Trauma Case Reports 48 (2023) 100966

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

# Hamatometacarpal fracture-dislocation: A case report

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ARTICLE INFO

*Keywords:*
Hamate
Coronal
Fracture
Carpometacarpal dislocation

ABSTRACT

Hamatometacarpal fracture-dislocation is a rare condition. Only a few cases have been reported in the literature. We present the case of a 26-year-old male patient who sustained a coronal fracture of the body of the hamate with the fifth metacarpal base interposed between volar and dorsal fragments on his right dominant hand. The patient underwent open reduction and internal fixation of the hamate with a 2.0-mm cortical screw and stabilization of the dislocated fifth metacarpal with Kirschner wire. At six months follow-up, total range of movement was allowed, the patient experienced no pain, and had successfully returned to work.

## Introduction

Hamatometacarpal fracture-dislocation is a rare injury that tends to be *missed* initially. It is seldom reported in the literature [1–3]. We present the case of a 26-year-old male patient who was admitted with a hamatometacarpal fracture-dislocation on his dominant right hand following a motorcycle accident.

## Case report

We present the case of a 26-year-old male admitted to our emergency department following a motorcycle accident. He complained of pain in his right hand and a loss of movement in his fourth and fifth fingers. Physical examination revealed painful swelling at the dorsal aspect of his right hand over the base of the fifth metacarpal. There were no sensory or motor deficits, and the skin was intact. Anteroposterior radiographs showed disappearance of the fifth carpometacarpal joint space, suggestive of a hamatometacarpal dislocation. On the lateral view, a fracture of the hamate was shown (Fig. 1). CT scan showed coronal fracture of the body of the hamate (type III according to the classification system developed by Cain et al. [4]), along with intraosseus dislocation of the 5th metacarpal (the fifth metacarpal base is interposed between volar and dorsal fragments of the hamate). The base of the fifth metacarpal was intact, and there was no injury or subluxation of the fourth metacarpal base (Fig. 2). Closed reduction was attempted but failed, and the carpometacarpal joint remained unstable, so the patient underwent open reduction and internal fixation of the hamate with a 2.0-mm cortical screw through a dorsal approach (Fig. 3), and stabilization of the dislocated 5th metacarpal with Kirschner wire (Fig. 4). Post-operatively, the wrist was immobilized with a volar splint. At 6 weeks, Kirshner's wire and splint were removed, and

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https://doi.org/10.1016/j.tcr.2023.100966
Accepted 19 November 2023
Available online 22 November 2023

progressive physiotherapy was started, including range of motion exercises, strengthening and stretching exercises. At six months follow-up, total range of movement was allowed, the patient experienced no pain, and had successfully returned to work (Fig. 5).

## Discussion

The articulations of the hamate with the fourth and fifth metacarpals are modified saddle joints; therefore, they are more mobile than their radial counterparts. The fifth carpometacarpal (CMC) joint has the greatest arc of movement, ranging between 15° and 30° [5,6].The dorsal hamatometacarpal ligament is lax, which explains the vulnerability of this joint compared to the other carpometacarpal joints [7]. Fractures of the hamate are relatively rare; they account for 2 %–7 % of all carpal fractures [8]. Hamate fractures can occur in the body or the hook (or hamulus) of the bone, but are more frequent in the hook [9,10]. Hamate fractures are frequently associated with a carpometacarpal fracture-dislocation. These injuries are usually seen in high-energy wrist trauma involving falls or motor vehicle injuries. The mechanism of these injuries implies axial loading forces. The degree of fifth metacarpal palmar flexion influences the type of hamate injury. Important flexion generate a dorsal dislocation of the base of the fifth metacarpal, an injury of the dorsal carpometacarpal ligament, and a dorsal fracture of the hamate. A slight flexion of the fifth metacarpal causes a longitudinal


