



FUNCTIONAL OUTCOME OF PERCUTANEOUS PINNING IN NON-COMMINUTED EXTRAARTICULAR FRACTURES OF DISTAL RADIUS

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ABSTRACT **INTRODUCTION:** Distal end radius is one of the most common fractures in orthopaedics and many conservative and surgical methods are available for management. Among them, percutaneous pinning is one of the commonly used methods but like other methods it has its own complications. The method used by us involves percutaneous pinning of the fracture and immobilization in neutral position for three to four weeks with aim of measuring functional outcome by this method.

STUDY DATA: Study was done from August 2018 to Jan 2019 at GMC Jammu.

Type of study: prospective study

Number of patients: 31

Number of males: 20

Number of females: 11

Lost in follow up: 1

Age: 20-55 years

Average time between injury and pinning - 8hrs

METHOD USED: First closed reduction done followed by percutaneous pinning using two or three K-wires under c arm guidance, followed by a below elbow plaster of pairs dorsoradial slab was applied in neutral position of the wrist for 3-4 weeks. After period of 3-4 weeks slab was removed, X ray done and patient send for physiotherapy. The radiographs were taken postoperatively, at 3 weeks, 6 weeks and 5 months. The functional evaluation of the patients was done at 5 months follow-up.

CRITERIA USED: Gartland and Werley's criteria.

COMPLICATIONS:

Pin loosening-7

wrist joint stiffness-3

infection-3 (all managed with oral antibiotics)

malunion-2

RESULTS: Excellent results were observed in 83.3% (25 Patients)

Good in 10% (3 Patients)

Fair in 6.6% (2 Patients).

CONCLUSION: Closed reduction and percutaneous pinning with k wires followed by slab in neutral position is an effective method of management of extra-articular fracture of distal end radius with minimal complications and excellent functional outcome.

KEYWORDS :

INTRODUCTION

Fractures of the distal radius represent one-sixth of all fractures treated in emergency department. Closed reduction and cast immobilization has been the mainstay of treatment of these fractures, but invariably it results in malunion, poor functional and cosmetic outcome. Restoration and maintenance of anatomy correlates well with function. The residual deformity of the wrist as a result of malunion is unsightly. It adversely affects wrist motion and hand function by interfering with the mechanical advantage of the extrinsic hand musculature. In many cases there is weakness of handgrip and return to pre-injury activity become impossible. Closed reduction and cast immobilization, often leads to collapse of the radius. Percutaneous K-wire fixation provides additional stability and is one of the earliest forms of internal fixation. Most of the work done with percutaneous pinning emphasizes that there is significant residual stiffness of the hand and wrist. The acute palmarflexed position of the wrist during the postoperative immobilization period was blamed as the main reason for stiffness. This study was conducted to examine the functional outcome of non comminuted extra-articular distal end radius fractures treated with closed reduction and percutaneous K-wire fixation with immobilization in neutral position of the wrist and early physiotherapy.

METHODS AND MATERIAL

Thirty one consecutive patients with extra-articular distal radius fractures were prospectively enrolled for the study between august 2018 to january 2019. Only patients with non comminuted extra-articular distal radius fractures were included in the study. All patients with intra-articular distal radius fractures, comminuted distal end radius fractures, presenting later than 2 weeks of injury, patients in whom ulnar shaft was not intact, polytrauma patients, patients with open fractures were excluded. Out of the 31 patients enrolled for the study, one of them was lost to followup. ALL 31 had AO type 2 fracture

OPERATIVE PROCEDURE

Closed reduction of the fracture was achieved by longitudinal traction and direct pressure over the displaced fragment under anesthesia. Hyperextension or flexion manoeuvres to disimpact the fragments

