

Fracture in the body of the hamate bone with associated dislocation in the fourth carpometacarpal joint: a case report

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ABSTRACT

Fractures of the hamate bone associated with dislocations of the 4th and 5th carpometacarpal joints are uncommon. They usually occur due to high-energy injuries, i.e., in the course of multi-trauma. A case of a young man who sustained such an injury after punching a wall is reported. Operative treatment

consisted of a reduction in the dislocation of the 4th carpometacarpal joint followed by a stable fixation of the hamate bone with lag-screws. This allowed recovery to normal function in the hand 3 months post-injury.

Keywords: hamate bone fractures; carpometacarpal joint dislocation; outcome of surgery.

INTRODUCTION

Fractures of the hamate bone associated with dislocations of the 4th and 5th carpometacarpal (CMC) joints are uncommon, accounting for less than 1% of all wrist injuries. They usually occur due to high-energy trauma which is commonly seen in bicyclists, motorcyclists and street-fighters (punching injuries). These injuries are difficult to diagnose on standard wrist and hand radiographs in the emergency department. If the diagnosis is missed, this may lead to lasting functional disability, as these fractures have a propensity to destabilize the 4th and 5th CMC joints. Misdiagnosis and inadequate treatment may cause malunion and residual subluxation leading to painful arthritis and grip weakness in the long term [1]. In this article, we report a case of such an injury in a patient who struck against a wall with the fist. A way of arriving to a proper diagnosis and method of treatment is presented.

CASE REPORT

A 28-year-old man presented to the out-patient clinic in the authors' institution with complaints of pain in the right wrist, swelling, a reduced range of motion and a lack of grip strength. He reported a right wrist trauma which started a week earlier after punching a wall with a clenched fist. Clinical examination showed swelling in the dorsum of the hand and wrist as well as tenderness in the ulnar CMC area. Active movements of the wrist were restricted due to pain. An X-ray showed no changes in the bones of the hand and wrist. An additional computed tomography (CT) scan of the right hand revealed a fracture in the body of the hamate bone, a small fragment at the base of the 4th metacarpal and dislocation in the 4th CMC joint (Fig. 1). After obtaining CT scans and making a confident diagnosis, the patient was admitted to the hospital and underwent surgery.



FIGURE 1. Computed tomography scan (A – coronal; B – sagittal) showing a fracture in the body of the hamate bone with dislocation

The operation was performed under brachial plexus block anaesthesia with an arm-tourniquet. The hamate bone and 4th CMC joint were exposed via a dorsal incision. The hamate fracture was inspected, bone fragments were debrided and then fixed with three 2.0 mm lag-screws (Fig. 2). Next, the dislocation in the 4th CMC joint was reduced by traction and manipulation under image intensifier guidance. Although the dislocation

slipped into place, it was unstable and thus required stabilization with a K-wire which was transfixed to the bases of the 3rd, 4th and 5th metacarpal (Fig. 3). After radiological confirmation of an adequate position of the 4th CMC joint, the capsule of the wrist joint was carefully repaired, the wound was closed and a splint was applied, immobilizing the carpus. The postoperative course was uneventful. Four weeks after surgery, the K-wire was removed and the patient was given a physiotherapy program. An X-ray performed at 8 weeks showed consolidation of the hamate body fracture (Fig. 4). At the 12-week follow-up, the functional results were good and the patient achieved a painless and only slightly limited range of motions of the wrist.

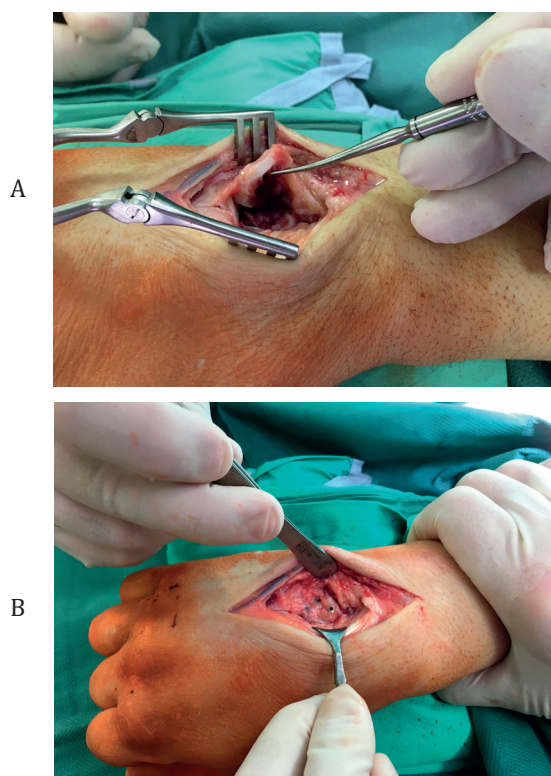


FIGURE 2. View of: A – displaced dorsal fragment of the hamate; B – reduced and fixed with 3 screw fragments of the hamate