**Fig. 1.** X-rays of the right hand at initial presentation: A: antero-posterior radiograph, B: lateral radiograph.

coronal fracture of the hamate [11]. The diagnosis of carpometacarpal fracture-dislocations is often difficult, and a high clinical suspicion with adequate use of radiographs is necessary. Anteroposterior and lateral radiographs do not provide an adequate image of the fourth and fifth carpometacarpal joints to allow the diagnosis of these injuries [12], therefore an additional 30° supination oblique image is recommended [13]. CT scan is often helpful for the diagnosis and can be useful for pre-operative planning [14,15]. According to the Cain classification, hamate body fractures associated with carpometacarpal fracture-dislocation are subdivided into 3 types: Type IA: subluxation of the base of the V metacarpal and tear of the dorsal carpometacarpal ligament, Type IB: dorsal fracture of the hamate; Type II: dorsal comminuted fracture of the hamate. Type III: longitudinal coronal fracture of the hamate [4]. Hamate body fractures associated with a carpometacarpal fracture-dislocation are unstable lesions that result in decreased grip strength, chronic pain, and posttraumatic arthritis if inadequately treated [16]. Therefore, surgical stabilization and anatomical reduction are recommended [17]. If the fragment of the hamate fracture involves less than one-third of the articular surface, closed reduction and Kirschner wire fixation may be attempted, whereas if the fracture involves more than one-third of the articular surface or coronal plane, open reduction and internal fixation (ORIF) through a dorsal approach is recommended [18]. Multiple possibilities have been described, including osteosynthesis with Kirshner wires, cortical screws, headless compression screws, or preformed low-profile plates. Biomechanical studies showed no significant differences between headless compression screws and cortical screws [19]. Headless

