



CODEN [USA]: IAJPBB

SSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1101098>Available online at: <http://www.iajps.com>

Research Article

**FUNCTIONAL RESULTS OF COLLES' FRACTURE MANAGED
BY PERCUTANEOUS CROSSED KIRSCHNER WIRES.**Niaz Hussain^{1*}, Imran Javed², Muhammad Ali³¹Department of Orthopedics, Liaquat University of Medical and Health Sciences, Jamshoro²Department of Orthopedics, Hamdard University, Karachi³Department of Orthopedics, Liaquat University of Medical and Health Sciences, Jamshoro**Abstract:****Objectives:** To observe functional outcome of Colles' fracture managed by Percutaneous Crossed Kirschner Wires.**Study Design:** Descriptive case study.**Setting:** Department of Orthopaedic Surgery, Liaquat University of Medical and health science, Hyderabad/ Jamshoro.**Period:** 1st January 2016 to 31st December 2016.**Methods:** 124 patients with Colles' fractures were taken for this study. For operative procedure all patients were operated under general anaesthesia. Close manipulating was done, reduction was checked under Image Intensifier and fracture were fixed with 2 cross k-wires, one starting from radial steroid and engaging in medial cortex of the radius and one from medial side of distal radius tip and engaging lateral cortex of radius. Functional outcome was assessed after 3 months and recorded on preformed proforma.**Results:** functional outcome of percutaneous Kirschner wire fixation for Colles' fracture was observed in 80.65% (100/124) cases.**Conclusions:** functional outcome of percutaneous Kirschner wire fixation is satisfactory in Colles' fractures and it appears to be an effective, easy, and technically less demanding procedure for stabilization, so this procedure can be applied for patients with these fractures.**Key words:** Colles' fractures, Percutaneous Kirschner wire fixation, distal radius bone fracture.**Corresponding author:****Niaz Hussain,**

Department of Orthopedics,

Liaquat University of Medical and Health Sciences,

Jamshoro

QR code



Please cite this article in press Niaz Hussain et al., **Functional Results of Colles' Fracture Managed by Percutaneous Crossed Kirschner Wires**, Indo Am. J. P. Sci, 2017; 4(12).

INTRODUCTION:

Colles' fracture (distal radius) is a fracture which usually presents with posterior angulation of the wrist and hand [2]. The fracture is sometimes called "dinner fork" deformity due to typical shape the forearm bones. This fracture was described by Abraham Colles' in 1814. It occurs within 2.5 cm of the articular surface and may extend into distal radioulnar and or radio carpal joints. Colles' fractures are very common in old age peoples mainly due to osteoporosis [3]. Female gender, early menopause and osteoporosis are the most common risk factors for these fractures [4]. Frykman introduced a comprehensive classification of Colles' fracture which is based mainly on involvement of articular surface of the radiocarpal and distal radioulnar joint [4]. All distal radial fractures with dorsal displacement are referred to as Colles' fracture regardless of the fracture configuration, comminution and age of the patient or mechanism of the injury [5]. There are different criteria to diagnose these types of fractures on x-rays like angulations and displacement for Colles' fracture occurs in more than 60% of cases [10]. There are many methods for management of these types of fractures like, external fixation, cast immobilization, pin and plaster, functional braces, percutaneous pinning, and open reduction and internal fixation with pins, wires, screws or plates [11]. Percutaneous K-wires fixation provides effective anatomical fracture reduction [8].

METHODS:

This descriptive case series study was conducted from 1st January 2016 to 31st December 2016 at Department of Orthopaedic Surgery, Liaquat University of Medical and health science, Hyderabad/Jamshoro. Total no of 124 patients were taken in this study. The cases were selected by nonprobability consecutive sampling. In this study only those patients were included who presented within 2 wks of injury. Patients with pathological fractures, open fractures, polytrauma, late presentation, infection anywhere in body, history of previous fracture at same wrist and first treated elsewhere were not included in this study. The fracture was diagnosed on AP and lateral X-rays, patient who fulfilled the eligibility criteria were included in this study. Written and informed permission and consent was taken from the patients for surgery and regarding study. All patients were operated on next elective operation theatre list within 2-3 days of admission. Procedure was performed by a