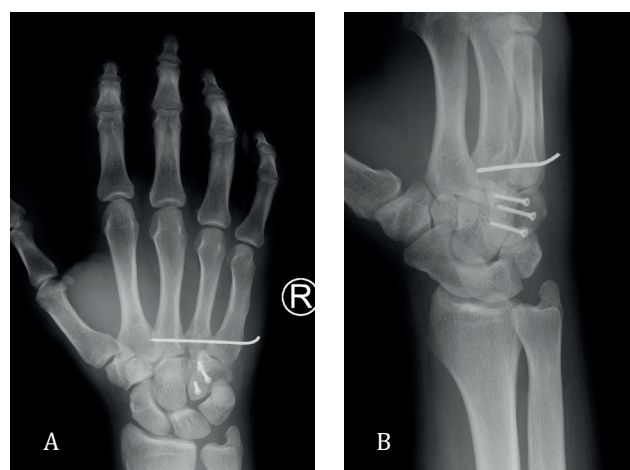


FIGURE 3. X-ray of the hand and wrist showing 3 transfixing ulnar metacarpals and hamate: A – p-a view; B – lateral view

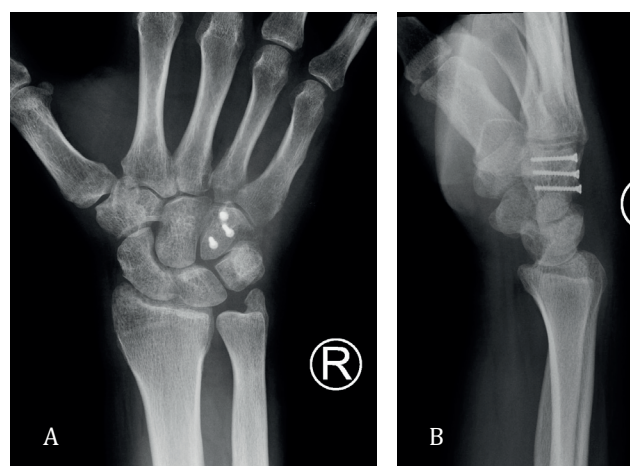


FIGURE 4. X-ray of the wrist showing a consolidated fracture of the hamate: A – p-a view; B – lateral view

DISCUSSION

The CMC joints have a complex anatomical configuration. The bases of the metacarpals are firmly joined to each other and the distal row of the carpal bones, due to their irregular shaped articulations, produce a so-called keystone relationship. These ligaments, surrounding muscles and tendons further reinforce the joints. This anatomical construct is very stable so a great deal of violence is needed to disrupt it. Direct force is the most common mechanism of injury. In cases of dislocation, an open reduction along with internal fixation is the treatment of choice, however, there is no consensus on an optimal treatment approach.

Gil et al. reported a case of a 28-year-old male who sustained multi-trauma injury as a consequence of a rollover motor vehicle collision. The main injuries included bilateral pulmonary contusions and pneumothoraces, scalp lacerations and a 1st rib fracture. Additionally, he had swelling and lacerations in the left wrist and instability of the left hand. Plain radiographs revealed an axial dislocation of the carpus that resulted in dorsal dislocations of all CMC joints, dislocation of the hamate-capitate articulation, as well as fractures of the 1st metacarpal and the hamate. Soon after the patient was stabilized, surgery of the left wrist was undertaken. The coronal hamate body fracture was identified, reduced and stabilized with a single 1.3-mm screw and a K-wire. As the hamate itself was dorsally dislocated, it was reduced and pinned to the capitate. Once the hamate was reduced and stable, the remaining CMC joints were reduced and pinned with a single K-wire each. The K-wires were removed 6 weeks postoperatively [2].

Brinkman et al. reported a case of a 28-year-old, right-handed man who sustained a fracture to the body of the hamate bone as well as a dorsal dislocation of the II–V CMC joints after punching a wall. The dislocation was revealed by plain radiographs and the hamate fracture was shown at a CT scan which revealed a bony fragment emanating from the hamate. The injury was treated with a closed reduction

and percutaneous transfixion with K-wires. The functional result was good (full and painless range of motion) at 12 weeks of follow-up [3].

The presented diagnosis is relatively rare and the author did not find anything similar in Polish literature. The diagnostic process, decision making and management seemed to be adequate and resulted in good function in the injured wrist.

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