

Functional Outcome of External fixator in Intra Articular Distal Radius Fractures

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ABSTRACT

Introduction: Fractures involving the distal end of radius are one of the most common injuries encountered in Orthopaedics. 90% of these fractures were treated with closed reduction and cast application. The aim of this study is to assess the efficiency of external fixators in the management of intra articular fractures of distal end of radius.

Materials and Method: Prospective study of forty patients with intra-articular fractures of the distal end of radius treated with external fixator from June 2013 to Dec 2015. All the patients were evaluated using x rays in posteroanterior and lateral views. The fractures were classified according to Frykman classification. All the cases were followed at an interval of 6 weeks, 3 months and 6 months. The follow up ranged from 1 month to 6 month with an average of 3 months. The Demerit point system Gartland and Werly score was used to evaluate the end results.

Results: We had excellent results in ten cases, good in twenty patients, fair in eight patients and poor in two.

Conclusion: We conclude that in younger age group [<50], ligamentotaxis by external fixation consistently results in a favourable outcome in the management of intra-articular distal end of radius fractures.

Keywords: Distal radius, External Fixator, Intra articular Fracture, Ligamentotaxis.

INTRODUCTION

Fractures involving the distal end of radius are one of the most common injuries encountered in orthopaedics.¹ Even though union of these fractures occurs, it has a very high incidence of malunion and joint disability and instability especially those with comminution and intra articular extension. Moreover there is a changing trend in the age group, seen more commonly in the younger age group as a result of Road traffic accidents and trauma, leading to more complicated fractures. Anderson and O'Neil were the first to introduce the use of external fixation in the treatment of these fractures.² Since then there is a trend to use external fixators in management of these fractures as these give improved results both functionally as well as improved anatomic reconstruction. With better understanding of the principles of external fixation, this procedure has become an indispensable tool in the management of intra articular distal end of radius fractures. The aim of this study is to assess the efficiency of external fixators in the management of intra articular fractures of distal end of radius.

MATERIALS AND METHODS

Prospective study of forty patients with intra-articular fractures of the distal end of radius treated with external fixator from June 2013 to Dec 2015. The patients came with com-

plaints of deformity, pain and swelling of the wrist associated with restricted and painful movements, of the wrist. None of the cases in our study had any median nerve involvement or any tendon injury. All the patients were evaluated using x rays in posteroanterior and lateral views.³ In this study of 40 patients, there were 26 males constituting 65% and 14 females constituting 35% indicating that males were more affected. The youngest patient was 19 years old and the oldest patient was 70 years old. The mean age group was 38.5. There were 30 cases of road traffic accidents, 10 cases of fall on out stretched hand. The fractures were classified according to Frykman classification⁴ and there were 20 cases of type III fracture (50%), 12 cases of type VIII fracture (30%), 8 cases of type VII fracture (20%).

Regional Anaesthesia was given in all cases. The patient was placed supine on the operation table. No Tourniquet was used. Intravenous antibiotics 1 gm of ceftriaxone was administered before the start of the procedure. The arm, Forearm, hand was scrubbed with Betadine scrub and was painted with betadine and spirit and then draped. Under C arm control closed reduction of the fracture was carried out and fixed with pins and mini external fixator. Under image intensifier guidance, further distraction if necessary was carried out. At the end of the procedure sterile dressing was applied over the pins. No cast or splint was given. Antibiotics [Intravenous] was continued over the next post-operative day and was then switched over to oral antibiotics (cefuroxime 500 mg tid) for the next 5 days. All the cases were operated within 1 to 3 days of injury.

Immediate post-operative check x-rays were taken in both AP and lateral views. Active exercises of all the fingers, Elbow and shoulder were carried out. The patient was discharged on the 2nd post-operative day after the first dressing change the patient was called for inspection and dressing change at the interval of one week for the next 6 weeks. The patient was assessed subjectively for pain at the fracture site; clinically for tenderness and loosening of the pins.

The external fixator was removed on the 6th week with out

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any anaesthesia. Check X - ray was taken in both AP and lateral view. The range of motion at the wrist was recorded and any deformity was assessed. Physiotherapy was carried out regularly for 2 weeks. All the cases were followed at an interval of 6 weeks, 3 months and 6 months. The follow up ranged from 1 month to 6 month with an average of 3 months. There was loosening of pins in only one case during the 4th week for which the fixator was removed on the 5th week. Following removal no displacement was noted. The Demerit point system Gartland and Werly score was used to evaluate the end results.⁵

RESULTS

We had excellent results in ten cases. They had no deformity of the wrist, and there was no pain. There was no restriction of movement of wrist and forearm. They did not have any complications. Twenty patients had good results. They had no deformity of the wrist but had some limitation of wrist movements. We had fair results in 8 patients who had pain, limitation of movement at the wrist that was less than 50% of that of normal. Poor result was seen in two patients. They had almost stiff wrist and finger. The results were tabulated in table 1.

DISCUSSION

Fractures of the distal end of radius continue to be one of the most common skeletal injuries of the upper limb. These fractures are frequently articular injuries resulting in disruption of both the radiocarpal and distal radio ulnar joints. In our series the majority of the cases of intra – articular fractures of distal end of radius were seen in the younger age group of patients with road traffic accidents [Fall from Motor bike] being the most common.

Several authors have stressed that a good functional outcome usually accompanies a good anatomical result.^{6,7} The application of cast in these patients would lead to loss of reduction and a poor functional outcome. In displaced intra articular fractures of distal radius, reduction is easy to achieve but difficult to maintain, due to intraosseous crushing, there is a void at the fracture site which can heal only after collapse, this collapse can be prevented by stabilizing either by packing corticocancellous bone graft in the void or by using metal to hold the fracture in place.

External pins through metacarpals rigidly fixed by distractor to distal part of radius probably provide the best stabilization for lower end radius fracture.⁸ This produces traction effect on comminuted distal radius; this effect has been called as ligamentotaxis. The tensile distraction of radius helps in healing of comminuted dorsal fragment to heal without displacement. External fixation also provides for retention of an anatomical reduction of the volar cortex obtained by traction with gentle manipulation. The distal fragments therefore are stabilized volarly, dorsal displacement is prevented and so is angulation. For an optional outcome selection of the patients is very important. Unreliable and poorly motivated patients are not the ideal candidates for external fixation. In our results, all the younger patients have had good and excellent results while the older patients (i.e. 50 – 70 years) have developed the complications. One patient (male) developed pin loosening on the 4th week. The fixator was removed on the 5th week. The pin loosening could be as a result of osteoporosis. Another elderly patient developed shoulder hand

S. No	Results	No. of cases	Percentages
1	Excellent	10	25%
2	Good	20	50%
3	Fair	8	20%
4	Poor	2	5%
5	Total	40	100%

Table-1: Results of operative treatment

syndrome. Even the remaining elderly patients had only fair to poor results.

Hence in our study the external fixators proved to be effective in younger patients but not very effective in elderly patients. In the literature the duration of fixation varies from 4 weeks to 10 weeks. In our series external fixation was maintained for 6 weeks. We had a high rate of excellent to good results and a low rate of complications.

CONCLUSION

External fixation engaging 4 cortices enhances the rigidity of the fixation, maintained for 6 weeks resulted in complete bony union of fracture. Good anatomical reduction was achieved by using ligamentotaxis with external fixator. Good wrist function can be achieved by removing the fixator in 6 weeks time. We conclude that in younger age group [<50], ligamentotaxis by external fixation consistently results in a favourable outcome in the management of intra -articular distal end of radius fractures.

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