

Case Report

Simultaneous ipsilateral fractures of both proximal and distal ends of radius or bipolar fracture of radius with olecranon fracture

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ABSTRACT

The combination of simultaneous fractures of both the proximal and distal end of radius is rare. Only a few cases had been mentioned in the literature. They are also termed as “bipolar fractures of radius”. The association of olecranon fracture with this combination is again very rare. The management protocol is also not very clear. Maintenance of the radius length is perhaps the main crux of treatment, since it takes part in both the proximal and distal radio-ulnar joint. Implant choices can be varied from rigid plating to percutaneous fixation. Radial head can be reconstructed or replaced depending on the fracture comminution. Post-operative rehabilitations also need to be tailored. Rigid fixation like plating favored early mobilization, while semi rigid fixation may need a period of immobilization. Regular follow up and guided physiotherapy optimizes good clinical outcome in such rare combinations of fracture.

Keywords: Ipsilateral, Bipolar, Distal radius, Proximal radius, TENS, TBW

INTRODUCTION

The simultaneous fracture of both the proximal and distal end of the radius in one incident is relatively rare occurrence. Only a few cases had been reported in the literature so far.¹⁻⁶ They are often termed as ‘bipolar fracture of the radius’ as it involves both the ends of the radius.⁴ These ipsilateral fractures of both the proximal and distal radius often pose treatment dilemma, like the sequence of fixing the fractures, choice of implants, and post-operative rehabilitation protocols. The scenario again gets more complicated if they are associated with dislocation of the elbow or fractures of other area like the olecranon or shaft of ulna.⁷⁻⁹ During treatment also, the maintenance of the length of the radius is of utmost importance as reduction of the length may alter the biomechanics of the radio-ulnar joints especially the DRUJ. Therefore, fracture reduction and the choice of implant is also very important. Rigid fixation often allows early mobilization of the joints, while semi-rigid fixation requires guarded mobilization protocol.⁴⁻⁶

We are presenting here a case of ipsilateral proximal and distal radius fracture resulting from fall, associated with fracture of the olecranon process of the same side ulna. Both the fractures were addressed by minimally invasive percutaneous fixation methods, while the olecranon fracture was dealt with traditional open reduction and internal fixation with tension band wiring construct.

CASE REPORT

A 56 years male sustained injury to his left elbow and wrist following fall from a bicycle on outstretched hand. He was presented to the emergency department where all the vitals were assessed and stabilized. The X-rays of the left elbow and wrist done and found to have distal radius fracture as well as fracture of the ipsilateral radial neck along with displaced olecranon fracture of left ulna (Figure 1). The distal radius fracture was an AO type A extra-articular fracture with mild dorsal and lateral tilt. The ipsilateral radial neck fracture was a Mason type 3 fracture. The

olecranon fracture was typical transverse avulsion fracture with gross displacement and retinacular tears.

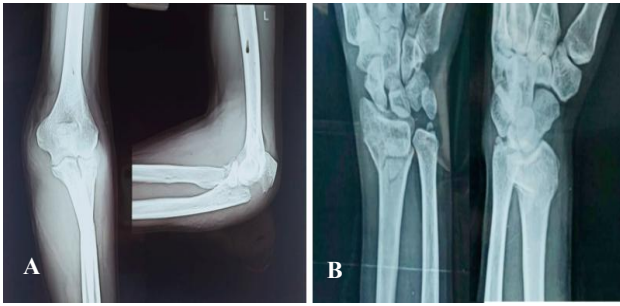


Figure 1(A and B): Fracture of the radial head, olecranon and distal radius.

Surgical fixation of the fractures was decided and after pre-anesthetic check-ups the patient was taken for surgery. Since there were three fractures and one in the same radius the sequence of fixation was a thing to ponder. The length of the radius should be re-approximated accurately not to have any deleterious effect on the DRUJ later on. Also the fixation of the olecranon should be adequate to allow early mobilization of the elbow, considering the loss of range of movement after two fractures around the elbow. Therefore, it was decided to fix the olecranon first and carried out nicely by a tension band wiring construct. Then the distal radius was reduced closed under Image intensifier and percutaneously fixed with two 2 mm K wires (Figure 2).

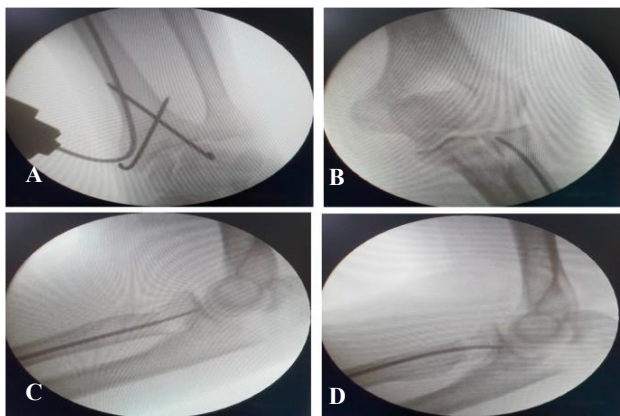


Figure 2 (A-D): Image intensifier view of proximal and distal radius fractures.

