ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 02 | February - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"ASSESSMENT OF OUTCOME IN 40 PATIENTS HAVING UN-STABLE DISTAL END OF RADIUS FRACTURES TREATED BY MODIFIED KAPANDJI WIRING TECHNIQUE"

Orthopaedics

Dr. Mayur B. Vania Assistant Professor.
Dr. Dhruvik K. Lathiya* Senior Resident. *Corresponding Author
Dr. Mayur Kalariya Senior Resident.

ABSTRACT

Introduction: Colles' fracture is one of the most common types of fracture in the elder population. It looks simple but improper reduction(treatment) of the fracture causes chronic wrist pain, loss of wrist joint movements, and/or other complication(s).
Aim of the study: To assess the outcome in terms of wrist movement and other complications and try to overcome that complication in patients of DER fracture managed by the Kapandji technique.
Patients and methods: The study was conducted on 40 patients with unstable DER (distal end of the radius) fracture in GMERS medical college Junagadh, Gujarat, India. We exclude the patient having more than 21 days old untreated DER fractures, un-displaced, or severely comminuted/intraarticular DER fractures. We treat the fracture bypassing one or two extra smooth Kirschner wire(s) through the fracture site.
Results: Superficial (local) infection was seen in 12.5 % of patients, chronic wrist pain has complained in 7.5 % patients, temporary tingling and numbness sensation over the dorsum of the 1st web space has complained in 5 %. deep infection, k-wire(s) migration, and EPL tendon injury were seen in none of our patients. **Discussion:** The Kapandji technique gives more stable fractures, allows an early range of motion with a shorter period of rehabilitation than conservative casts. The Kapandji technique has no major complications like the risk of bleeding, infection, etc. as when we compared with volar plating.

KEYWORDS

Distal end of the radius fracture, Kirschner (K) wires, Kapandji technique.

INTRODUCTION:

The most common type of fracture in the elder population is a distal end of the radius fracture - the Colles' fracture. It is a challenging type of fracture to treat an especially unstable fracture.

Treatments of a distal end radius fracture are many like above elbow pop cast for un-displaced and stable fracture, k wiring and cast, external fixator, open reduction & internal fixation by volar plate supplement with a below-elbow slab.

In 1913, the styloid process Kirschner (K) wires technique was first described by Lambotte [1-3]. Many studies have shown good results with Kirschner wire osteosynthesis so it become an acceptable procedure for the Colles' fracture [4-6].

We used one or two extra smooth Kirschner wire(s) passing through the fracture site – A modified Kapandji technique.

PATIENTS AND METHODS:

The study was conducted in GMERS medical college Junagadh, Gujarat, India. The study was conducted from August 2020 to December 2021 on forty patients having unstable distal end radius. Fractures with angulations of more than 20 degrees, and radial shortening of more than 10 mm on anteroposterior (AP) x-ray and lateral x-ray of the wrist joint (Fig 1).

All patients were treated by a modified Kapandji wiring method. The patient is supine position on the OT table without a radiolucent arm board. We used arm support acting as a counterforce which helped in the reduction of fractures.

Under local anesthesia with hematoma block or supraclavicular block or general anesthesia, one or two K wires were passed through the fracture line (Fig 2) and crossed into the opposite cortex, using the image intensifier. We insert two to three percutaneous k-wires through the Lister tubercle, and/or through the interval between the fourth and fifth dorsal compartments across the DRUJ, and/or through the radial styloid between the first and second dorsal compartments, with proper care (Fig 3).

Fig 1: Pre-operative x rays show right DER extra-articular fracture.

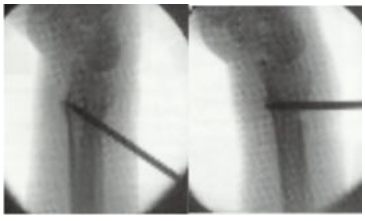


Fig 2: Intra-operative IITV images - Percutaneous k-wire inserted through the fracture site to correct dorsal tilt/dorsal translation.

Fig 3: Post-operative x rays show restoration of radial height and volar tilt by using percutaneous two k-wires. One dorsal k wire passed through the fracture site.

