

Functional Outcome of Column Specific Fixation for Intraarticular Distal Radius Fractures with K Wires

Dr. A Manikandarajan¹, Dr. Dhanpal Singh², Dr. M.Gurumoorthy³,
Dr. J B Beffrin Rex⁴

^{1,3}Assistant Professor in Orthopaedics, Rajah Muthiah Medical College, Annamalai University

²Professor in Orthopaedics, Rajah Muthiah Medical College, Annamalai University

⁴Postgraduate in Orthopaedics, Rajah Muthiah Medical College, Annamalai University

Corresponding Author

Dr. M.Gurumoorthy

Assistant Professor in Orthopaedics, Rajah Muthiah Medical College, Annamalai University

ABSTRACT

Background: Distal radius fractures shows Bimodal distribution about 25% of the fractures in paediatric age group and 18% fractures in adults. The goals of treating distal radius fractures include articular congruity, radial alignment and length, functional mobility, stability.

Aim: To assess the functional outcome of column specific fixation for intraarticular distal radius fractures with k wire

Material and Methodology: Study was conducted between July 2019 and July 2021 in department of orthopaedics, RMMCH, 23 patients with intra articular distal radius fracture were included in our study. Follow up was done for a minimum of 6 months period, functional outcome was assessed using the Quick DASH scoring system

Results: Of the 23 patients based on our quick DASH scores

- Excellent to good results were obtained in 20 patients
- Satisfactory results were seen in 3 patients
- None of the patients had poor results
- Two patients had wrist stiffness attributed to the non compliance with physiotherapy for mobilisation
- One patient had mal union due to malreduction attributed to the late presentation to hospital

Conclusion: Column specific fixation with k wire is a less invasive method of treatment of intraarticular distal radius fractures. Although complications like stiffness and malunion were noted it was due to non compliance and late presentation. Hence we would like to conclude that column specific fixation of intraarticular distal radius fractures with k wire shows good long term functional outcome.

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

Introduction

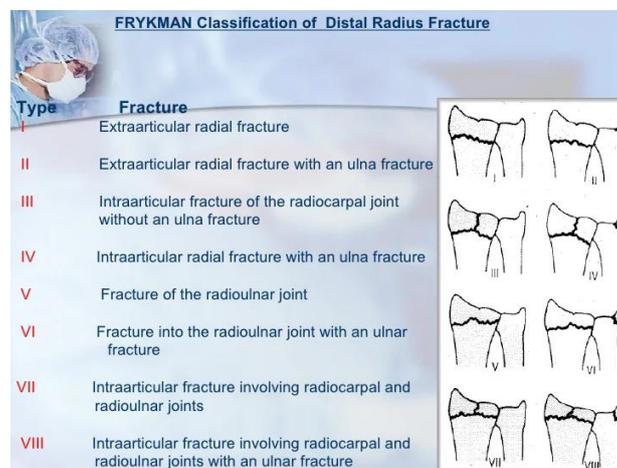
Intra articular fractures of the distal radius are common fractures of the upper extremity. It shows Bimodal distribution about 25% of the fractures in paediatric age group and 18% fractures of adults comes under distal radius fractures. High energy trauma can also result in intra articular fracture in young individuals.^[1] Since functional mobility of the wrist and hand is of significant importance for daily activity of the patients the optimal treatment and functional outcome of these fractures are of significant importance. Intra articular distal radius fractures has its own unique issues in fixation.^[2]

Distal radius is surrounded by complex network of tendons, neurovascular structures, retinacular sheaths which makes it difficult for fixation using bulky plates also the use of screws can cause iatrogenic comminution since the distal fragments may be too small to provide adequate screw purchase.^[3,4]

The goals of treating distal radius fractures include articular congruity, radial alignment and length, functional mobility, stability.

Classifications

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



Materials and Methodology

Study was conducted between July 2019 and December 2021 in department of orthopaedics, RMMCH, patients with intra articular distal radius fracture were included in our study. Follow up was done for a minimum of 6 months period, functional outcome was assessed using the Quick DASH scoring system

Inclusion criteria

- Age more than 20 years and less than 80 years
- All intraarticular distal radius fractures without neurovascular deficits undergoing surgical fixation.
- Patients agreement to participate and sign the informed written consent form

Exclusion Criteria

- Previous history of distal radius fracture or surgery.
- Associated fractures of the upper limb.
- Age less than 20 years and more than 80 years
- Patients with neurovascular deficit
- Patients with cognitive impairment

Operative protocol

Patients with minimal or no comminution in fracture site were fixed with k wires without ligamentotaxis. Patients with distal radioulnar joint disruption were treated with additional radioulnar k wire and patients with comminution in fracture site were subjected to ligamentotaxis with augmented k wire

Post operative protocol

Patients were immobilised with below elbow POP cast for a period of 6 weeks

Implant exit was done after 6 weeks

Mobilisation of wrist was done after implant exit

Follow up Xray's were taken on 3,6,12 months post operatively

Functional outcome scoring was done on 3,6,12 months postoperatively

www.orthopaedicscores.com Date of completion
December 27, 2021

The Disabilities of the Arm, Shoulder and Hand Score(QuickDash)

Clinician's name (or ref) Patient's name (or ref)

INSTRUCTIONS: This questionnaire asks about your symptoms as well as your ability to perform certain activities. Please answer every question, based on your condition in the last week. If you did not have the opportunity to perform an activity in the past week, please make your best estimate on which response would be the most accurate. It doesn't matter which hand or arm you use to perform the activity; please answer based on you ability regardless of how you perform the task.

