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Case Study

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SURGICAL MANAGEMENT OF OPEN FRACTURE DISTAL RADIUS WITH EXTERNAL FIXATOR AND KIRSCHNER'S WIRES: A CASE REPORT

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ABSTRACT

Fractures of distal radius account for up to 20% of all fractures treated in emergency department. Treatment options include conservative management, internal fixation with pins, bridging and non-bridging external fixation, dorsal or volar plating with/without arthroscopy assistance. We report herein, a case of 45-year-old female with grade II open fracture of right distal radius with disruption of distal radioulnar joint. This patient was managed successfully with application of external fixator and kirschner's wire which results in favourable outcome.

KEYWORDS: External fixator, Radioulnar joint, Ligamentotaxis.

INTRODUCTION

The distal radius fracture has been an orthopaedic conundrum since its description by Colles in 1814.[1] Open distal radial fractures are an uncommon mode of injury in the upper limb and there is little information in the literature regarding their management. Prevention of infection, healing of the fracture and restoration of function are the primary objectives in the treatment of open fractures. External fixator use for distal radial fracture stabilization, which began over a half century ago in the United States, has provided improved anatomical and clinical results in 80-90 percent of patients as shown by several studies.[2-4] In present case study we evaluate the outcome of open fracture of distal radius managed with debridement and application of external fixator.

CASE PRESENTATION

A 45-year-old woman presented to emergency with history of fall from height, with an isolated grade II open fracture of right distal radius with disruption of distal radioulnar joint and volar wound (Figure 1). The fracture is intra articular, notably displaced and unstable before reduction (Figure 2). Initially patient was managed with emergent operative wound irrigation, debridement, administration of intravenous antibiotics and tetanus prophylaxis. In addition, immediate skeletal stabilization of the fracture was obtained by means of an external distal radius fixator and Schanz screws in the shaft of the second metacarpal and in the distal radius shaft under axillary block. Due to the clamps, which permit independent fixation of the Schanz screws and stainless steel rod, the fracture was optimally reduced (Figure 3 and 4). The reduction of fracture was performed by conventional traction on the first and second finger (thumb and index finger) and counter traction on the forearm. After reduction, both axis set screws were fixed jointly in a single step and two additional Kirschner wires were inserted percutaneously under fluoroscopic control to lock in the radial styloid buttress and support the elevated lunate fossa fragment (Figure 3 and 4). The distal radioulnar joint disruption fixed with two Kirschner wires. The traumatic wound was loosely approximated. The patient received 5 days course of parenteral antibiotics. At follow-up, wrist motion was evaluated by the Gartland and Werley[5] clinical scoring system and the patient had a good result without complications.

Figure 1: Open distal radius fracture.

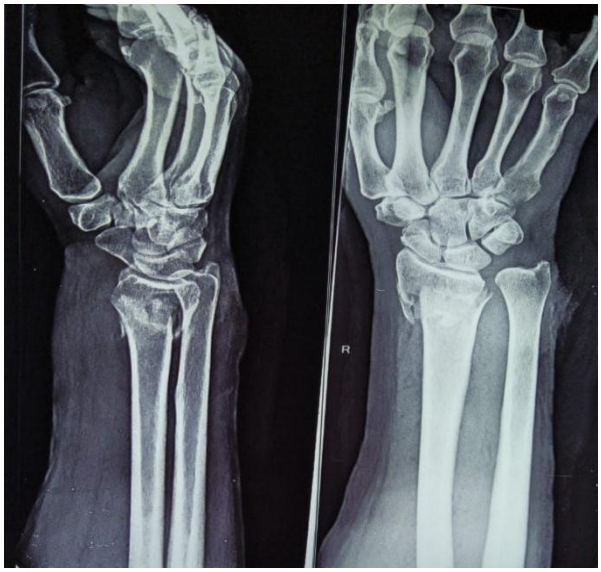

Figure 2: Displaced and unstable intra-articular fracture of the right distal radius.

Figure 3: Fracture reduction with external fixator and Kirschner's wires (Antero-posterior view).

Figure 4: Reduction of fracture with Kirschner's wires and external fixator (Lateral view).

DISCUSSION

Open fractures are complex injuries that involve both the bone and surrounding soft tissues and management goals are prevention of infection, union of the fracture and restoration of function.[6] Achievement of these goals requires a careful approach based on detailed assessment of the patient and injury. Open fractures of the distal radius with lower grade soft tissue injuries treated with debridement and definitive fixation were found to do as well clinically, radiographically, and functionally. External fixation for fractures of the distal radius has been used for almost 80 years.[7] Although volar plate fixation is currently popular, the indications for external fixation remain largely unchanged.[8] External fixation of distal radius fractures typically relies on ligamentotaxis to obtain and maintain a reduction of the fracture fragments. As longitudinal traction is applied to the carpus, the tension is transmitted mostly through the radioscaphocapitate and long radiolunate ligaments to restore the radial length.[8] Traction does not correct the dorsal tilt of the distal fracture fragment because the stout volar radiocarpal ligaments are shorter, and they pull out to length before the thinner dorsal radiocarpal ligaments exert any traction. Excessive traction may increase the dorsal tilt. With intra-articular fractures, ligamentotaxis reduces the radial styloid fragment, but it does not reduce a depressed lunate fragment.[8] For the aforementioned reasons, the technique of augmentation of external fixation employs the use of percutaneous Kirschner's wires to secure the radial styloid fragment as a lateral buttress, elevate and fix in place the depressed lunate fossa fragment.[9] Given the paucity of data, the current treatment strategy is generally guided by both opinion and a larger literature on the treatment of open hand and forearm fractures. The current opinion is unless a patient is too medically unstable owing to other injuries, the open wound should be debrided and the stabilization of the fracture with an external fixator on the day of presentation is a valuable option.[10]

CONCLUSION

We would like to conclude that the open fractures of the distal end radius can be managed with the external fixator augmented with k-wires. Proper preoperative planning, good reduction and surgical technique leads to high rate of bone union, minimal soft tissue damage and complications.

Conflict of interest: All authors declare they have no conflict of interest.

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