International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2019; 5(1): 67-69

www.orthopaper.com
Received: 08-11-2018
Accepted: 12-12-2018

Dr. Santosh Borkar
Professor Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

Dr. Manas Pusalkar
Assistant Professor Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

Dr. Shivraj Konde
Associate Professor Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

Dr. Rahul Patil
Junior Resident Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

Dr. Sameer Desai
Junior Resident Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

Correspondence
Dr. Manas Pusalkar
Assistant Professor Department of Orthopaedics, MIMER Medical College, Talegaon (Dabhade), Pune, Maharashtra, India

To study the clinical and radiological outcome of patients with intraarticular or unstable lower end radius fractures treated with ligamentotaxis with external fixator and K wires

Dr. Santosh Borkar, Dr. Manas Pusalkar, Dr. Shivraj Konde, Dr. Rahul Patil and Dr. Sameer Desai

DOI: https://doi.org/10.22271/ortho.2019.v5.i1b.15

Abstract
Introduction: Treatment for intraarticular lower end radius fractures has been conventionally with closed reduction with plaster /k wires / external fixator or open reduction internal fixation with plate. We thought that by combining external fixator with k wires better anatomical and thus functional results would be obtained.
Material and methods: A prospective follow up study was carried out on 50 fresh closed intraarticular or unstable lower end radius at MIMER Medical College Talegaon from June 2014 to May 2018 after taking appropriate consents. Ligamentotaxis with external fixator was combined with k wires under C arm guidance. Patients were followed up at 3,6,9,12 weeks and 6 months clinically and radiographically.
Results: Average time for surgery was 34.2 min, radial shortening was less than 4 mm, and hospital stay was 2.3 days. Anatomical assessment was grade l or ll in 96 % patients. Good to excellent results by Lindstrom's criteria was there in 78% patients.
Conclusion: Combining external fixator with k wire fixation gives well to excellent results in majority of patients with unstable intraarticular distal end radius fractures without significant complications and with a short hospital stay.

Keywords: Intraarticular, radius, external fixator, K wires

Introduction
Lower end radius fracture constitutes about 17% of all fractures in patients above 60 years of age. Treatment for these fractures has been conventionally with closed reduction with plaster/ K wires or open reduction internal fixation with plate [1]. Another option is closed reduction and ligamentotaxis with external fixator [2]. Accurate fracture reduction can results into healing of ligaments ruptured and fractures during the post-operative and post reduction immobilization period [2]. Inaccurate reduction and union can devastate hand function [2]. It is said that Ligaments, Retinaculae, Tendons, Periosteum that are barrier to open reduction of fracture fragments can help to achieve reduction of the fracture by ligamentotaxis and hence soft tissue ruptured, by technique of ligamentotaxis as compared to open reduction of fractures and plating techniques [3]. However some fragments which can re displace can be addressed by simultaneous closed k wires put during the same surgery [4]. Hence combining both techniques looks to be good option for treatment of these fractures, particularly unstable, comminuted or intra articular fractures. Hence we carried out a study to assess the functional and radio logical outcome of this treatment method.

Materials and Methods
A postoperative follow up study was carried out at MIMER Medical College Talegaon Dabhade from June 2014 to May 2018.All patients were followed up for at least six months. Informed consent was obtained from patients and local ethical committee approval was taken from college. Only acute <10days old, fresh fractures and closed fractures were included in study. We excluded open fractures, pathological fractures, undisplaced or somewhat displaced

Fractures (which can be treated by closed reduction and k wiring) or plaster, patient aged <18 years and patients with medical contraindications to surgery and anaethesia. We treated these patients by closed reduction under C-ARM and ligamentotaxis with AO Type static uniplanar external fixator and k wire augmentation. Patients were discharged after 48 to 72 hours and advised active exercises. They were followed up at 3, 6, 9 weeks postoperatively. Pain, pin loosening, swelling, infection, stiffenss etc was assessed at 3 weeks and also dressing was done for pins then. At 6 weeks if tenderness was absent and bridging callus was seen on x-rays, k wire and external fixator was removed under sedation in operation theatre. If tenderness was present or there was doubt about union, fixator was removed but k wires were removed at nine weeks.

