding the usefulness of the lateral and oblique radiographs in making a diagnosis of carpometacarpal fracture dislocations. An overlap on the lateral X-ray may obscure the accurate depiction of the injury pattern, and most authors recommend at least one variant of an oblique view for making a diagnosis of carpometacarpal fracture dislocations [5]. Nalebuff (1968) [6] suggested that a

carpometacarpal dislocation will be better delineated on an oblique radiograph, whereas both Hazlett (1968) [8] and Dennyson and Stother (1976) [9] have suggested that a lateral radiograph is of more value. In Henderson et al's case series [10], the antero-posterior radiograph appeared to be virtually normal, the oblique view was thought to show no major abnormality, and only the true lateral view of the hand revealed the dislocation. In our patient, the lateral radiograph clearly revealed a dorsal dislocation of the carpometacarpal joints [Table/Fig-3].

Even though these injuries can be treated by different methods, better results are seen by open reduction and internal fixation with K-wires, especially when the dislocations are associated with fractures – as was seen in our patient. This will help in the accurate reduction of the fracture dislocations and an early functional recovery [1].

CONCLUSIONS

Carpometacarpal fracture dislocations of the hand are a relatively uncommon pattern of injury. The injury is difficult to diagnose because of the gross swelling of the hand and ignorance about the entity, because of its rare occurrence. The diagnosis of this unusual form of injury requires a high index of suspicion, vigilant examination and high-quality radiography. In the normal practice, only the antero-posterior and the oblique views of the hand are taken, but it is recommended that a lateral radiograph of the hand should also be taken, in order to avoid missing the suspected carpometacarpal dislocations. An early closed reduction should be attempted by the trained doctors in the emergency settings, especially if there are no associated fractures. A delay in the recognition of this injury is likely to result in morbidity which is associated with this injury.

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AUTHOR(S):

1. Dr. Yasir Salam Siddiqui
2. Dr. Mohammad Zahid
3. Dr. Aamir Bin Sabir
4. Dr. Julfiqar
5. Dr. Gaurav Kumar

NAME OF DEPARTMENT(S) / INSTITUTION(S) TO WHICH THE WORK IS ATTRIBUTED:

Orthopaedic Registrar, Dept. of Orthopaedic Surgery
J. N. Medical College, A.M.U., Aligarh, India.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Yasir Salam Siddiqui, Orthopaedic Registrar,
Dept. of Orthopaedic Surgery, Jawaharlal Nehru Medical College,
Aligarh Muslim University, Aligarh
E-mail: yassu98@gmail.com; Phone: +919837343400

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