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Surgery

The Surgical Treatment of the First Metacarpal Fractures in Adults- About 30 Cases

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Abstract **Original Research Article**

This is a retrospective study of 30 cases of first metacarpal fractures in adults collected in our service from March 2015 to March 2018. The average age was 31 years with a male predominance (80%). The etiologies were dominated by domestic accidents (50%). The mechanism of injury was direct in all patients. Imaging confirmed the diagnosis and allowed the classification. Surgery concerned types Rolando (40%), Bennett (30%), extra-articular (20%) and diaphyseal (10%), it consisted of pinning according Iselin 07 cases (70%), ascending pin according Kapandji 02 cases (20%) and direct screw 01 case (10%). Immobilisation after surgery was systematic in all patients (100%) for six weeks. Functional rehabilitation began early in all cases (100%). Bone healing was achieved in 06 to 08 weeks in 100% of cases. A complication was observed in 03 patients (10%), it was a malunion. Our results have been very satisfactory in 90% of cases.

Keywords: Fracture, first metacarpal, hand surgery.

INTRODUCTION

The metacarpals are the long and thin bones that tie the wrist (carpal bones) and the fingers (phalanges) together. As a general rule, fractures of metacarpals result from falling on a stretched hand [1]. The purpose of this work is to determine the role of surgical techniques in the treatment of fractures of the first metacarpal.

MATERIAL AND METHODS

This is a retrospective study of 30 patients over a 03-year period between March 2015 and March 2018. Our study denoted an age between 18 and 49 with an average of 31 years old. 80% of the patients were represented by men (24 men). All patients were right-handed; the injury was on the dominant side (20 patients) in 2/3 of all cases. In 50% of the cases the fractures were due to a domestic accident, 30% of the injuries were due to an occupational accident (recoil movement of the rifle on the thumb); and 20% of them happened because of a sports accident. It was a direct fracturing mechanism for all patients. Rolando's fracture was found in 40% of cases (12 cases), Bennett's fracture was diagnosed in 30% of cases (or 9 cases), the extra-particular type was found in 20% (or 6 cases), the diaphysial type was diagnosed in 10% (or 3 cases) (figures1-3). Clinically, all patients had total pain and functional impotence with oedema and deformity.

We operated on our patients under locoregional anesthesia, in dorsal decubitus position, the concerned limb was put on a shelf with the brightness amplifier in place, a tourniquet is used only in case of an open fracture).

RESULTS

70% of the patients benefited from an «Iselin» skewer (figure4), 20% benefited from a "Kapandji" skewer (figure5), and 10% of the patients benefited from direct screwing. The immediate postoperative course was uneventful. The removal of osteosynthesis equipment and the rehabilitation process started from the 6th week. There were 03 cases of malunion, whereas there were no cases of infection or stiffness. 27 of our patients had good Kapandji scores (Figure2) and a good joint congruity, moreover, 03 patients Kapadji scores were considered good enough with a fairly good joint congruity. The grip strength was good for all patients.

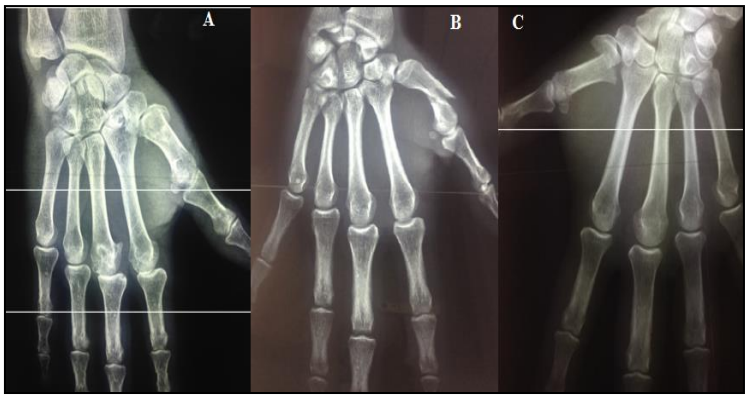

Fig-1: first metacarpal fractures: A- Bennett's fracture typeA B- Diaphyseal fracture C- Extra-particular type

Fig-2: Kapandji Scor: Quotation of the opposition of the thumb [3]

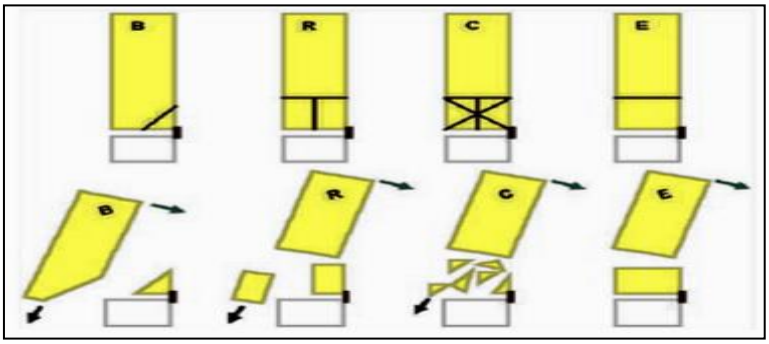

Fig-3: Classification of the fracture of the base of the first metacarpal: Bennett (B) Rolando(R) Comminuted fracture(C) Extra articular (E) [2]

