Original Research Paper

Volume - 10 | Issue - 6 | June - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Orthopaedics

A COMPARATIVE STUDY OF MANAGEMENT OF EXTRA ARTICULAR DISTAL RADIUS FRACTURES IN ELDERLY BY CLOSED REDUCTION ALONE AND CLOSED REDUCTION WITH PERCUTANEOUS K-WIRE PINNING.

Dr. K. Vijay Mohan Reddy	Assistant Professor, Dept. of Orthopaedics, Kurnool Medical College
Dr. K. Suman Kumar*	Resident, Dept. of Orthopedics, Kurnool Medical College *Corresponding Author
Dr. K. Laalasa	Resident, Dept. of Orthopedics, Kurnool Medical College
Dr. Chandan S	Resident, Dept. of Orthopedics, Kurnool Medical College
Dr. C. Venkappa	Resident, Dept. of Orthopedics, Kurnool Medical College

ABSTRACT **Background:** A prospective, randomized study of patients older than 60 years of age with extra–articular fracture of distal radius was performed to compare the outcome of immobilization in a cast alone and cast with supplementary percutaneous pinning. The objective of the study was to determine which of the two methods is beneficial.

Materials and methods: 36 patients were treated with closed reduction, and 33 were treated with closed reduction and percutaneous k-wire pinning between august 2018 to February 2020 at government general hospital, Kurnool. The mean age of the patient was 64 years.

Results: Patients treated with percutaneous wiring had statistically significant improvement in their radiological findings, i.e., volar angulation (mean -4.32 degrees), radial inclination (mean 23.22 degrees), and radial length (mean 10.49mm).

However, there was no significant difference in functional outcomes in terms of the range of movement and Quick DASH score.

KEYWORDS : Distal radius fracture, percutaneous pinning, casting, Quick DASH.

INTRODUCTION:

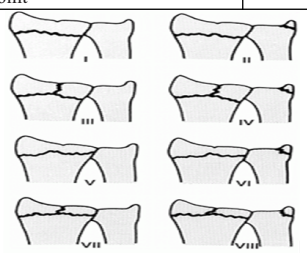
In 1814, Abraham Colle described the Colle's fracture for the first time, Dublin, in Ireland. The Colle's fracture was named after him. Fracture of the distal radius has been associated with a long history since the first description by Puntcan in 1783 and Colle in 1814[1].

This type of fracture usually results from low energy trauma in the elderly with low functional demand. Significance of this increased because of the increasing elderly population, high energy vehicle accidents, greater demand for perfection by patients, and also due to potential early and late complications. Approximately 10% of 65 years old will sustain a distal radius fracture during the remainder of their lifetime. Until 19th century disability due to malunited distal radius fracture was accepted and considered stable. With the changing trend of management and the unacceptability of deformity by patients, a near-normal function of the wrist had to be achieved. There are a lot of treatment modalities of distal radius fracture ranging from traditional closed reduction and cast immobilization to open reduction and internal fixation with plating[2,4,5-10].

While considering the treatment methods, it depends on many other factors besides the patients age, lifestyle and associated medical co-morbidities, compliance, their functional demands, the dominance of the limb, the type of fracture, the severity and alignment of the fracture, soft tissue condition including any open wound, the concomitant fractures, these are paramount importance when one considers treating a patient of distal radius fracture[2,4].

FRYKMAN CLASSIFICATION (1967):

FRACTURES	Distal Ulnar Fractures	
	Absent	Present
Extra-articular	I	II
Intraarticular involving distal radio-carpal joint	III	IV
Intraarticular involving distal radio-ulnar joint	V	VI
Intraarticular, involving both distal radioulnar and radiocarpal joint	VII	VIII



The variable results obtained by closed methods prompted us to compare the results with distal radius fractures treated by either cast immobilization alone or by percutaneous K-wire fixation in addition to casting.

OBJECTIVES OF THE STUDY:

Is to compare the functional and radiological outcomes, and the quality of life between immobilization in a cast alone and percutaneous k-wire pinning in addition to casting in the treatment of extra articular fractures of the distal radius in an elderly population.

MATERIAL AND METHODS:

Between August 2018 and February 2020, elderly patients above the age of 60 years who presented with an extra articular fracture of distal radial metaphysis [Frykman types I and II] were treated in the department of orthopaedics, Government General Hospital, Kurnool and those who were available for follow up.

The patients were then randomly allocated to either closed reduction or the closed reduction and percutaneous pinning groups.

INCLUSION CRITERIA:

- All patients above 60 years with distal radius fracture treated by only closed reduction or closed reduction with k-wiring.

EXCLUSION CRITERIA:

- Patients below the age of 60 yrs.
- Patients who lost for follow up.
- Multiple trauma or other injuries.
- Open fractures
- Neurovascular injuries
- Associated musculoskeletal injuries to the same arm.
- Inflammatory arthritis
- Patients having dementia and psychiatric illness

STATISTICAL ANALYSIS:

The two groups were analyzed using students' t-test, ANNOVA, Bonferroni comparison test, and chi-square test.

RESULTS:

AGE INCIDENCE- The analysis of the mean age of patients was 64 years.

SEX INCIDENCE- Gender distribution in each group were woman (73%) and men (27%).

Mode Of Injury- The mechanism of injury in most cases was fall on outstretched hand (90%).