Thereafter all exercises including palmar flexion, dorsiflexion, abduction, adduction, pronation, and supination were started. Check x-rays were done at 6 weeks, 9 weeks, 12 weeks and 6 months. Radiological evaluation was done on basis of Lindstrom's criteria and clinical evaluation was done on basis of modified Werley's score. At final follow up, a questionnaire was filled up with a set of questions pertaining to pain, stiffness, function, satisfaction, disability of upper extremity etc. Incidence of complex regional pain syndrome if any was also noted.

Results

There were 21 males and 29 females in study. 70% patients were in the group 40 to 70 years. 20% were below 40 years while only 10% were above 70 years. Average time for surgery was 34.2 minutes. Average hospital stay was 2.3 days only.

Table 1: Distribution of patients with respect to radial shortening.

Radial Shortening (in mm)	Number of Pateints	Percentage
0	9	18
1	14	28
2	8	16
3	16	32
4	3	6
Total	50	100

Shortening greater than 4 mm was not seen in our study. Dorsal angulation of 1-10 degrees was seen in 7 patients while dorsal angulation of 11-15 degrees was seen in 4 patients. In rest 39 patients normal or volar angle was achieved.

Table 2: Movements after 12 weeks

Movements	Normal Range (Degrees)	Average Reuslts After 12 Weeks (Degrees)
Dorsiflexion	75	68.5
Plantar Flexion	75	70
Radial Deviation	20	15
Ulnar Deviation	35	30
Supination	80	65
Pronation	75	70

There was mild to moderate deformity in 10 patients (out of 50) i.e. only 20 percent of patients, while rest had no deformity. There was mild to moderate loss of grip in 15 patients (i.e. 30%), while no loss of grip in 35 patients (i.e. 70%). Anatomical assessment was I or II in 48 (i.e. 96%) of patients, while it was III in 2 patients (4%). In no patients it was IV (0%).

Table 3: Functional assessment

Functional Assessments	No. of Patients	Percentage
Good	25	50
Fair	11	22
Excellent	14	28
Poor	0	0
Total	50	100

Thus according to Lindstorm's criteria for functional hand results, we got good to excellent results in 78% patients while fair results in 22% patients. In no patients we got poor results. As regards complications wrist pain was seen in 1 patient (2%), stiffness in 7 patients (14%), and pin tract infection or loosening in 4 patients (8%)

According to modified Gartland and Werley's wrist grading system, we got excellent results in 12(24%) patients, good results in 26(52%) patients, fair results in 10(20%) patients and poor results in 2(4%) patients.

Discussion

The fracture of lower end radius is about 17% of all fractures in elderly. Most fractures can be managed by closed reduction and k wires or cast. However in unstable and comminuted distal end radius fractures, open reduction and plating is advised to restore anatomy and better results. In some patients small AO external fixator is advised as it restores anatomy by ligamentotaxis but its results are at the most equal to k wire fixation for unstable distal end radius fractures [4, 5]. In addition, open reduction and plating though advised, is more invasive procedure and is not without complications [5]. In addition plating technique requires more time for surgery and thus more anaesthesia and its complications. Also sometimes with extensive bone disruption, plate application is near to impossible [6].

According to literature for displaced intrarticular distal end radius fractures treated by ligamentotaxis, there are many short comings like gradual loss of initial distraction force, inability to correct dorsal tilt of distal fragment (due to stout volar radiocarpal ligaments), inability to reduce depressed lunar fragments without over distraction etc. [7]. These problems can be overcome partially by combining with k wires. Also k wire allows to place wrist position in mild extension, which facilitates finger flexion and relaxes extensor tendons, which in turn prevents stiffness of fingers [7, 8].

Results of our study shows that in our patients average time for surgery was 34.2 minutes, average shortening was less than 4 mm, anatomical assessment was grade I or II in 96% of patients, good or excellent results according to Lindstrom's criteria in 78% of patients and poor results in no patients. According to Modified Gartland and Werley's wrist grading system, we got poor results in only 4% patients. Average hospital stay was only 2.3 days. There is enough literature which says that leaving fixator for too long a period (>7 weeks) leads to complications [7, 8]. Hence we remove the fixator at 6 weeks and leave k wires if there is inadequate union.

