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Contents lists available at ScienceDirect

Journal of Acute Disease

journal homepage: www.jadweb.orgCase report <http://dx.doi.org/10.1016/j.joad.2016.03.016>

A rare case of isolated trapezium fracture in motorcycle polytrauma patient in emergency department

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ARTICLE INFO

Article history:

Received 25 Sep 2015

Received in revised form 24 Oct, 2nd

revised form 27 Oct, 3rd revised form

11 Nov 2015

Accepted 12 Jan 2016

Available online 2 Apr 2016

Keywords:

Trapezium

Isolated fracture

Polytrauma

Trapezium treatment

Hand fracture

ABSTRACT

Medical staff hardly recognize fractures of trapezium due to the small size and the complex anatomy of the wrist and the hand. Seventy percent of all carpal fractures are scaphoid's fractures. Only 0.4% of all carpal injuries are trapezium fractures. In this paper, we presented a case of a high speed trauma where there were only trapezium fractures. Origin, diagnosis, differential diagnosis, treatment and complications are evaluated and described.

1. Introduction

Fractures of trapezium are very rare accounting for about 0.4% of the hand's injuries^[1], while 80% of cases are associated with other carpal metacarpal injuries^[2]. Isolated fracture of the trapezium is often misunderstood for an incorrect radiological diagnosis and can lead to important deficit of hand function unless it was treated early^[3]. In this paper, we reported a case

of a 64-year-old man with isolated trapezium fracture due to a motorcycle accident.

2. Case report

A 64-year-old motorbiker had an accident with a car and he was riding his motorcycle at 70 km/h. In his anamnestic history, he reported a left wrist fracture operated when he was young. He had loss of consciousness for 2 h from the accident. In our emergency department, G. Rummo Hospital, Benevento, Italy, the patient presented at computed tomography epidual haematoma (operated in emergency department), many bruises throughout the body and swelling of his left hand.

Orthopaedics putted a short-arm volar plaster cast to his left hand to treat a soft-tissue injury of the arm. Two days after the trauma, a X-ray of the left hand reported: a lateral fragment dislocation fracture of the left trapezium, type IIb, according to Walker's classification^[4] (Figures 1 and 2).

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Peer review under responsibility of Hainan Medical College. The journal implements double-blind peer review practiced by specially invited international editorial board members.



Figure 1. X-ray in LL and AP projection showed an isolated lateral fragment dislocation fracture of the trapezium. The third images from the left is an representation of Walker's type IIb (Classification of Trapezial fracture)^[4].

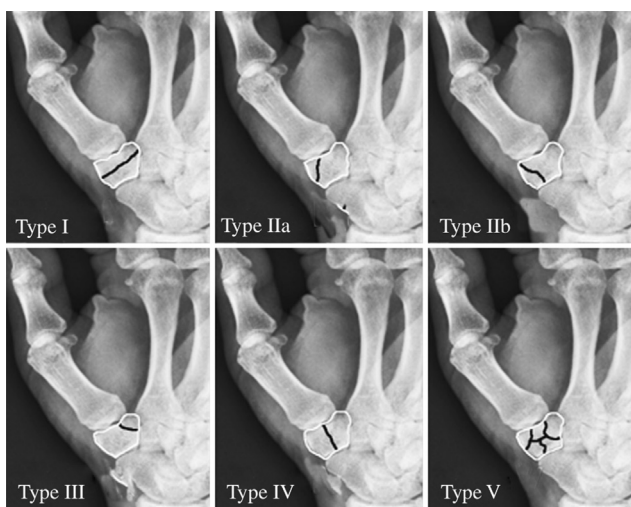


Figure 2. Classifications of trapezium fractures by Walker *et al.*^[4]. Black lines show the fractures^[8].

Five days after the injury, we did the surgery to his trapezium fracture. A percutaneous approach was decided under general anaesthesia. The definitive fixation reached three 1.1 mm Kirschner wires (Figure 3).

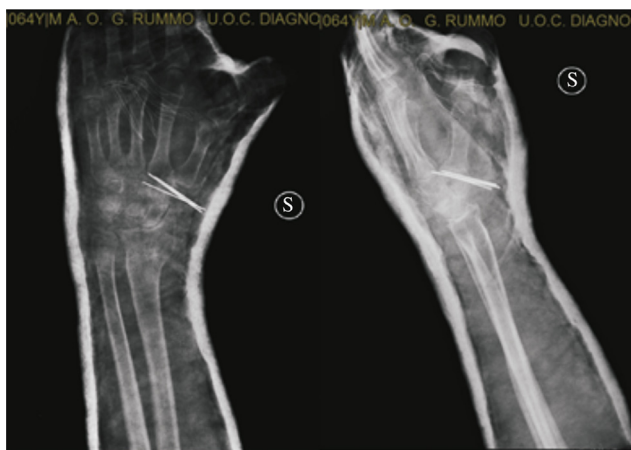


Figure 3. X-ray in the brace (AP and LL projections) after surgery showed the correct reduction of the trapezium fracture.