Details Of Patients In Both Groups:

	Closed reduction	K-wiring and closed reduction
Number of patients	36	33
Men: Women	8:28	10:23
Right: Left side	20:16	17:16
Frykman I: II	22:14	14:19
Mean age in years	67	63

MEAN RANGE OF MOVEMENTS:

S- SIGNIFICANT; NS- NOT SIGNIFICANT;

Movement	Closed reduction group(mean in degrees)	K-wiring and closed reduction group (mean in degrees)	P-value
Palmar flexion	63	63.65	NS
Dorsiflexion	61.22	62.38	NS
Supination	66.13	70.78	NS
Pronation	61.92	64	NS
Ulnar deviation	24.75	25.95	S
Radial deviation	12.50	13.11	NS
Quick DASH	17.58	16.31	NS

Except for the ulnar deviation, no statistical difference in the range of movements was found between the two groups. The mean score of Quick DASH, though, was lower in the k-wire pinning group but was insignificant, indicating that the quality of life was the same irrespective of the modality of the treatment received. Both the patients had healthy daily living without hindrance by the fractured limb.

Mean Radiological Measurements For Two Groups:

Radial Length:

	Mean Difference (I-J)	Standard error	P-value
Post-op closed reduction /K-wiring with closed reduction	1.258	.299	HS
4th week closed reduction / K-wiring with closed reduction	2.288	.308	HS
3 months closed reduction / K-wiring with closed reduction	1.936	.287	HS

HS- Highly Significant

Radial Inclination:

	Mean Difference (I-J)	Standard error	P-value
Post op closed reduction /K- wiring with closed reduction	1.911	.213	HS
4th week closed reduction / K-wiring with closed reduction	3.557	.185	HS
3months closed reduction / K-wiring with closed reduction	2.991	.216	HS

HS- Highly Significant

Volar Tilt:

	Mean Difference (I-J)	Standard error	P-value
Post op closed reduction /K-wiring with closed reduction	-3.616	.370	HS
4th week closed reduction / K-wiring with closed reduction	-5.636	.419	HS
3months closed reduction / K-wiring with closed reduction	-5.449	.414	HS

HS- Highly Significant

The radiological parameters were assessed for pre-reduction, post-reduction, 4weeks, and at 3 months intervals. The K-wiring with closed reduction and casting showed not only better but also statistically significant anatomical reduction compared to the other group.

DISCUSSION:

Distal radius fractures are one of the most frequent fractures in the orthopaedic practice with an increasing number of low energy fractures in elderly[2]. Distal end radius fractures have a higher incidence of aging, which is associated with all of the risk factors for Osteoporosis.

Although several studies on the use of percutaneous k-wires for the stabilization of distal radius fractures have been published[4,5-10,13], their use in the elderly remains uncertain, as seen by McQueen[14].

In our study, 4 weeks of immobilization was considered adequate and found considerable differences in radiological alignment between the two groups, was similar to the results found by Azzopardi[13]. Though standardizing the later views of the wrist are difficult, the magnitude of difference seen was within errors of measurement.

Even if such errors were excluded, our results showed that supplementary fixation by k-wiring was only marginally superior to cast immobilization alone in reducing displacement of fracture after closed manipulation.

In our study, we assessed functional outcomes by Quick DASH, unlike other studies where Mayo wrist score by Azzopardi and ADL (activities of daily living) by Wong were used[13]. The improvement in functional outcome and range of movement in patients treated by supplementary wires was not statistically significant.

This supports the opinion of McQueen that k-wires do not gain sufficient purchase in osteopenic bone in elderly patients to maintain anatomical reduction of the fracture and to improve function[14].

CONCLUSION:

Our results concluded that functional outcome is comparable in both the groups with no added advantage in the group treated with closed reduction and percutaneous k-wire pinning, despite better radiological alignment, in the elderly population.

REFERENCES

1. Colles A. On the fracture of the carpal extremity of the radius. Edin Med Surg J 1814; 10:182.
2. Jupiter JB. Fractures of the distal end of the radius. J Bone Joint Surg [Am] 1991;73-A:461-9.
3. Young BT, Rayan GM. Outcome following nonoperative treatment of displaced distal radius fractures in low-demand patients older than 60 years. J Hand Surg [Am] 2000; 25:19-28.
4. Ring D, Jupiter JB. Percutaneous and limited open fixation of fractures of the distal radius. Clin Orthop 2000; 375:105-15.
5. Clancey G. Percutaneous Kirschner-wire fixation of Colles fractures: a prospective study of thirty cases. J Bone Joint Surg [Am] 1984;66-A:1008-14.
6. Mah ET, Atkinson RN. Percutaneous Kirschner wire stabilization following closed reduction of Colles' fractures. J Hand Surg [Am] 1992;17:55-62.
7. Stoffelen DV, Broos PL. Closed reduction versus Kapandji-pinning for extra-articular distal radial fractures. J Hand Surg [Br] 1999;24:89-91.
8. Shankar NS, Craxford AD. Comminuted Colles' fracture: a prospective trial of management. J R Coll Surg Edin1992;37:199-202.
9. Lenoble E, Dumontier C, Goutallier C, Apoil A. Fracture of the distal radius: a prospective comparison between trans-styloid and Kapandji fixations. J Bone Joint Surg [Br]1995;77-B:562-7.
10. Rayhack JM. The history and evolution of percutaneous pinning of displaced distal radius fractures. Orthop Clin North Am 1993; 24:287-300.
11. Green DP. Pins and plaster treatment of comminuted fractures of the distal end of the radius. J Bone Joint Surg [Am] 1975; 57-A:304-10.
12. Howard P, Stewart HD, Hind RE, Burke FD. External fixation or plaster for severely displaced comminuted Colles' fractures?: a prospective study of anatomical and functional results. J Bone Joint Surg [Br] 1989; 71-B:68-73.
13. Azzopardi T: A prospective randomized study of immobilization in a cast versus supplementary percutaneous pinning. J Bone Joint Surg Br June 2005; vol. 87-B no. 687
14. McQueen MM. Redisplaced unstable fractures of the distal radius: Surg[Br] 1998;80-B:665-9.