were not recommended. Reduction was checked under image intensifier in both anteroposterior and lateral planes. As an assistant held the wrist with fracture in the reduced position, the first K-wire of 1.5-2.0 mm was inserted from the dorsolateral aspect of the distal radius fragment across the fracture and into the proximal fragment under image intensifier guidance. A second K-wire was passed from the dorsomedial aspect of the distal fragment across the fracture into the proximal fragment. After checking the stability of the fracture under image intensifier, if required, a third K-wire was passed from dorso-lateral aspect from distal to proximal fragments. The wires were drilled to engage the opposite cortex. K-wires were bent at a right angle and cut short outside the skin for easy removal. A sterile dressing including sponge padding was applied to prevent skin irritation. With the wrist in the neutral position, a dorsoradial below elbow plaster of Paris slab was applied up to the knuckles. Postoperative radiographs are obtained in the anteroposterior and lateral planes. Postoperatively, the limb was kept elevated for 24 hours. Active finger, shoulder and elbow mobilization was started at the earliest. Patients were discharged 24 hours post surgery after ensuring good distal circulation of fingers. At 3 weeks follow-up, X-rays were taken, both in the anteroposterior and lateral planes to check the position of the fracture. The slab was removed and active finger, wrist exercises and forearm pronation and supination exercises were started. Handgrip was improved by using soft ball exercises. At 6 weeks, anteroposterior and lateral view radiographs were repeated. K-wires were then removed without anaesthesia. Wrist physiotherapy and handgrip exercises were continued for another 2-4 weeks. Results were evaluated at 5 months using Gartland and Werley criteria.

RESULTS

Sarmiento's modification of Lindstrom criteria

	Residual deformity	Loss of palmar tilt (degrees)	Radial shortening (millimeters)	Loss of radial deviation (degrees)
Excellent	No/ insignificant	0	<3	5°
Good	Slight	1 – 10°	3 - 6	5 – 9°
Fair	Moderate	11 – 14°	7 - 11	10 – 14°
Poor	Severe	At least 15°	At least 12	>14°

Excellent results were observed in 83.3% (25 PATIENTS)

Good in 10% (3 patients)

Fair in 6.6% (2 patients)

COMPLICATIONS

Pin loosening - 7

wrist joint stiffness - 3

infection - 3

Malunion - 2

Complications like reflex sympathetic dystrophy, post traumatic arthritis of wrist, subluxation of distal radio-ulnar joint were not seen.

DISCUSSIONS

Distal radius fracture is a common injury. The importance of anatomic reduction has been demonstrated by clinical studies as well as by laboratory assessment of force and stress studies. Accurate reduction of the fracture is the first step in the treatment of distal radial Fractures. Many options are available to maintain this initial reduction. The most common traditional method is closed reduction and cast immobilization, but this often fails to prevent early radial collapse and is associated with a high risk of malunion, joint stiffness and painful wrist. Hence, this method is for low-demand elderly patients. External fixators can maintain radial length and radial inclination by ligamentotaxis, but cannot effectively maintain palmar tilt. Also complication rates as high. These mainly include pin loosening, pin tract infection, reflex sympathetic dystrophy, radial sensory neuritis and delayed union. Thus, external fixators are better avoided in noncomminuted extra-articular distal end radius fracture. Open reduction and internal fixation and arthroscopic reduction techniques should be reserved for partial and complex intra-articular distal radius fractures. Percutaneous pinning with K-wires was first recommended by Green as a simple and inexpensive procedure. Various techniques of percutaneous pinning are available. Most studies attribute poor results of this technique to radial shortening, wrist stiffness and reflex sympathetic dystrophy. We are of the view that wrist stiffness and reflex sympathetic dystrophy occur because of the palmar-flexed position of the wrist in which postoperative immobilization of the fracture is done. Prolonged immobilization of the wrist for greater than 3 weeks increases the magnitude of the problem. Hence we developed our protocol for the treatment of extra-articular distal radius fractures. Fracture reduction was achieved by longitudinal traction and direct pressure over the displaced fragment followed by percutaneous pinning. Instead of circumferential cast, dorso-radial plaster of Paris slab was applied in neutral position of the wrist. Active finger mobilization was started immediately. Three cases in our series had pin tract infection, but this was superficial and did not necessitate early removal of the pins. The infection subsided with removal of the pins at 5 weeks in both the cases. Loosening of one of the K-wires was observed in 7 cases at the time of removal of the pins, but it did not jeopardize the fracture alignment. Circumferential cast for additional immobilization was not necessary.

CONCLUSION

In conclusion, percutaneous pinning and immobilization of the fracture with wrist immobilized in neutral position for 3-4 weeks and early physiotherapy is a simple procedure for extra-articular noncomminuted distal radius fractures. It provides anatomic fracture reduction and fixation and allows earlier rehabilitation without jeopardizing the fracture alignment.

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