A week after the first operation, the patient came for medication and the change of gauzes. The patient had not paraesthesia or dysaesthesia in the left radial nerve distribution.

After the 5th week from the surgery, the three 1.1 mm Kirschner wires and cast were removed because the X-ray showed that all were well positioned (Figure 4).



Figure 4. X-ray at the 5th postoperative week, before removing the Kirschner wires. The fracture was consolidated and the joint surface between trapezium and the 1st metacarpal was smoothed anatomically.

The hand therapist started motion and graded strengthening exercises. Six weeks following the percutaneous fixation, the functionality of the patient's hands was assessed. The patient had an excellent range of motion. The left thumb's radial abduction was very similar to the right hand and the joint surface was anatomic.

The patient could go to work and drive his motorbike again with 100% radial abduction of the thumb, normal opposition to the little finger and no local tenderness (Figure 5). The Grind test of the trapezium-metacarpal joint did not show any joint limitations or any roar or pain.

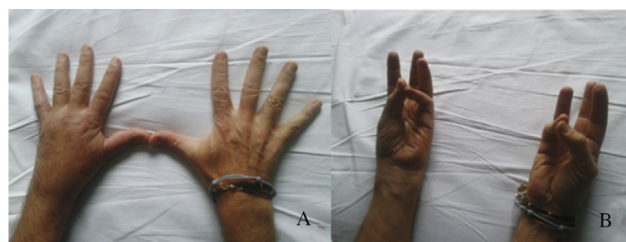


Figure 5. Six weeks after the surgery, the left thumb's radial abduction was the same as the right (A) and thumb's opposition to the little finger was 95% (B).

3. Discussion

Trapezium fractures are rare and unrecognized^[1]. Many authors suggest that incidences of trapezium fractures are more common about 3%–5% of hand injuries^[5]. According to the literature, nearly 50% of the trapezium fractures were a consequence of motorbike accidents^[6], while the others had a high energy trauma^[6]. From laboratory studies we could suggest two common mechanisms of injury^[7].

The first is Falling onto the hand with the extended wrist and the hand in radial deviation.

The second is direct commissural trauma combined with varying degrees of shearing.

The trapezial fractures such as types IIa, IIb, or IV (longitudinally oriented trapezium fractures) are the most reported cases where there is a possibility of a combination of thumb's dislocation and trapezium fracture^[4,8].

Most frequent management and treatment of trapezial fractures can be carried from non-operative techniques^[7,9] (thumb immobilisation in a plaster or other metacarpal-finger types of immobilization for 6 weeks) for open reduction and internal fixation^[1,6,8,10] or arthroscopic methods for internal fixation^[11].

According to expert surgeons, the use of a Kirschner wires can decrease the axial load on the first metacarpus during the early first phase of the healing process^[1,8–10].

Suthersan and Chan^[1] reported in their paper a case of isolated trapezial fracture in a 34-year-old police man caused by a motorbike accident.

The patient was given general anaesthesia. They used an open internal fixation by a dorso-radial approach. They preserved branches of the superficial radial nerve and the radial artery; And a longitudinal arthrotomy was performed to expose the trapezial-metacarpal joint.

The articular surface was reconstructed and the fracture fixed with three 1.3 mm screws. The joint capsule was repaired with a 1.2 Kirschner wire, and the thumb was protected and rested in a plaster splint^[1].

At the 2nd postoperative week, they reported that the altered sensation and dysaesthesia in the radial nerve distribution can be felt by patient; at 5th postoperative week the dysaesthesia improved significantly; after one week from the last clinical control, they removed the 1.2 mm Kirschner wires from the trapezial-metacarpal joint.

A fluoroscopy demonstrated the stability of trapezium-metacarpal joint. One year later, radial abduction of the thumb was at 70%, and the opposition to the thumb was normal. No local tenderness were appreciated^[1].

Anyway, closed reduction and percutaneous pin fixation are of course the most appropriated treatment methods. These types of surgery are both minimally invasive and prevent complications and the loss of reduction^[8].

Our choice of using the percutaneous technique was dictated by the need to save the microcirculation and soft tissues and to avoid a high risk of nonunion trapezium. We did not include a wire stabilizing in the MCP joint for not weakening the MCP joint capsule and not creating a MCP's stiffness after the surgery

and also we did not want to create possible causes for stiffness or post traumatic epiphyseal necrosis.

Even if trapezial fractures are really common, but they are often misunderstood^[1].

Feelings of pain and swelling at the carpal, metacarpal or the thumb after a motorcycle accident should lead the doctor to think about the possibility of a trapezial fracture, and not just to other common carpal injuries^[1].

The percutaneous technique with the aid of immobilization in a plaster cast or brace in our view remains the best possible option for the treatment of fractures of the trapezoid type IIb, according to Walker.

Conflict of interest statement

The authors report no conflict of interest.

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