During bending and cutting a k wire, care must be taken to avoid loosening or pulling out of k wire(s). The proper dressing was applied. Below elbow Plaster of Paris slab or cast (according to wrist swelling status) was given with arm sling to keep the hand in an elevated position. Oral antibiotics and analgesics were given for five days. Post-operative, we hadn't done dressing in any patients

All patients were assessed clinically for wrist pain and wrist swelling, and radiologically on postoperative day 1 for post-operative fracture alignment and, post-operative day seven for early detection of loss of reduction and fracture-collapse. All patients were also assessed clinically for wrist pain, wrist swelling, and wrist movement and radiologically for a bony union, four to six weeks after surgery.

Plaster of Paris cast was removed on the fourth post-operative week and wrist exercises were encouraged. K-wires had been removed, four to six weeks after surgery.

Inclusion Criteria:

1. We include the patient having unstable distal end radius fracture

alone.
2. We include the patient having unstable distal end radius fracture with un-controlled diabetes mellitus, those are relatively contraindicated for open reduction and internal fixation like volar plate due to risk of post-operative infection and other complications.
3. We include the patient having unstable distal end radius fracture with cardiac and/or other comorbidities, those are relative contraindicate - anesthetic point of view.

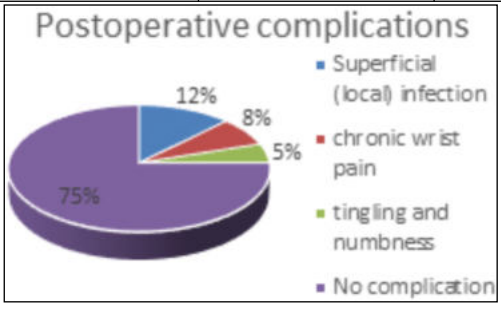
Exclusion Criteria:
1. We exclude the patient having more than 21 days old, untreated stale/unstable distal end radius fracture.
2. We exclude the patient having stable with un-displaced distal end radius fracture.
3. We exclude the patient having severely comminuted/intraarticular distal end of the radius fractures.

RESULTS:
- the study was conducted on 40 patients out of them, 26 patients were female and 14 patients were male. The range of age was from 26 years to 72 years (The mean age of the patients was 55 years). 32 patients had an injury over the right side (dominant hand) and 8 patients had an injury over the left side (non-dominant hand). (Table 1)

Table 1		Number of patients (n=40)	Percentages
Age	<30 years	6	15 %
	30-50 years	14	35 %
	>50 years	20	50 %
Sex	Male	14	35 %
	Female	26	65 %
Side	Right	32	80 %
	Left	8	20 %

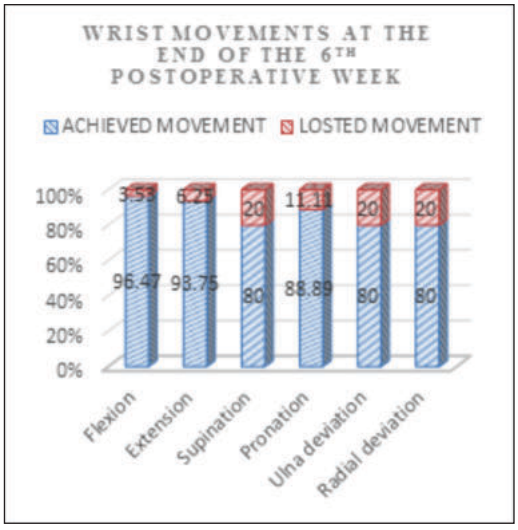
- We assessed the patients by using Gartland and Werley score with Sarmiento et al modification in post-operative follow-up period [7].
- Superficial (local) infection at the K-wire site was found in 5 patients which were managed by regular dressings and oral antibiotics. No one develops a deep infection in our study.
- Three patients developed chronic wrist pain up to 8-10 weeks post-operative. The pain was mild in intensity and it was managed by local ice application and oral analgesic.
- Two patients complain of tingling and numbness sensation over the dorsum of the 1st web space in the follow-up period (Temporary paresthesia/nerve irritation). Both patients got complete recovery from paresthesia 4 to 6 weeks after the removal of k wire, we also start Tab MVBC for 3 weeks in both patients.
- In our study k-wire(s) migration rate was 0 percentages.
- Tendon injury or rupture especially injury of the extensor pollicis longus tendon was not detected in even a single patient.
- Assessment of postoperative complications up to 6 months. (Table 2)

Table 2	Number of patients (n=40)	Percentages
Superficial (local) infection	5	12.5 %
deep infection	0	0 %
chronic wrist pain	3	7.5 %
tingling and numbness sensation over the dorsum of the 1st web space	2	5 %
k-wire(s) migration	0	0 %
EPL tendon injury	0	0%



- Kapandji technique gives a rigid construct as compared to cast alone and so, patients are encouraged to mobilize their wrist joint earlier, resulting in less post-operative stiffness [8]. We assess all patients clinically for wrist pain and wrist movement at the 6th week postoperatively. Wrist movements at the end of the 6th postoperative week are given in table 3.