Results of our study are comparable to study by Rakesh Yalavarthi *et al* which gave excellent to good results in 88% patients [9], GS Edwards *et al* which gave 96% good results [10], Schuind *et al* which gave good results in 94% [11], Jenkins *et al* which gave good results in 93% [12],Vaughan PA *et al* which gave good results in 94% [13], D" Anca *et al* which gave good results in 94% [14],Cooney *et al* which gave good results in 87% [15], Nagi ON *et al* which gave good results in 80% (16)

and Rajeev Shukla *et al* which gave 77.8% good results [17]. However slightly less (78% good or excellent results) may be due to selection of only unstable / intra articular lower end radius fractures in our study, but never the less, the results are good in majority of patients.

Conclusion

Combining external fixator application with k wire fixation gives well to excellent results in majority of patients with unstable intra articular distal end radius fractures, without significant complications and with short hospital stay. However, our sample size was small (only 50 patients), it was a non-comparative study without control group and follow up period was short (only 6 months). Hence further studies will be necessary before final conclusion about this modality of treatment is reached.

References

1. Ark J, Jupiter JB. The rationale for precise management of distal radius fractures. The Orthopedic Clinics of North America. 1993; 24(2):205-10.
2. Koval KJ, Harrast JJ, Anglen JO, Weinstein JN. Fractures of the distal part of the radius: The evolution of practice over time. Where's the evidence?. JBJS. 2008; 90(9):1855-61.
3. Berglund LM, Messer TM. Complications of volar plate fixation for managing distal radius fractures. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2009; 17(6):369-77.
4. Kreder HJ, Agel J, McKee MD, Schemitsch EH, Stephen D, Hanel DP. A randomized, controlled trial of distal radius fractures with metaphyseal displacement but without joint incongruity: closed reduction and casting versus closed reduction, spanning external fixation, and optional percutaneous K-wires. Journal of orthopaedic trauma. 2006; 20(2):115-21.
5. Arora R, Lutz M, Hennerbichler A, Krappinger D, Espen D, Gabl M. Complications following internal fixation of unstable distal radius fracture with a palmar locking-plate. Journal of orthopaedic trauma. 2007; 21(5):316-22.
6. Chilelli BJ, Patel RM, Kalainov DM, Peng J, Zhang LQ. Flexor pollicis longus dysfunction after volar plate fixation of distal radius fractures. The Journal of hand surgery. 2013; 38(9):1691-7.
7. Anderson JT, Lucas GL, Buhr BR. Complications of treating distal radius fractures with external fixation: A community experience. The Iowa orthopaedic journal. 2004; 24:53.
8. Lin C, Sun JS, Hou SM. External fixation with or without supplementary intramedullary Kirschner wires in the treatment of distal radial fractures. Canadian journal of surgery. 2004; 47(6):431.
9. Yalavarthi RK, Vishal A. Outcome of management of distal radius fractures by ligamentotaxis. IOSR. 2015; 14(7):33-7.
10. Davis DI, Baratz M. Soft tissue complications of distal radius fractures. Hand clinics. 2010; 26(2):229-35.
11. Schuind F, Donkerwolcke M, Burny F. External fixation of wrist fractures. Orthopedics. 1984; 7(5):841-4.
12. Jenkins NH, Jones DG, Johnson SR, Mintowt-Czyz WJ. External fixation of Colles' fractures. An anatomical study. The Journal of bone and joint surgery. British volume. 1987; 69(2):207-11.
13. Vaughan PA, Lui SM, Harrington IJ, Maistrelli GL. Treatment of unstable fractures of the distal radius by external fixation. The Journal of bone and joint surgery. British volume. 1985; 67(3):385-9.
14. D"Anca AF, Byron TW, Feinstein PA. External fixator management of unstable Colles fractures Orthopedics 1984; 7:853-9.
15. Cooney WP, Agee JM, Hastings H, Melone CP, Rayback JM. Symposium: management of intraarticular fractures of the distal radius. Contemp Orthop. 1990; 21(1):71-104.
16. Nagi ON, Dhillon MS, Agarwal S, Deogaonkar KJ. External fixators for intra -articular distal radius radius fractures. Indian Journal of Orthopaedics. 2004; 38:19-22.
17. Shukla R, Jain RK, Sharma NK, Kumar R. A multifactorial study of application of Joshi's External Stabilizing System in displaced Distal End Radius Fractures. IJBAMR. 2013; 3(1):165-71.