Vol 5 | Issue 4 | 2015 | 212-214.

e-ISSN 2248 – 9142
print-ISSN 2248 – 9134

International Journal of
Current Pharmaceutical & Clinical Research

www.ijcpcr.com

COMPARISON OF ANATOMICAL AND FUNCTIONAL END RESULTS OF DISTAL RADIUS FRACTURE TREATED BY EXTERNAL FIXATOR CUM DISTRACTOR

Harminder Singh* and Devindra Kaur

*Postgraduate PT.BDS PGIMS, Rohtak, Rohtak, Haryana, India.
[1]Gynaecologist, General Hospital, Rohtak, Haryana, India.

ABSTRACT

Distal radius fracture was first described by Sir Abraham Colles. The functional outcome was better if anatomy was restored. Initially cast immobilization was the preferred mode of treatment for this fracture but due to inability to maintain reduction external fixator was employed. Present study was directed towards comparing anatomical and functional end results in treatment of this fracture using external fixator and cast immobilization. Study consisted of 40 patients divided into 2 groups. Group A with 20 patients treated using closed reduction and external fixator and group B with 20 patients treated by closed reduction and cast immobilization. Evaluation was done clinically and radiologically. Regarding anatomical end results group A having 95% excellent and good results and group B having 60% excellent and good results. No patient showed poor results in group A but in group B 10% had poor results. Regarding functional end results 95 % in group A showed excellent and good results while in group B 70 % showed excellent and good results. No dissociation was observed in group A in anatomical and functional end results Functional results were better than anatomical end results in group B. Complications were more in conservative group. External fixator allows better anatomical result and superior grip strength. Good functional outcome is assured even in presence of less than satisfactory anatomical union as found in conservative group. External fixator is ideal for managing distal radius fracture.

Key words: Distal radius fracture, External fixator, Anatomical and functional end result.

INTRODUCTION

Distal radius fracture was first described by Sir Abraham Colles in 1814 who stated that "The limb will at some remote period again enjoy perfect freedom in all movements and be completely exempted from pain but deformity will be undiminishable throughout life" [1]. Distal radius fractures were considered benign 30 years ago and conservative treatment was the rule but due to occurrence of complications like mal-union leading to pain and disability surgical treatment is preferred to avoid this sequel. Several investigations of factors affecting the functional outcome of fractures of distal radius have more convincingly shown that patient functions more effectively when anatomy is restored [2]. Fracture distal radius is associated with high energy trauma in young adults with definable functional demands and if articular anatomy is not restored within reasonable degree of congruency, those associated with shearing type fracture dislocation may lead to significant functional disability. Closed reduction and immobilization in a plaster cast still remains the accepted method for treatment for 75 to 80 percent of fractures of the distal end of the radius and for the extra-articular fractures that are minimally displaced or impacted and, thus judged inherently stable [3]. But maintenance of reduction with cast immobilization is difficult. Percutaneous pinning is a simple technique which can be used along with as external fixator in the management of

Corresponding Author :- **Harminder Singh** Email:- harminder697@gmail.com

comminuted intra articular distal radius fracture [4]. The principle behind external fixator cum distractor is the maintenance of reduction by continuous distraction commonly termed "Ligamentotaxis" [5].

This study was designed to compare the anatomical and functional end results in patients of distal radius fracture treated with closed reduction and external fixator with those treated with closed reduction and cast immobilization.

MATERIAL AND METHOD

This prospective study was conducted at Department of Orthopaedics. 40 patients of fracture distal end of radius were divided in two groups-

Group A- 20 patients treated using closed reduction and application external fixator cum distractor.

Group B- 20 patients treated by closed reduction and pop immobilization.

Patients subjected to-

- Standard AP and lateral radiograph of wrist with distal forearm
- Radiograph of normal wrist
- Classified according to Frykman classification
- Broad spectrum i.v antibiotics before start of surgery to group A

Surgery performed under suitable anesthesia. The first schanz screw of 2.00 mm passed through second metacarpal on the radial side, the second schanz screw of 3.5 mm passed on radial side of the radius. Once closed reduction achieved pins are connected to the stabilizing rods, the second schanz screw in second metacarpal and forearm passed and clamps were tightened by Allen keys. Pin site dressing done and radiographs were taken post operatively. Patient discharged after 1-3 days of observation. Patients were followed up clinically and radiologically regularly and evaluated for functional and anatomical outcome after 6 months.

Group B : cast removed after consolidation of the fracture site seen on radiograph and patients were evaluated at the end of 6 months.

- Anatomical outcome was assessed on antero-posterior (Radial angle, Radial length,

Radial shift) and lateral radiographs (Dorsal angle, Dorsal shift) of the wrist including lower forearm.

Evaluation was based on a system devised by Stewart et al (1984) [6] (table I).

Grading according to score: Excellent 0, Good 1-3, Fair 4-6, Poor 7-12 Functional end result were analysed subjectively by questionnaire and objectively by noting range of motion, grip strength and functional capacity in both the groups by criteria based on Sarmeinto et al [7]:

Point range: 0 to 3. Prominent residual deformity 1, Residual dorsal tilt 2, Radial elevation of hand 2 to 3.

