A comparative study of functional outcome of intraarticular distal radius fractures treated with K wire versus conservative management

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Abstract

Background: Intraarticular distal radius fractures are commonly seen fractures of upper extremity showing bimodal distribution in paediatric and elderly adults. The age distribution of distal radius fracture is typically peaks in the 5-14 year age group and also peaks in elderly patients more than 60 years of age.

Aim: To compare the functional outcome of intraarticular distal radius fractures treated with k wire versus conservative management

Material and methodology: Study was conducted between July 2020 to December 2021 in department of orthopaedics, RMMCH, 20 patients with intraarticular fractures of distal radius were included in the study. 10 patients were treated with k wire/ligamentotaxis with k wire, 10 patients were treated with conservative methods. Follow up was done for a minimum period of 6 months, functional outcome was assessed using Quick DASH Scoring system

Results: The functional outcome in the k wire group was 12.9 which was found to be better than the conservative group 17.49. No poor outcome was seen in the k wire group. 2 patients had poor outcome in conservative group. Mal union was found in 2 patients in conservative group. No patients had malunion in k wire group. Superficial pin site infection was found in one patient. Stiffness was found in 1 patient in k wire group and 3 patients in conservative group

Conclusion: In our study the functional outcome results were better in the patients managed with surgical intervention by percutaneous fixation using K wire/ligamentotaxis with k wire than patients managed with conservative method by closed reduction and cast immobilisation.

Keywords: Intraarticular distal radius fracture, K - wires, ligamentotaxis, conservative

Introduction

Intraarticular distal radius fractures are commonly seen fractures of upper extremity showing bimodal distribution in paediatric and elderly adults [1]. The age distribution of distal radius fracture is typically peaks in the 5-14 year age group and also peaks in elderly patients more than 60 years of age. The common mechanism of injury of Intraarticular distal radius fractures involves fall on outstretched hand and high energy trauma in form of road traffic accident. The optimal management of these fracture plays a vital role in the daily activity of the patients. Traditionally distal radius fractures were treated with conservative management with POP application. There is an increase in trend towards operative management [2]. The goals of treating intraarticular distal radius fractures are articular congruity, radial length and alignment, functional mobility [3]. In this study we have compared the functional outcome of intraarticular distal radius fractures

Classifications
1. Frykman classification
2. AO classification
3. Gartland and Werley
4. Melone
5. Fernandez
Material and Methodology

Study was conducted between July 2020 to December 2021 in department of orthopaedics, RMMCH, 20 patients with intraarticular fractures of distal radius were included in the study. 10 patients were treated with k wire/ligamentotaxis with k wire, 10 patients were treated with conservative methods. Follow up was done for a minimum period of 6 months, functional outcome was assessed using Quick DASH Scoring system.

Inclusion Criteria

- Age within 20 to 80 years
- All intraarticular distal radius fractures without any neurovascular deficits.
- Patients agreement to participate in the study and have signed the informed written consent form.

Exclusion Criteria

- Previous history of any distal radius fracture or surgery to the wrist.
- Associated fractures of the ipsilateral upper limb.
- Age less than 20 years, more than 80 years.
- Patients with any neurovascular deficit.
- Patients in whom functional outcome was not been able to assess due to any cognitive impairment.
- Compound fractures.

Informed consent was obtained from all the patients undergoing the study. A through history was taken and clinical evaluation was done. Neurovascular examination was done temporary splinting was done and radiographs were taken.

Results

- The total study population was 20 patients.
- 10 patients were treated with percutaneous k wire fixation.
- 10 patients were treated with conservative management.
- In both the groups male preponderance was found 70% in k wire group and 60 % in conservative group.
- Both groups were followed up for 1 year. The functional outcome in the k wire group was 12.9 which was found to be better than the conservative group 17.49.
- No poor outcome was seen in the k wire group. 2 patients had poor outcome in conservative group.
- Mal union was found in 2 patients in conservative group. No patients had malunion in k wire group.
- Superficial pin site infection was found in one patient.
- Stiffness was found in 1 patient in k wire group and 3 patients in conservative group.

<table>
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<th>Table 1: Results of K-wire vs conservative</th>
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<td>Pin site infection</td>
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Case Illustrations

Case 1 34/M

Graph 1: Functional Outcome

Pre op x-ray

Post reduction

Immediate Post op x-ray
1 Month Follow Up

6 Months Follow Up

Functional Outcome
Distal radius fracture in patients were traditionally treated with closed reduction and cast immobilisation. This avoided the need for surgical intervention and related complications. But cast immobilisation couldn’t maintain the length and rotation of the distal fragment especially in fractures that had comminution. Loss of reduction was usually noted around the second week of initial reduction. Articular incongruity and distal radioulnar joint instability resulted in poor functional outcome in patients treated with conservative management.

In patients with persistent dorsal tilt resulted in dorsal overload and which lead to secondary carpal bone disease. J. song et al. have shown that 30% of patients treated with cast immobilisation showed unsatisfactory results 

A. Daniel et.al 51.4% unsatisfactory results were seen with closed reduction and cast in the treatment of comminuted intraarticular fracture of distal radius.

Although the final functional outcome in elderly patients were independent of radiological outcome as per some authors like E. Spira et al. 

Discussion

Functional Outcome
Considering the benefits of closed reduction which preserve the fracture haematoma and follows biological healing, percutaneous fixation with k wires has an advantage of utilising these principles and also can avoid complications like loss of reduction and can address distal radioulnar joint instability [4, 10].

In study done in 2015 by Lolade Giwa et al. which compared closed reduction and casting, with percutaneous K-wire fixation of Distal radius fractures, and found that patients treated with K wire was associated with better grip strength and hand function at 6 months with reduced risk of displacement [8].

Abhishek K Das et.al. in his study of percutaneous pinning and cast immobilization of the fracture found (81.25%) had excellent to good functional outcome. The study also concluded that, percutaneous pinning of distal radius fractures combined with early physiotherapy with wrist mobilisation provided good functional outcome and no loss of fracture alignment [9].

In our study 90% of the patients in k wire group showed excellent to good functional outcome 10% of patients showed satisfactory outcome.

In Conservative management group 50% of patients had excellent to good outcome and 30% had satisfactory outcome and 20 % had poor outcome. Also the malunion and stiffness rates were higher in conservative group.

Conclusion
In our study the functional outcome results were better in the patients managed with surgical intervention by percutaneous fixation using K wire/ligamentotaxis with k wire than patients managed with conservative method by closed reduction and cast immobilisation. Since the sample size of the study being small larger study survey is needed to correlate the superiority of methods of fixation and fracture patterns affecting the functional outcome.

Reference