While putting the K wires, the radial styloid process area was kept unoccupied intentionally. Then a 2.5 mm titanium elastic nail was introduced through the radial styloid process and carefully negotiated up to the proximal fracture. The radial neck fracture was reduced closed under image intensifier and the TEN was pushed to cross the fracture and engage in the head fragment. Mild rotation of the elastic nail was done to fine tune the reduction of the fracture. Upon satisfactory reduction, the TEN was bent at the styloid process and cut to bury under the skin (Figure 3).

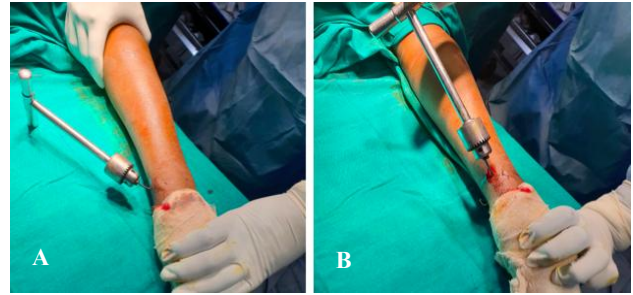


Figure 3 (A and B): Introduction of titanium elastic nail through styloid process.

The immediate post-operative X-rays showed good alignment and there was no reduction of the overall length of the radius and the fracture seemed reduced (Figure 4). The wrist was immobilized with a below elbow POP slab and the elbow was mobilized slowly once the pain became tolerable.



Figure 4 (A-C): Immediate post-operative X-rays.

After six weeks the percutaneous K wires of the distal radius were removed and mobilization of the wrist began along with the elbow. The six week follow up x-ray showed mild displacement of the radial neck fracture, however the pain was minimal and the callus response was there (Figure 5).



Figure 5 (A-D): Follow up X-rays at 6 weeks.

We continued gentle physiotherapy of wrist and elbow as well as finger and shoulder mobilization exercises. At 14 weeks follow up; he regained almost pre-injury level range of movements of elbow and wrist (Figure 6).



Figure 6: Functions of elbow and wrist at 14 weeks.

Radiologically also, all the fractures healed nicely though there was mild displacement of the radial neck fracture (Figure 7). The length of the radius was maintained and there was no pain in the DRUJ area.



Figure 7 (A-D): Follow up X-ray at 14 weeks.

DISCUSSION

The simultaneous fracture of both the proximal and distal end of radius is a rare event. They are also referred as “bipolar fracture of radius”.⁴ The exact mechanism for such involvement is also not known. Most probably the energy got dissipated between both the ends and causes the fractures. The distal radius may first absorb the major portion of the force generated due to fall and fractures first, and then the force transmits axially to the proximal part. The proximal radius also suffers due to the sudden movement of the elbow joint, most likely valgus, flexion and rotational element. This may also cause dislocation of the elbow.⁸⁻¹¹

The treatment approach for such unusual fractures is also not well defined. The conventional wisdom of fracture management helps. The length of the radius must be restored in such cases. The distal radius fractures are notorious for collapse during treatment resulting deformity of wrist and poor functional outcome.¹² Therefore, the distal radius fracture should be managed accordingly to prevent such collapse. Open reduction and internal fixation with plating or percutaneous K-wires can also serve the purpose.^{2,5} Similarly, to maintain the radius length, the

proximal radius fractures should also be managed by surgical reconstruction. Intramedullary flexible nails or plating can be an option for reconstruction. In case of fracture comminution, the radial head can be replaced by prosthesis.^{6,13}

In case of associated elbow dislocation, it is reduced closed before undergoing open reduction of the radius fractures. Rarely, it may be necessary to go for open reduction in late presented cases. Olecranon fracture is fixed by ORIF with tension band wiring.^{8,9}

The post-operative rehabilitation protocol is also debatable. If both the fractures are stabilized by rigid fixation by plating, then early mobilization should be the rule. However, in hybrid fixation like in the presented case, association of elbow dislocation or olecranon fracture, it is prudent to immobilize the limb for at least three weeks, and then mobilize gradually.

CONCLUSION

The ipsilateral fractures of both proximal and distal end of radius, is a very rare combination. Sometimes they may be associated with elbow dislocation or fracture of the olecranon. The exact treatment protocol is still not well defined. They should be surgically managed with an aim to maintain the length of the radius. Choice of implant depends upon the availability, expertise of the treating surgeon and of course the fracture configuration. Good results can be expected after tailored post-operative mobilization protocol.

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