Complications were in the **point range 0 to 5** depending on *the severity of arthritic change* and *association of pain*. Arthritic change minimum 1, minimum with pain 3, moderate 2, moderate with pain 4, severe 3, severe with pain 5. Nerve complications (median) given 1 to 3 and poor finger function due to cast 1 to 2.

End result point ranges from 0 to 2- excellent, 3 to 8- good, 9 to 20- fair and 21 and above- poor

Complications like infection, pin site loosening, breakage of pins etc were also carefully noted.

Observations

According to Stewart [6] et al (1984) criteria as modified by Sarmiento [7] et al (1980) final results were excellent in 60% (12 patients) in external fixator group. 35% (7 patients) had good, 5% (1 patient) had fair result. No patient presented with poor end results in external fixator group (Fig1). In conservative group 10% (2 patients) reported excellent results, 50% (10 patients) with good end results, 30% (6 patients) showed fair results and 10% (2 patients) had poor end results (Fig2). Regarding functional end results according to Dermit System of Sarmiento et al [7] among external fixator group 60 % showed excellent, 35% good, 5% fair result and none showed poor result, while in conservative group 15 % showed excellent, 55% good, 20% fair and 10% showed poor results. These observations clearly showed that group A having 95% excellent and good results and group B having 70% excellent and good results. On following anatomical and functional end results in both the groups, it was found that the average loss of dorsal angle, radial length, radial angle was more in conservative group. This group had more average loss of dorsiflexion, palmar flexion, radial deviation, ulnar deviation and supination/pronation as compared to external fixator group. The most significantly altered parameter was supination and the most significantly altered anatomical parameter was dorsal tilt. On comparison of functional and anatomical end results no dissociation was observed in group A in anatomical and functional end results. Conservative group showed some dissociation between anatomical and functional end results. Functional results were better than anatomical end results in this group. Complications like residual pain, restriction of finger movements, residual deformity, prominent ulnar styloid were more common in conservative group. 2 patients in external fixator group had superficial pin site infection, 1 patient presented with pin site loosening and 1 patient had breakage of schanz screw(TableII).

Table I. Adopted from Stewart et al (1984)

Final dorsal angle(degrees)	Loss of radial length (mm)	Loss of radial angle (degrees)	Score for each measurement
Neutral	Less than 3	0-4	0
1-10	3-6	5-9	1
11-14	7-11	10-14	2
Above 15	12 and more	15 and more	3

DISCUSSION

On comparing anatomical and functional end results of both groups it was found that external fixator group showed no dissociation in anatomical and functional end results but in conservative group functional results were superior over anatomical results. There occurs a parallel relationship between anatomical and functional end results as the maintenance of reduction of fracture in anatomical position was better with external fixator. So, functional and anatomical end results were comparable. But in conservative group functional results were better than anatomical results. This is probably due to large range of motion and multiplicity of joints in wrist which overcomes and compensates for residual deformity to some extent. The Cassebaum [4] (1950) who stated that "Though the relationship between anatomical and functional end results exists but good functional results can be obtained even when anatomical results are poor". Cooney analysed different external fixators in the treatment of unstable distal radius fractures. Overall, the number of good to excellent result, range of motion and incidence of complications were similar for each group[8]. Complication profile of external fixator group was more favourable than conservative group. Occurrence of superficial pin site infection and breakage of schanz screw was attributed to the surgical procedure. Superficial infection healed with dressing of pin sites and antibiotics.

CONCLUSION

Wrist joint is a highly complex and versatile joint. If articular anatomy is not restored to a reasonable degree of congruency, it leads to significant functional disability. External fixator allows much better anatomical result and superior grip strength. Good functional outcome is assured even in the presence of less than satisfactory anatomical union as found in conservative group. External fixator is ideal for wider use and applications in management of distal radius fracture.

REFERENCES

1. Colles A. On the fractures of the carpal extremity of the radius. *Edinburgh Med and Surg*, 10, 1814, 182-186.
2. Trumble TE, Schmitt SR, Vedder NB. Factors affecting functional outcome of displaced intra-articular distal radius fractures. *J Hand Surg Am*, 19(2), 1994, 325-340.
3. Cooney WP. Management of colles' fractures.*J Hand Surg Br*, 14, 1989, 137-139.
4. Cassebaum WH. Colles' fracture:a study of end results. *JAMA*, 143, 1950, 963-965.
5. Raskin KB, Melone CP.Unstable articular fractures of the distal radius.Comparative techniques of ligamentotaxis. *Orthop Clin North Am*, 24(2), 1993, 275-286.
6. Stewart HD, Innes AR, Burke FD.Functional cast bracing for colles' fractures:A comparision between cast bracing and conventional plaster cast. *J Bone Joint Surg*, 66B, 1984, 749-753.
7. Sarmiento A, Zagorski JB, Sinclair WF. Functional bracing of colles' fractures: A prospective study of immobilization in supination vs pronation. *Clin Orthop Relat Res*, 146, 1980, 175-183.
8. Cooney WP. External fixation of distal radial fractures. *Clin Orthop*, 180, 1983, 44-49.