qualified Orthopaedic surgeon, with more than 5 years of post masters experience. In the operation theatre under general anaesthesia close manipulation was done and checked under fluoroscope in both AP and Lateral direction. After restoration of normal anatomy fracture was fixed with 2 cross k-wires of 1.6mm. One starting from radial stieloid and engaging medial cortex proximal to fracture and other starting from medial side of distal end of radius and engaging lateral radial cortex proximal to fracture. This surgical procedure was carried out under C-arm control and proper placement of k-wires was made sure. Finally wires were shortened, turned and kept out of the skin and then below elbow cast was applied for additional stability. Intravenous antibiotics were given at the time of induction of general anaesthesia in the operation theatre. Patient was discharged on 2nd day with oral antibiotics for one wk and oral analgesia as needed. At the time of discharge patient was advised for active and passive finger range of motion exercises. K-wires and cast was removed after 6 wks. Final functional outcome was assessed according to Cooney's modification of the Green and O'Brien scheme after 3 months of surgery and recorded on predesigned proforma. Statistical analysis was done SPSS 18.0. Frequency and percentage were computed for categorical variables like gender, mode of injury, side and acceptable functional outcome (good to excellent) in terms of yes or no. Mean and standard deviation were estimated for duration of fracture (time interval between trauma and surgery) and age. Stratification analysis was done with regards to age, gender, duration of fracture, side of injury and mode of injury to control the effect modifiers. Chi-Square test was applied to see the difference. P-value of less than ≤ 0.05 was taken as significant.

RESULTS:

Total no of 124 patients who fulfilled the acceptable criteria were taken for this study
Average age of patients in our study was 45.66 ± 10.94 years. Most of the patients presented after average 5.49 ± 3 days. Out of 124 cases, 34(27.42%) were females and 90(72.58%) were males. In our study 54(43.55%) patients presented with history of fall, 70(56.45%) were involved in RTA (road traffic accidents). Left wrist was affected in 56.45% cases and right wrist was affected in 43.55% cases. Acceptable functional outcome of percutaneous Kirschner wire fixation for Colles' fractures was observed in 80.65% (100/124).

Score	Findings
Pain	
54	None (0 on numerical analogue scale)
40	Mild, occasional (1-3 on numerical analogue scale)
30	Moderate, tolerable (4-7 on numerical analogue scale)
0	Sever or intolerable (8-10 on numerical analogue scale)
Functional Status	
54	• Returned to regular employment(was taken as returned to normal routine function with same efficiency as before injury)
40	• Restricted employment(was taken as returned to normal routine function but with decreased efficiency as before injury)
30	• Able to work but unemployment(was taken as only performing self-care like dressing, eating, washing, bathing and grooming)
0	• Unable to work because of pain(was taken as unable to perform even self-care)
Dorsiflexion- palmarflexion arc of injured hand	
64	120°-150°
30	91°-119°
20	61°-90°
10	31°-60°
0	30 ° or less Grip
Grip Strength 64	
30	100% perfect hand grips
20	75-99% normal hand grips
10	50-74% normal hand grips
0	24-49% normal hand grips 0-24% abnormal hand grips
Final Results	
90-100	Excellent
80-89	Good
65-79	Fair
<65	Poor
Acceptable outcome:	Yes No

DISCUSSION:

Colles' Fracture is the most common fractures in elderly age group, accounting for 1/6 of all the injuries seen in emergency department [6]. These fractures are usually treated by close reduction and applying plaster of Paris [7,8]. It has been seen most of the time in these fractures there is late collapse of fracture and reduction lost during the course of treatment. These patients usually present with complain of wrist pain even after fracture union. Now it has been well understood that exact anatomical reduction affect the final function. Mal-united Colles' fracture results in weak, deformed, stiff and painful wrist [12, 14] Therefore, every effort should be made to restore normal anatomical length and alignment of the distal radius fracture. The purpose of our study was to restore normal alignment of fracture so that patient should not suffer with prolong wrist pain. Our