Wrist movements (table 3)	Wrist movement value in terms of range	Average wrist movement value
Flexion	72-85 degree	82 degree
Extension	60-80 degree	75 degree
Supination	65-75 degree	72 degree
Pronation	70-85 degree	80 degree
Ulna deviation	20-35 degree	30 degree
Radial deviation	10-20 degree	12 degree



- In our study, we hadn't faced a problem like splitting of distal fragments during k-wire insertion. Kapandji even reported very good anatomical and functional results without any post-operative splinting [9].

DISCUSSION:
- The advantage of the Kapandji technique are:
  - The basic benefit of the Kapandji technique is, it gives more stable fractures than conservative casts.
  - It allows an early range of motion with a shorter period of rehabilitation as when we compared with plaster of Paris casts.
  - The Kapandji technique is easy to learn and perform, cost-effective, low radiation exposure.
  - The Kapandji technique has no major complications like the risk of bleeding, infection, etc. as when we compared with volar plating.

- In thirty-two patients need three K-wires and six patients need four K-wires to stabilize a fracture. According to the AO classification system twenty-seven patients had type A2 fractures pattern, nine patients had type A3 and four patients had type C1 fractures patterns.
- Post-operative, we hadn't done dressing in any patients. Many studies show post-operative loosening rate of k-wire(s) especially in elder (Osteoporotic) patients was 4 to 17 percentages. Post-operative during dressing, there may be a risk of k-wire loosening (k wire pulled out). So, this complication was avoided by avoiding regular dressing, which was not required in these patients. In our study k wire(s) migration rate was 0 percentages.
- We insert percutaneous pin(s) through the radial styloid between the first and second dorsal compartments with proper care still two patients complain of Temporary tingling and numbness sensation over the dorsum of the 1st web space in the follow-up period.
- We insert percutaneous pin(s) through the Lister tubercle, through the interval between the fourth and fifth dorsal compartments, and across the DRUJ with a take of not to damage an extensor tendon, and not even a single patient got this complication.

Declaration of Patient Consent:
Consent was given by all patients for their images and other clinical information to be reported in the journal for education purposes. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

REFERENCES:
1. Firtz T, Werschning D, Klavora R, Krieglstein C, Friedl
2. W. Combined Kirschner wire fixation in the treatment of Colles' fracture. A prospective,

controlled trial. Arch Orthop Trauma Surg. 1999;119:171-8.
3. Board T, Kocialkowski A, Andrew G. Does Kapandji wiring help in older patients. A retrospective, comparative review of displaced intra-articular distal radial fractures in patients over 55 years. Injury 1999;30:663-9.
4. Azzopardi T, Ehrendorfer S, Coulton T, Abela M. Unstable extra-articular fractures of the distal radius, a prospective, randomized study of immobilization in a cast versus supplementary percutaneous pinning. J Bone Joint Surg Br. 87-B: 837-40.
5. Kreder HJ, Hanel DP, Angel J, McKee M, Schemitsch EH, Trumble TE, Stephen D. Indirect reduction and percutaneous fixation versus open reduction and internal fixation for displaced intra-articular fractures of the distal radius. J Bone Joint Surg- Br; 87-B; 829- 36.
6. https://www. researchgate.net/ publication/ 13896094_A Modified Kapandji Procedure_for Smith's Fracture_in_Children
7. Gartland JJ, Jr, Werley CW. Evaluation of healed Colles' fractures. J Bone Joint Surg Am. 1951; 33(4):895-907.
8. Kiernan C, Brennan SA, McInerney N, Jadaan M, Kearns SR, O'Sullivan M. Volar locking plate versus k-wiring fixation of distal radius fractures in 20-65 year olds. ORS Annual Meeting; Poster No. 1424, 2012
9. Kapandji A. Internal fixation by double intrafocal plate, Functional treatment of non articular fractures of the lower end of the radius. Ann Chir 1976;30:903- 8.