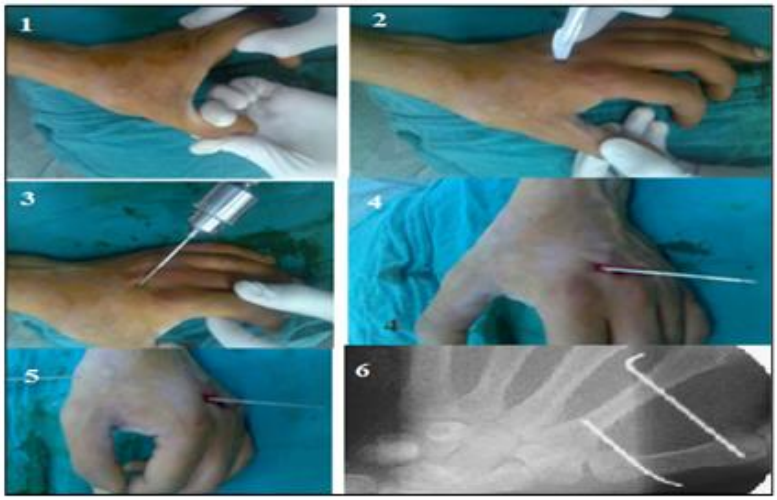

Fig-4: Iselin skewer

Fig-5: Kapandji skewer

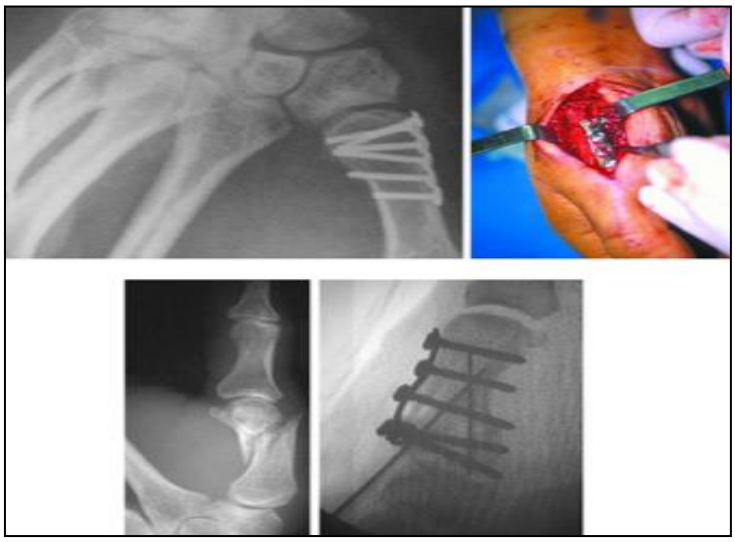

Fig-6: Osteosynthesis by L-plate

DISCUSSION

Fracture of the first metacarpal occurs mainly among young subjects, mostly due to a domestic accident or an occupational one [4-7-8].Clinically, pain with oedema, deformation, and shortening of the thumb are its manifestations. X-ray sometimes presents problems related to the partial superposition of the bases of the first and second metacarpals. Kapandji described two specific impacts [6]: thumb seen from front and side. These impacts allow us to classify these fractures: Base fractures, diaphysical fractures, cervical fracture and head fracture of the first metacarpal.

Base Fractures are the most common [4-9] and can be articular or extra articular (figures 1-3): there are two articular types: Bennett which is a fracture dislocation of the trapezoid metacarpal (1.4% of the fractures of the hand), it was the most frequent one in our series. Then comes the Rolando fracture, which has two separate articular fragments, one is dorsal while the other is palmar, with a metaphyseal line separating these two fragments from the diaphysis.

The other types of this fracture are rare, such as the fracture of the neck of the first metacarpal, which is most noticeable in boxers. Our series denoted no such case.

The treatment of joint fractures is always surgical, either percutaneously using «Iselin» or «Kapandji» type pinning (figures 4-5) that will be removed 6 weeks later followed by functional rehabilitation, or surgically using either more or less miniaturized osteosynthesis materials (plate, blade plate, L-plate, T-plate, mini bolts) (figure6) or 14-month absorbable materials, either in the form of pins or screws, or staples. The stability obtained by these processes allows immediate mobilization under the guise of a metacarpal hull orthosis.

The prognosis of the fractures of the first metacarpal mainly concerns the joint fractures of Bennett and Rolando, because of the risk of osteoarthritis or stiffness of the trapezoidal metacarpal joint. Subsequently, a perfect joint reduction and an appropriate functional rehabilitation are essential [10].

CONCLUSION

The first metacarpal plays a fundamental role in the biomechanics of the hand. Thus a poorly treated

fracture may affect the function of the hand. Some fractures of the first metacarpal are essentially surgical. Their reduction and stabilization remain important to allow early mobilization which is be the best way to avoid swelling, joint stiffness and tendon-periosteal adhesions. Neglect of these fractures can result in serious consequences.

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