Please rate your ability to do the following activities in the last week.

1. Open a tight or new jar	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable
2. Do heavy household chores (eg wash walls, wash floors)	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable
3. Carry a shopping bag or briefcase	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable
4. Wash your back	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable
5. Use a knife to cut food	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable
6. Recreational activities in which you take some force or impact through your arm, shoulder or hand (eg golf, hammering, tennis, etc)	<input type="radio"/> No difficulty	<input type="radio"/> Mild difficulty	<input type="radio"/> Moderate difficulty	<input type="radio"/> Severe difficulty	<input type="radio"/> Unable

During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups?

7. Not at all Slightly Moderately Quite a bit Extremely

During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem?

8. Not limited at all Slightly limited Moderately limited Very limited Unable

Please rate the severity of the following symptoms in the last week

9. Arm, shoulder or hand pain None Mild Moderate Severe Extreme

10. Tingling (pins and needles) in your arm, shoulder or hand None Mild Moderate Severe Extreme

During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand?

11. No difficulty Mild difficulty Moderate difficulty Severe difficulty So much difficulty I can't sleep

Thank you very much for completing all the questions in this questionnaire.

The Disabilities of the Arm, Shoulder and Hand (quickdash) Score

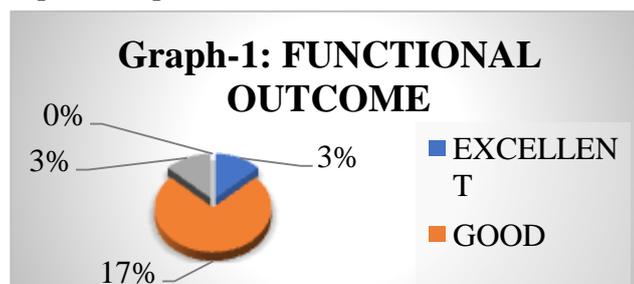
To save this data please print or (NB, A DASH score may not be calculated if there are greater than 1 missing items.)

Nb: This page cannot be saved due to patient data protection so please print the filled in form before closing the window.

Results

Of the 23 patients based on our quick DASH scores

- Excellent to good results were obtained in 20 patients
- Satisfactory results were seen in 3 patients
- None of the patients had poor results
- Two patients had wrist stiffness attributed to the non compliance with physiotherapy for mobilisation
- One patient had mal union due to malreduction attributed to the late presentation to hospital
- One Patient had superficial pin site infection



Case -1



PRE OP

POST REDUCTION



POST OP X-RAY

1 MONTH FOLLOWUP



6 MONTHS FOLLOWUP



FUNCTIONAL OUTCOME

Case -2



PRE OP



POST OP



ONE MONTH FOLLOW UP



2 MONTHS FOLLOW UP



6 MONTHS FOLLOW UP





FUNCTIONAL OUTCOME



COMPLICATIONS

Discussion

Distal radius fractures are commonly treated with closed reduction and cast immobilisation which has the advantages of preserving the fracture haematoma and triggering biological healing but the chances of loss of reduction and subsequent malunion rates are high although open reduction and internal fixation with plate osteosynthesis shows good immediate post op functional outcome it also has its own risk factors in terms of invasiveness^[5,6]. Closed reduction and internal fixation with k wires have been used extensively for extra articular distal radius fracture which shows excellent outcome in long term follow up. Using k wires for intraarticular fractures utilises the advantages of biological healing and reduces the incidence of complications related to invasive procedures^[7]. Although the immediate post operative functional outcome is compromised in patients presenting late for intervention the long term follow up was comparable with invasive procedures

Goals of distal radius fracture management are Anatomic reduction, Fracture stability, Range of movement, Articular Congruity. These goals are being addressed by the above fixation method^[8].

In highly comminuted fractures were treated with ligamentotaxis and augmentation with column specific k wires gave good results it prevented fracture collapse and radial shortening.^[10]

The quick DASH scores in the study by Brennan et al comparing Kwire fixation vs volar plating was 13.12 vs 11.25.^[11] The quick DASH scores in our study were excellent or good in most cases. The average quick DASH score in our study being 12.34 in one year follow up which is comparable to volar plating.

In our study we encountered complications like stiffness in two patients which was mainly due to non compliance with mobilisation. And one patient went for malunion due to late presentation to hospital and failure to achieve reduction

Conclusion

Intraarticular distal radius fracture often may not be treated with conservative methods due to loss of reduction, less stability, intraarticular malreduction and loss of functional outcome. Though invasive operative procedures like plate osteosynthesis may show good immediate and long term follow up it may also lead to complications due to its invasiveness and needs second surgery for implant exit hence we are bound to choose an intermediate in terms of non invasive and invasive mode of management.

Column specific fixation with k wire is a less invasive method of treatment of intraarticular distal radius fractures. Although complications like stiffness and malunion were noted it was due to non compliance and late presentation. Hence we would like to conclude that column specific fixation of intraarticular distal radius fractures with k wire shows good long term functional outcome.

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