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Fracture of the body of hamate associated with a fracture of the base of fourth metacarpal: A case report and review of literature of the last 20 years

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ABSTRACT

INTRODUCTION: Fractures of the carpal bones are often difficult to diagnose and treat due to the complex bone architecture of this region. Hamate fractures, particularly body fractures, are extremely uncommon.
PRESENTATION OF CASE: We present a case of a coronal fracture of the hamate associated with a fracture of the base of the fourth metacarpal, which was treated by open reduction and internal fixation.
DISCUSSION: Some of hamate body fractures are associated with other injuries like metacarpal fractures. Its diagnosis is difficult and requires a high clinical suspicion and a proper radiological examination. This fracture is a very rare lesion that can raise questions about their most adequate diagnostic and therapeutic approaches.
CONCLUSION: After reviewing the literature, we conclude that there is a high rate of delay in the diagnosis of these lesions, probably due to their rarity and to the lack of radiological studies specifically targeting this region. Despite this, surgical treatment in its different modalities has been shown to have the best clinical and functional results.

1. Introduction

Coronal fractures of the hamate bone, either associated to fractures of the base of the metacarpal or not, are rare lesions.[1] Some authors believe that the main cause for these lesions is a direct impact against a hard surface with a clenched fist. Clinically, patients with hamate fracture have pain and swelling. Radiological diagnosis with posteroanterior and lateral radiographs may not provide adequate images, and cause these injuries go unnoticed.[2] Usually, oblique radiographs (30°) are required in order to reveal the fracture. It is advisable to complete the radiological study with a computed tomography (CT) scan of the wrist, which will help us in deciding the therapeutic approach. A conservative approach will only be advisable in cases without displacement or with minimal displacement, which is rare, due to the fact that these fractures are usually unstable. For this reason, open reduction and internal fixation (ORIF) are usually applied. The osteosynthesis is generally carried out with screws and/or Kirschner wires, followed by an inmobilization period no less than 6 weeks. This treatment approach has resulted in the better clinical and radiological outcomes.[3,4] We report a case of a fracture of the body of the hamate associated with a fourth metacarpal fracture, which was successfully treated by ORIF and immobilization for 8 weeks.

2. Presentation of case

We report a case of a 34 years old, right-handed construction worker, that goes to emergency (ER) room with pain on the back of his right wrist after an accidental fall with support on his right hand a few hours ago. The physical examination reveals swelling and severe pain on the ulnar side of the wrist. Posteroanterior and lateral radiographies were inconclusive, so a computerized tomography was performed, which showed a coronal fracture of the body of the hamate associated with a fracture of the base of the fourth metacarpal (Figs. 1 and 2). We decided to perform an open reduction with internal fixation with an interfragmentary screw associated to 2 Kirschner wires (used as a temporary stabilization device) (Fig. 3). The fracture was reduced and fixed through a dorsal approach whereby it was possible to check the reduction of the carpal arcs (Fig. 4).

The patient was immobilized, first with a splint and later by means of an antebrachial plaster cast that was removed after 8 weeks, together with both percutaneous wires. The evolutive follow-up after 3 months shows no pain, normal balance of the wrist and radiological consolidation of the fracture (Fig. 5 and 6). The patient also has returned to work.

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Figs. 1 and 2. CT scan.

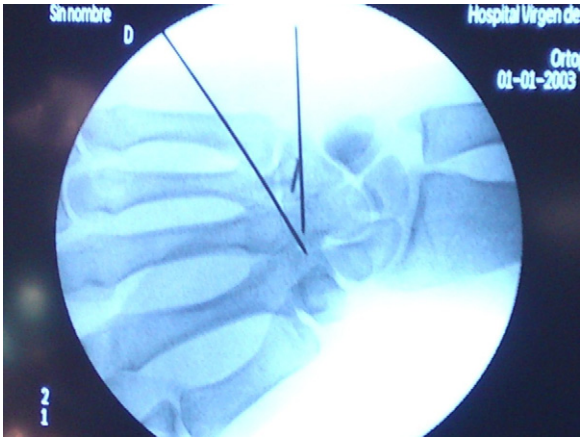

Fig. 3. Intraoperative radioscopy.

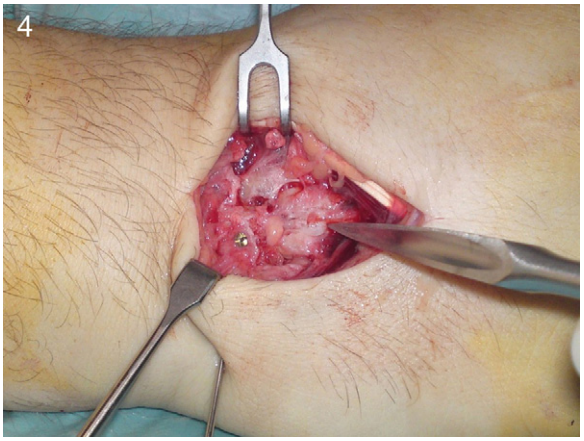

Fig. 4. Intraoperative image that shows the reduction and the operation approach.

3. Discussion

Hamate fractures represent only 2–4% of all carpal fractures. Within these, fractures involving the coronal plane of the body of the hamate are even less frequent.[3] Considering the production mechanisms of these fractures may be associated with fractures and fracture/dislocation of the bases of the fourth and fifth metacarpals. Due to carpal anatomy, all patterns of this lesion involves the existence of a certain degree of instability, because the action of the extensor carpi ulnaris (ECU) and of the flexor carpi ulnaris (FCU), which are inserted into the back of the base of the 5th metacarpal bone and the pisiform bone (which exerts force on the 5th metacarpal via the pisometacarpal ligament), respectively. Diagnosis is difficult, and a high clinical suspicion and an adequate use of the radiological tests are required. CT scan can be useful for the diagnosis and for an accurate definition of the pattern of the lesion. The literature shows that this lesion can easily go unnoticed.[3,4] An early diagnosis is essential in order to avoid or minimize the risk of side effects, such as chronic post-traumatic arthritis or a potential loss of strength of the hand.

Studies on cadavers have helped us to clarify the biomechanical and physiopathological processes of these lesions, and showed that the position, direction and transmission of forces through the 4th metacarpal determine the pattern of the fracture. Milch classified hamate fractures into two types: fractures of the body (with a fracture line that extends toward the radial or ulnar side of the hook) and fractures of the hook. Coronal fractures of the body were considered so rare that they were not included in Milch's classification.[5] On the contrary, a study carried out by Ebraheim et al. on 11 cases of fractures of the hamate bone, 3 patterns of coronal fractures were found. In type A, the fracture line crosses the center of the body of the hamate bone. In type B, the line crosses the body obliquely. Both types required open reduction and internal fixation. A third kind, type C, showed a carpometacarpal dislocation associated to a small avulsion of the distal end of the hamate bone. In this case, the authors presented the possibility of treating it with