study shows 124 cases, as in our country males are the only earning members of family in majority of cases so our study also reflects that, and males are involved in 90(72.58%) cases where as females are involved in 34(27.42%) cases. Regarding mode of injury, 54(43.55%) were involved in fall and 70(56.45%) were injured in RTA (road traffic accident). Excellent functional outcome of percutaneous K-wire was observed in 80.65% (100/124) case in our study. Study of articles by Ashok et al [9] and Marco et al [17] show almost similar results and is comparable to our study. Fernandez [18] also reported in his study that anatomic restoration should remain the primary goal of conservative management. He added that though closed reduction and cast application render satisfactory results in stable fractures. Hence these types of fractures represent a contraindication for cast

treatment [19]. As Colles' described plaster of Paris stabilization prevents deformity and malalignment but there is enough research work which shows there is considerable evidence of displacement of these types of fracture if managed in plaster of Paris cast only. In a study, 70% of cases undergoing conservative treatment are associated with considerable displacement¹⁹. In a study, the patients underwent closed manipulation and stabilization by percutaneous pinning primarily with K-wires. Anatomical fractures were reduced and stabilized under the same anesthesia¹⁹. Percutaneous pinning is an excellent technique [19]. The advantages of K-wires kept outside of skin are many as easy to remove as an outpatient procedure which is economically very much beneficial for patients [19]. In another study, there was no difference in clinical outcome could be found between plates and k-wires despite a better correction of ulnar variance [20]. Rodriguez – Merchan in a study comparing Colles' fracture treatment by percutaneous pinning and plaster cast immobilization showed that the best anatomic and functional results were obtained by percutaneous pinning¹⁵. Percutaneous K-wires fixation is a minimally invasive technique that provides an effective tool of anatomical fracture reduction [16]. Percutaneous K-wire fixation is a better alternative to simple POP cast and it does not require highly skilled person or sophisticated instrument for application. The percutaneous k-wire fixation is minimal invasive but very effective method to maintain the reduced Colles fracture [14]. It prevents collapse of radial fragments even when the fracture is highly comminuted [15].

CONCLUSION:

Percutaneous K-wire fixation is a better alternative to simple POP cast, and this is minimal invasive and effective method to stabilize Colles' fracture of distal radius. These methods prevent collapse of radial fragments during the course of treatment even when the fracture is grossly comminuted and unstable. Acceptable and satisfactory functional outcome can be achieved with this method in terms of good hand grip, early fracture healing and early relief of pain.

REFERENCES:

1. Panthi S, Khatri K, Kharel K, Byanjankar S, Sharma JR, Shrestha R, et al. Radiological and Functional Outcome of Displaced Colles' Fracture Managed with Closed Reduction and Percutaneous Pinning: A Prospective Study. *Cureus*. 2017 Jan 6;9(1):e960. DOI: 10.7759/cureus.960.
2. Chuang PY, Yang TY, Shen SH, Tsai YH, Huang KC. The Effects of Dorsal Cortical Comminution on Radiographic Results following Percutaneous

