Case Report

Transtriquetral perihamate fracture-dislocation: case report

Frederico Barra de Moraes*, Rodrigo Cunha Ferreira, Stéphanie Zago Geraldino, Renato Silva Farias, Ricardo Pereira da Silva, Mário Yoshihide Kuwae

Universidade Federal de Goiás (UFG), Faculdade de Medicina, Goiânia, GO, Brazil

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ABSTRACT

The wrist is a region that is very vulnerable to injuries of the extremities. Among these injuries, fractures of the pyramidal bone (or triquetrum) in association with dislocation of the hamate and carpal instability are uncommon. They are generally correlated with high-energy trauma and may be associated with neurovascular deficits, muscle-tendon disorders, skin lesions or injuries to other carpal bones. Thus, in this report, one of these rare cases of transtriquetral perihamate fracture-dislocation with carpal instability is described, diagnosed by means of radiography on the right wrist of the patient who presented pain, edema and limitation of flexion-extension of the carpus after trauma to the region. The stages of attending to the case are described, from the initial consultation to the surgical treatment and physiotherapy, which culminated in restoration of the strength and range of motion of the wrist.

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Fratura-luxação transtriquetral peri-hamato: relato de caso

RESUMO

O punho é uma região muito vulnerável a traumas de extremidade. Entre tais lesões, as fraturas do piramidal (ou triquetrum), associadas à luxação do hamate e a instabilidade carpal, são pouco frequentes. Geralmente relacionadas a traumatismos de alta energia, podem estar associadas a déficit neurovascular, miotendíneo, lesões de pele ou em outros ossos do carpo. Assim, neste relato, apresenta-se um desses casos raros de fratura-luxação transtriquetral peri-hamato com instabilidade carpal, diagnosticadas por radiografias do punho direito de um paciente que apresentava dor, edema e limitação da flexoextensão do carpo após trauma.

*Study conducted at the Universidade Federal de Goiás (UFG), Faculdade de Medicina, Hospital das Clínicas, Departamento de Ortopedia e Traumatologia, Goiânia, GO, Brazil.

*Corresponding author.

E-mail: frederico_barra@yahoo.com.br (F.B. Moraes).

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na região. As etapas do atendimento foram descritas desde a consulta inicial até o trata-
mento cirúrgico e a fisioterapia, que culminaram com a restauração da força e da amplitude
de movimento do punho.

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Introduction

Fractures of the pyramidal bone (or triquetrum) in association with dislocation of the hamate and carpal instability
are uncommon, usually related to high-energy trauma, and may be associated with neurovascular deficit, skin lesions,
myotendinous or even other carpal bones injuries. Early diagnosis and treatment of these injuries can prevent
complications.1 Indeed, the stability of the bone-ligament structure of the carpus is essential for its proper functioning.2
This study aimed to report a rare case of transtriquetral peri-
hamate fracture-dislocation and its treatment.

Case report

A 27 year-old male manual laborer, right-handed, presented
to the emergency room with severe pain (VAS = 7) in the right
wrist, edema ++/4+, with limited carpal flexion-extension
without skin lesions or neurovascular deficit. He reported having
suffered a direct trauma to the right wrist on the same day,
which had been crushed between two iron bars at work. Pain
was more intense on palpation of the ulnar region of the wrist,
with a slight crackle and instability.

Right wrist radiographs were made in true anteroposterior,
ulnar deviation, and profile views, which indicated fracture of
the pyramidal and instability of the hamate (Fig. 1).

Patient underwent surgery; a dorsal incision was made,
followed by an open reduction of the hamate-capitate insta-
bility and reduction of pyramidal fracture, which were fixed
with Kirschner wires. Capsulorrhaphy and repair of hamate-
capitate and lunotriquetral ligaments were also performed
(Fig. 2). The wrist was immobilized in a short arm cast for four
weeks, and K-wires were removed after eight weeks. Physi-
cal therapy was initiated after the fourth week. Eight months
after surgery, patient was asymptomatic, with restored range
of motion and strength, comparable to the contralateral side,
with a decrease in the last 10° in extension and flexion on the
right wrist (Fig. 3).

Discussion

The wrist has a complex anatomy, developed for a highly spe-
cialized function, and at the same time it is very exposed to
extremity trauma through various mechanisms. The carpal
bones and ligaments promote a multiplanar mobility and
maintain stability in the various movements performed by the
wrist, such as flexion, extension, radial and ulnar deviation,
pronosupination, and circumduction.3,4

Trauma mechanism of this injury differs from the theory by
Mayfield et al.5,6 of progressive perilunate instability in greater
arc injuries, where the trauma energy passes through the
carpal bones and ligaments from the radial to the ulnar side
in stages, which would be explained in stage 3, with lunotri-
quetral ligament rupture without semilunar dislocation. The
injury described in the present patient indicates the existence
of a greater arc injury in reverse, from ulnar to radial. The
radial carpal bones were spared.7

Moreover, it is certain that the patient had carpal instabil-
ity, which is a disturbance of the static and dynamic balance
between joints under physiological loads and movements.
This loss of stability, which is related to bone and/or liga-
mament injuries, leads to alterations in the joint anatomical
relationships, affecting the biomechanical activity, as well as
generating pain and carpal collapse.8

Fig. 1 – Right wrist X-rays in true anteroposterior (A), ulnar deviation (B), and profile incidences (C), showing pyramidal
fracture and instability of the hamate.
This pattern of carpal injury was studied by Garci-Elias et al., who identified longitudinal and axial carpal instabilities, subdivided into three groups: axial-ulnar, axial-radial, and axial-radial-ulnar. Thus, the reported case would be classified as a longitudinal carpal instability, axial-ulnar subtype, specifically transtriquetral perihamate. It is important to note that the cleavage line in the diastasis between the capitate and the hamate may be subtle and the diagnosis may be overlooked.

Wrist X-rays are usually sufficient for the diagnosis of these lesions; in doubtful cases, CT can better assess fracture lines, and magnetic resonance imaging can identify ligament injury. Impairment of the median nerve is frequent and can trigger carpal tunnel syndrome (compression of the median nerve in the carpal tunnel area), characterized by pain with burning, paresthesia, thenar atrophy, and limitation of activity. Nerve decompression is required. Although a closed reduction and immobilization are initially possible, surgical treatment should eventually be performed to restore the anatomy and stability of the carpus, as was done in the case reported.

**Conflicts of interest**

The authors declare no conflicts of interest.

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