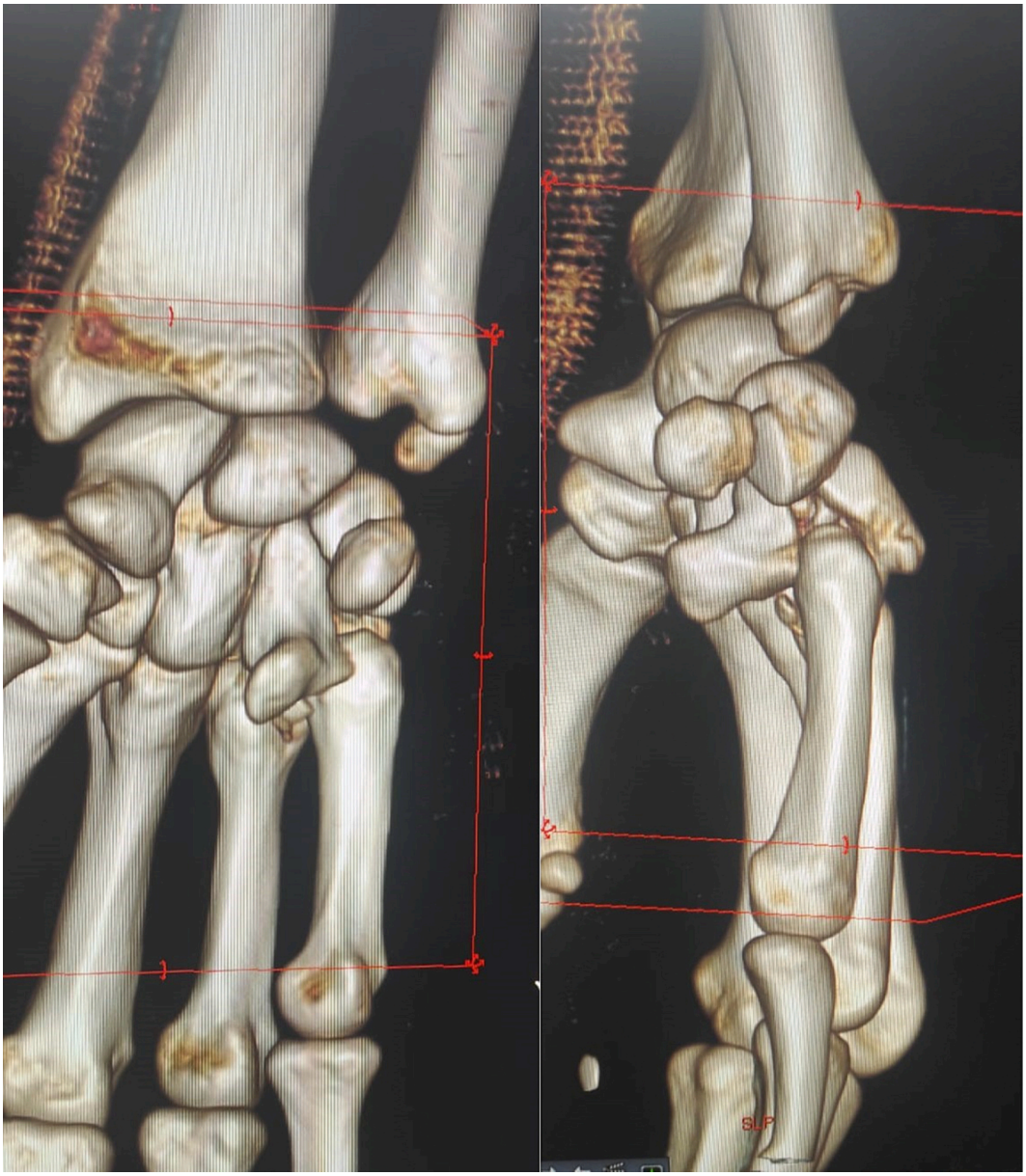


**Fig. 2.** CT scan of the right hand: the fifth metacarpal base interposed between volar and dorsal fragments of the hamate.