- Pinning for Extra-Articular Colles' Fracture. *Biomed Res Int*. 2015; 2015:714351. DOI: 10.1155/2015/714351. Epub 2015 Jul 29.
3. Hosseini HS, Dünki A, Fabeck J, Stauber M, Vilayphiou N, Pahr D, et al. Fast estimation of Colles' fracture load of the distal section of the radius by homogenized finite element analysis based on HR-pQCT. *Bone*. 2017 Jan 7;97:65-75. DOI: 10.1016/j.bone.2017.01.003.
4. Golec P, Depukat P, Rutowicz B, Walocha E, Mizia E, Pełka P, et al. Main health-related quality-of-life issues in patients after a distal radius fracture. *Folia Med Cracov*. 2015;55(2):23-32.
5. Jantzen C, Cieslak LK, Barzanji AF, Johansen PB, Rasmussen SW, Schmidt TA. Colles' fractures and osteoporosis--A new role for the Emergency Department. *Injury*. 2016 Apr;47(4):930-3. DOI: 10.1016/j.injury.2015.11.029.
6. Baruah RK, Islam M, Haque R. Immobilisation of extra-articular distal radius fractures (Colles type) in dorsiflexion. The functional and anatomical outcome. *J Clin Orthop Trauma*. 2015 Sep;6(3):167-72. DOI: 10.1016/j.jcot.2015.03.006.
7. Meena S, Sharma P, Sambharia AK, Dawar A. Fractures of distal radius: an overview. *J Family Med Prim Care*. 2014 Oct-Dec;3(4):325-32. DOI: 10.4103/2249-4863.148101.
8. Finsen V, Rajabi B, Rod O, Roed K, Alm-Paulsen PS, Russwurm H. The clinical outcome after extra-articular colles fractures with simultaneous moderate scapholunate dissociation. *J Wrist Surg*. 2014 May;3(2):123-7. DOI: 10.1055/s-0034-1372514.
9. Sarmiento A, Latta LL. Colles' fractures: functional treatment in supination. *Acta Chir Orthop Traumatol Cech*. 2014;81(3):197-202.
10. Rothenfluh E, Schweizer A, Nagy L. Opening wedge osteotomy for distal radius malunion: dorsal or palmar approach? *J Wrist Surg*. 2013 Feb;2(1):49-54. DOI: 10.1055/s-0032-1326725.
11. Shayota BJ, Oelhafen K, Shoja M, Tubbs RS, Loukas M. Abraham Colles and his contributions to anatomy. *Clin Anat*. 2014 Jul;27(5):670-4. DOI: 10.1002/ca.22258.
12. Lazović M, Kocić M, Dimitrijević L, Stanković I, Spalević M, Cirić T. Pulsed electromagnetic field during cast immobilization in postmenopausal women with Colles' fracture. *Srp Arh Celok Lek*. 2012 Sep-Oct;140(9-10):619-24.
13. Ellis H. Abraham Colles: Colles' fracture. *J Perioper Pract*. 2012 Aug;22(8):270-1.
14. Mostafa MF. Treatment of distal radial fractures with antegrade intra-medullary Kirschner wires. *Strategies Trauma Limb Reconstr*. 2013 Aug;8(2):89-95. DOI: 10.1007/s11751-013-0161-z.
15. Lee YS, Wei TY, Cheng YC, Hsu TL, Huang CR. A comparative study of Colles' fractures in patients

between fifty and seventy years of age: percutaneous K-wiring versus volar locking plating. *Int Orthop*. 2012 Apr;36(4):789-94. DOI: 10.1007/s00264-011-1424-2.

16. Golden GN. Treatment and programs of Colles' fracture. *Lancet*. 1963; 1:511-4.

17. Liporace FA, Adams MR, Capo JT, Koval KJ. Distal radius fracture. *J Orthop Trauma*. 2009; 23:739-48.

18. Uzzaman KS, Awal KA, Alam MK. closed reduction and percutaneous Kirschner wire fixation combined with plaster cast versus conventional plaster cast immobilization in the treatment of Colles' fracture – a prospective randomized comparative study. *J Dhaka Med Coll*. 2008; 17(2):98-105.

19. Baig MA, Ahmed K, Humail SM. Closed reduction and percutaneous Kirschner wire fixation of displaced Colles' fracture in adults. *Pak J Surg*. 2008; 24(1):31-7.

20. Rosati M, Bertagnini S, Digrandi G, Sala C. Percutaneous pinning for fractures of the distal radius. *Acta Orthop Belg*. 2006; 72(2):138-46.

21. Clancey GJ. Percutaneous Kirschner-wire fixation of Colles' fractures—a prospective study of thirty cases. *J Bone Joint Surg Am*. 1984; 66:1008–14.

22. Zekry M, Mahmoodi SM. Colles fracture: Is Kirschner wire fixation sufficient alone? *Med J Islam Repub Iran*. 2006; 8(3):7-14.

23. Manandhar RR, Lakhey S, Pandey BK, Pradhan RL, Sharma S, Rijal KP. Displaced Colles fractures: Functional outcome following closed reduction and stabilization with percutaneous K-wires. *Nepal Orthopaed Assoc J*. 2011;2(1):14-20.