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COLLE'S FRACTURES TREATED BY CLOSED REDUCTION AND PERCUTANEOUS K-WIRE FIXATION

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ABSTRACT

OBJECTIVE: *To see functional outcome of wrist joint after treating fracture of distal end of Radius(Colle's) by percutaneous pinning and POP cast*
PATIENTS AND METHODS : *It is a multicentered study done at three centres simultaneously i)Orthopaedic dept. Lahore General Hospital, Lahore ii)Orthopaedic unit 111 Dow University of Health Sciences and Lyari General Hospital Karachi iii)Orthopaedic dept. Bir Hospital, Kathmandu, Nepal. Between January 2003 and September 2005, 160 patients with Colle's fracture were treated by closed reduction and percutaneous K-wire fixation under image intensifier, followed by POP cast. The type of fracture, reduction technique, wrist movement and complications were recorded.*
RESULT : *Patients treated by this method had union in five weeks with good function of the wrist and with no significant pin tract infection and wrist stiffness, irrespective of nationality.*
CONCLUSION : *It is concluded from this study that this is a better and safe procedure, provided expertise and C-arm facility are available.*

KEY WORDS: Colle's fracture, Percutaneous pinning, POP cast, Image intensifier (C-arm)

INTRODUCTION:

Distal radial fracture is the most common fracture seen in the emergency department [(1)]. The incidence of this fracture is about 20%. The injury affects 17% of women over the age of fifty years [(2)].

The basic principles in management of such fractures are anatomical reduction and effective immobilization [(3)]. The recommended methods of wrist immobilization vary from wooden splint[(4)], closed reduction and POP cast immobilization, pin and plaster, external fixator[(5)], percutaneous K-wire fixation[(6)], early open reduction[(7)], bone grafting and bone graft substitute[(8)], bone cementing or limited open fixation[(9)]. The traditional method of application of plaster cast to support fracture healing remains the single most common method of treatment [(16)].

The functional outcome following external splintage by means of POP cast for Colle's fracture is more common but controversial. Redisplacement, stiffness of the wrist and hand are very common but can be prevented by reducing the time of wrist immobilization[(10)]. Duration of Pop cast, grasp and key pinch of hand, displacement of fracture and residual deformity, reduction of distal radioulnar joint, inclination of distal radius and radial height were noted in patients with Colle's fracture treated by closed reduction and percutaneous K-wire fixation and supported by POP back slab.

PATIENTS AND METHODS

It is a multicentered study done in 3 centres at the same time
(i) Orthopaedic dept. Lahore General Hospital, Lahore
(ii) Orthopaedic unit111, Dow University of Health Sciences and Lyari General Hospital, Karachi
(iii) Orthopaedic dept. Bir Hospitl, Kathmandu, Nepal
In this study 186 patients were treated but 26 were lost to followup. So One hundred and sixty cases of Colle's fracture, Frykman type 1 and type 11 were included in this study. 63 patients were Nepali, out of which 11 lost to followup, so, 52 patients treated in Bir Hospital were included in this study. 85 Pakistani patients were treated in Lahore General Hospital, out of which 7 lost to followup, so 78 patients from that centre

included in this study. 38 patients were treated in Lyari General Hospital, out of which 8 patients lost to followup, so 30 patients were included in this study. So in this study 52 patients were Nepali, the rest were Pakistani. The age of patients were between 35 and 65 years. All these patients were treated by closed reduction either under general anaesthesia or regional anaesthesia. After reduction, trans styloid fixation with two K-wires of 1.5 mm diameter was done. Reduction and fixation was checked under C-arm and limb was splinted with plaster of paris back slab. Open fractures, fractures with wrist dislocation and poly trauma patients were not included in this study. All patients were operated under image intensifier control by either consultant or registrar using standard techniques and a protocol. Anteroposterior and lateral radiographs were obtained postoperatively and analysed for reduction of fracture, position of pins, inclination of distal radius and restoration of radial height.

TABLE 1

OBSERVATION	RANGE	AVERAGE
Radial inclination	13-30°	21.5°
Volar tilt	16-22°	11.73°
Radial height	9-18mm	11.4mm
Pintract infection	2 pts.	1.25%

TABLE 2

Result	No of pts	Average
excellent	121	75.6%
Good	33	20.7%
Satisfactory	6	3.7%

RESULT

Out of 160 patients 108(67.5%) were females and 52(32.5%) were males, age was between 35-65 yrs. Mean 47.1 yrs. According to Frykman classification 72(45%) patients had Frykman type 1and 88(55%) had Frykman type 11. The hospital stay for all the patients was 24-48 hrs. Majority of fractures were fixed with two parallel k-wires, but in few cases the k-wires converged. All patients were splinted with pop back slab for five weeks. All fractures united well. Radial inclination was measured in all cases on x-rays and the radial inclination was 13-30° average 21.5°. The volar tilt was measured on x-rays. The average volar tilt was 11.73° with a range of16-22°. Radial height ranged from 9mm to 18m and average was 11.4mm. The flexion, extension, ulnar and radial deviation were measured postoperatively after 3 months.The flexion of wrist ranged from 60-75° and the extension ranged from 61-75°. Pin tract infection was noted in 2 patients, average 1.25%.

With all these observations, 121 patients (75.6%) were rated as excellent, 33(20.7%) as good and 6(3.7%) as satisfactory. No significant difference is seen in any respect whether the patient is Pakistani or Nepali.

DISCUSSION

The traditional treatment of fractures distal radius is closed manipulation and casting [11]. Recent trends in the management of these fractures are changing due to availability of C-arm. Patients' intolerance to pop cast, repeated need for change of cast due to displacement of fracture and residual deformity after fracture healing are the reasons of these changes. Prolonged immobilization leads to stiffness of wrist and fingers [12]. Orthopaedic advances over the past decade have resulted in the concept that the function and early rehabilitation result after a fracture can be improved by maintaining anatomical reduction [13]. There appears to be a distinct parallel between anatomical and functional result. Complications directly related to malunion include osteoarthritis, tendon rupture, weak grip, secondary midcarpal collapse and instability of distal radioulnar joint [14].

In case of unstable fracture, there is no benefit of applying pop cast but other methods like percutaneous wire fixation, pin and plaster, external fixator, limited open reduction, bone grafting and wire fixation are being practiced[16]. Open reduction and internal fixation have to be used with the risk of median nerve compression and reflex sympathetic dystrophy [15]. Several studies have suggested that there is a direct relationship between the anatomical results and the functional outcome. Anatomical reduction can be achieved by closed manipulation. There is still no agreement as to the most appropriate way of maintaining reduction in unstable fractures [16].

Different studies have shown that percutaneous wire fixation for Coll's fracture maintains the reduction and good results are produced. Maintenance of anatomical reduction is more important factor than the fracture pattern in determining the final result. Percutaneous pinning is simple, minimally invasive and prevents displacement of fracture fragment [17].

CONCLUSION

We conferred that this method has low morbidity and complication rate. There was no nonunion. There was insignificant post operative stiffness of the wrist. The superiority of this procedure regarding grip strength and hand function were also noted. The procedure has safety with adequate efficacy.

Close reduction and percutaneous wire fixation is a simple and minimally invasive procedure. This technique is recommended for extraarticular Colle's fracture type1 and type2 provided expertise and C –arm facilities are available.

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