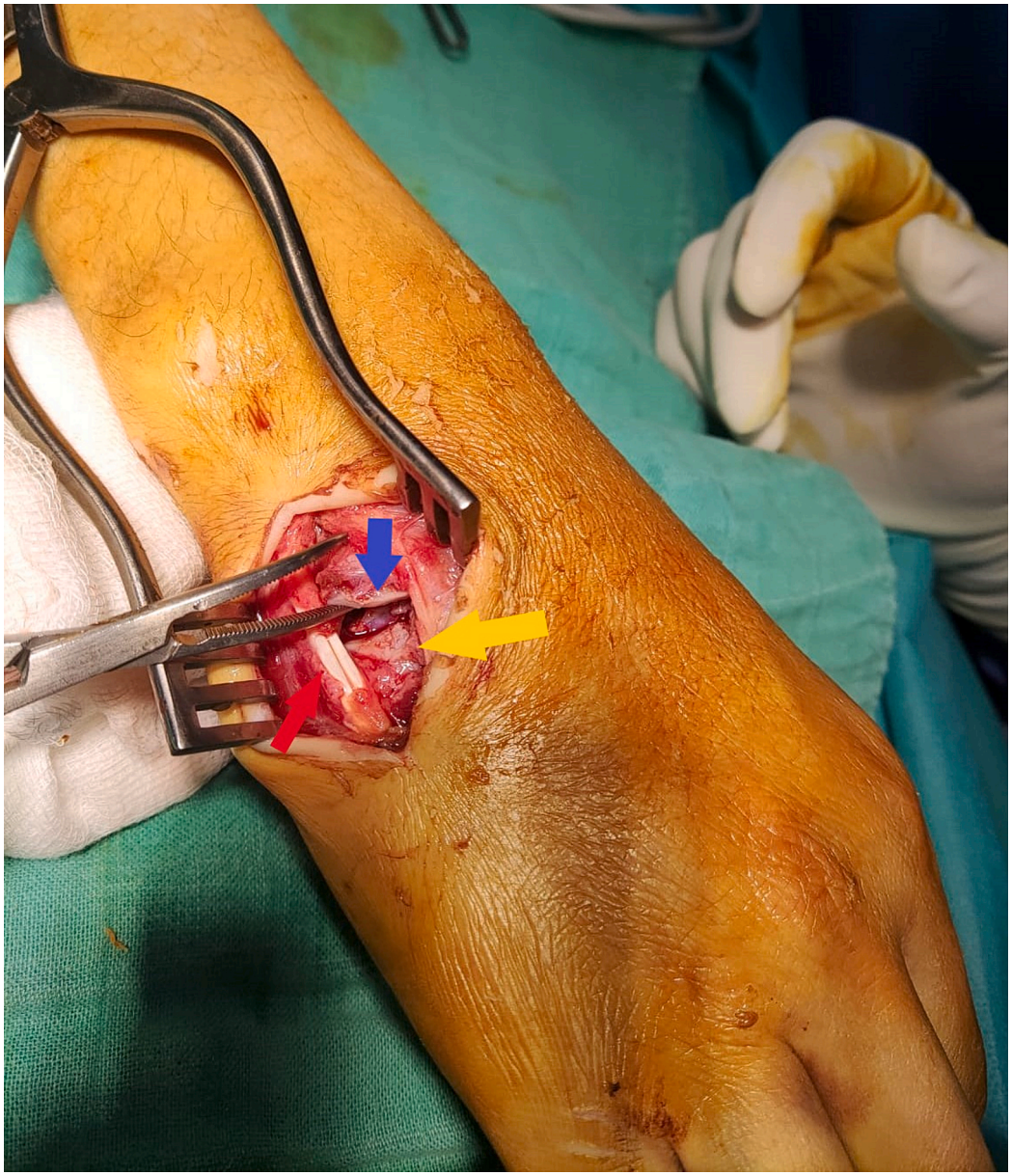

**Fig. 3.** Peroperative view: coronal fracture of the hamate (blue arrow), base of the fifth metacarpal (yellow arrow), extensor tendons of the fifth finger (red arrow).

compression screws are associated with a lower risk of hardware irritation for the soft tissue, therefore, implant removal is not required. Additionally, Kirschner wire stabilization is recommended if the stability of the carpometacarpal joint is in doubt [11].

## Conclusion

Fractures of the hamate combined with carpometacarpal dislocations are rare injuries that are often missed on initial assessment. A delayed or missed diagnosis may result in a poor outcome and long-term functional disability. Anatomical reduction with adequate stabilization generally results in satisfactory outcomes.

## Ethical approval

This study is exempt from ethical approval in our institution.

**Fig. 4.** Postoperative X-rays.

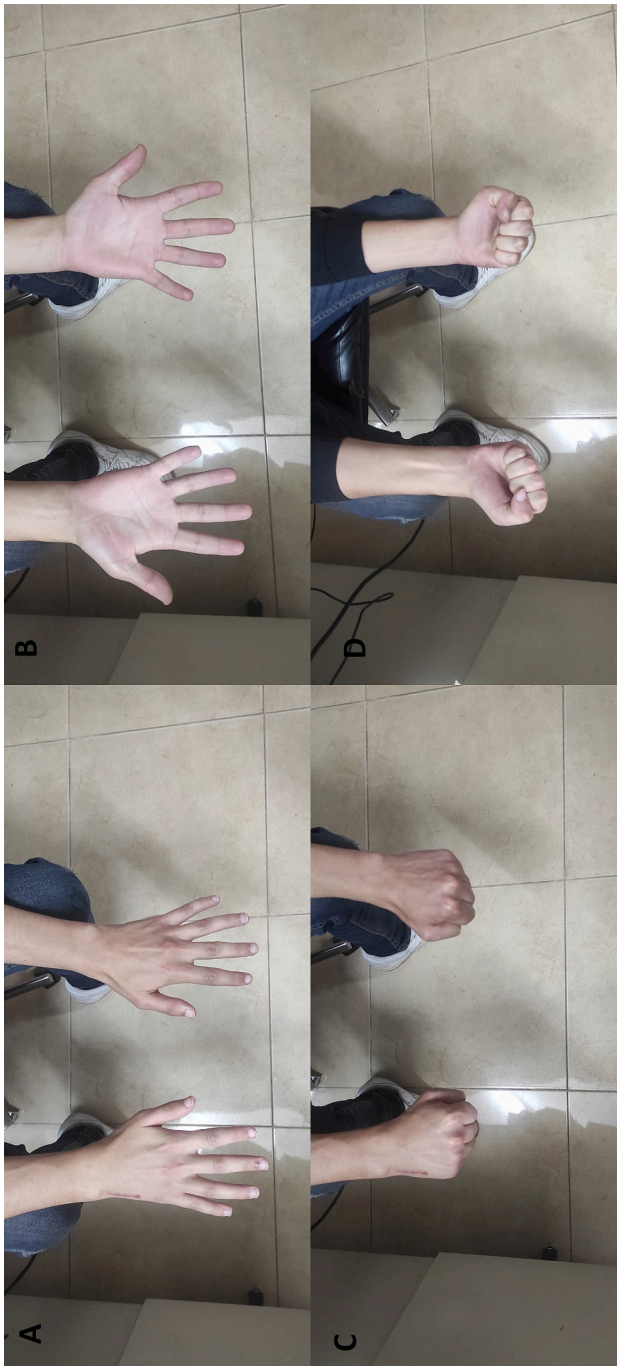


**Fig. 5.** Final clinical result: A, B: active extension; C, D: active flexion.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgements

This research did not receive any specific grant from any funding agencies in the public, commercial, or not-for-profit sectors.

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