

Distal End Radius Fractures Managed Surgically by Combined Antegrade and Retrograde Percutaneous K-wiring

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1. Introduction

- Most common fractures-15-20%
- F:M =3:1
- Age and Gender specific distribution curves.
- Males-40s, Females-60s.
- Extra articular-57-66%
- Metaphyseal comminution-48%
- Low energy fractures

2. Injury Mechanisms

- Fall on an outstretched hand.
- Dorsiflexion-40 to 90 degrees.
- Tensile forces at volar cortex.
- Compression at dorsal cortex.

3. Associated Injuries

- Interosseous ligaments of the carpus
- Triangular Fibrocartilage Complex(TFCC)
- EPL Injuries

4. Classification

A. O. System of classification

The most detailed classification, to date is the AO system which is recognized in order of increasing severity of the osseous and articular lesions.

Type A: Extra articular

Type B: Partial articular

Type C: Complete articular

Aim

To study efficacy and functional outcome of extra-articular distal end radius fractures treated surgically by combined anterograde and retrograde percutaneous k- wire fixation.

Objectives:

- To study the impact of this procedure on angulation and deformity.
- To study the functional outcome in terms of range of movements and other complications.
- To study the efficacy of this procedure in unstable fractures of distal end radius in terms of hospital stay, early mobilization, cost factor.
- To compare the results of this study with similar studies involving unstable distal end radius fractures.

5. Materials and Methods

- The present study was prospective observational study.
- In this study, 30 patients with extra-articular fractures of distal end radius were taken (11 males and 19 females).
- Fixation of these fractures were assessed with post op and follow-up plain radiographs.
- Functional outcome was assessed with modified dermat point system of Gartland and Werley's.

Inclusion criteria

- Adults with extra-articular fracture lower end of radius (A.O Classification)
- All eligible candidates undergoing this procedure and are willing to participate in this study

Exclusion criteria

- Distal radius fracture associated with other injuries around the wrist joint
- Open Fracture
- Pathological Fracture
- Distal radius Fracture associated with neurovascular complications
- Patients who are not willing to participate in the study.

Preop x-ray:



Surgical Technique

Closed reduction performed under c-arm guidance

First k-wire inserted in retrograde direction from radial styloid

Second k-wire inserted dorsoradially at the level where first k-wire exits in an antegrade direction kwire directed toward lunate in AP and lateral view

k-wires bent just above skin followed by a below elbow plaster of paris cast.

Postoperative Care and Rehabilitation

- The check X-rays were taken in both A-P and Lateral views.
- The fixation was assessed with check X-rays and amount of distraction was assessed with radio carpal joint space which should be 1mm wider than the mid carpal joint in AP view.
- Finger movements and shoulder ROM physiotherapy was commenced.
- Patient was discharged on post op Day 1 and was advised to come back after 5 to 7 weeks.
- During the first follow-up cast and k-wires were removed after taking the follow-up X-ray.
- Physiotherapy of wrist was advised and removable splint were given during night time for 2 more weeks.
- Patients were followed up for 3 to 12 months.
- Functional outcome was assessed with modified dermat point system of Gartland and Werley's.



Post Operative Movements

EXTENSION



FLEXION



PRONATION



SUPINATION



RADIAL DEVIATION



ULNAR DEVIATION



PREOP XRAY-



POSTOP XRAY-





6. Observation

- Age- In the study, most of the patients belong to age group of 50-69 years. The mean age of the patient in the study was 50.23 years.
- Sex- There were 11 male patients (36.66%) and 19 female patients (63.33%).

The Final Outcome depends upon:

- Amount of radial shortening
- Residual extra-articular angulation
- Associated soft tissue complications.

Goals of Treatment:

- The goal of the treatment was to achieve a
- Angular deformity of < 20 degrees
 - Radial shortening of < 5mm compared to the contralateral side.

Follow- Up Regimen

During the follow up, patients were asked for the history of any

- Pain
- Disability
- Limitations of motion wrist joint
- Reduction in grip strength

Patient were asked detailed history regarding

- Duration between the injury and treatment
- Immobilization in immediate post- operative period
- Early complication like

- Stiffness of fingers
 - Oedema of hands fingers
- Post treatment physiotherapy

Patients were examined for all movements at wrist joint

- Dorsiflexion
- Palmar flexion
- Supination
- Pronation
- Ulnar Deviation
- Radial Deviation

After Clinical assessment of movements, check x-rays were taken

The results were evaluated as per the modified criteria suggested by Gartland & Werley

Complications

S. No.	Complications	No. of Cases
1	Wrist pain- Reduced ROM	3
2	Finger Stiffness	2
3	Malunion	1
4	Pin tract infection	1

In our study 3(10%) patients showed wrist pain-reduced range of movements, 2(6.6%) patients had finger stiffness 1 (3.3%) patient had malunion and 2(6.6%) patients had superficial pin tract infection.

Functional Outcome

There were 30 patients in this study. The results were categorized into four groups (excellent, good, fair and poor) and their demography was studied as shown in the previous observation tables. The data collected from the study group was tabulated as in the tables

We performed clinical, radiological and functional review and final results were evaluated with the help of Modified Demerit Point System of Gartland and Werley's.

Study	No. of Cases	Percentage
Excellent	17	56.6%
Good	9	30%
Fair	3	10%
Poor	1	3.3%

7. Results

The results in 17 fractures (56.6%) were rated as excellent, 9 fractures had (30%), 3 fractures had fair (10%), and only 1 fracture had poor result (3.3%). The patients with results rated fair (3) had poor reduction of the fracture. All the patients with adequate reduction had excellent or good results, no matter how severely displaced the fracture was. All fractures united at an average of 6.1 weeks post operatively.

8. Conclusion

- Our study indicates that combined retrograde and ante-grade pinning was well tolerated treatment modality for unstable extra-articular distal end radius fractures.
- From the present study of 30 patients with extra-articular distal end radius fractures after analyzing the observation and looking at the results, there was no statistical difference between the outcomes achieved with retrograde pinning, we can conclude that both modalities are closely comparable. Whereas grip and ROM data were similar in these techniques, lower infection rates and a superior purchase in the sub-chondral bone, lesser rate of tendon and soft tissue injury, and the possibility of wrist immobilization in functional dorsiflexion is where the combined ante-grade and retrograde technique of pinning scores over the conventional retrograde pinning