



EVALUATION OF OUTCOMES OF INTRA-ARTICULAR DISTAL RADIUS FRACTURES TREATED BY OPEN REDUCTION AND INTERNAL FIXATION – PROSPECTIVE STUDY

Orthopaedics

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ABSTRACT

Objective -The aim of this study was to evaluate functional and radiological outcomes of intraarticular distal radius fracture treated by open reduction and internal fixation **Method**- 21 patient of intra-articular distal radius fracture were taken . who underwent open reduction and internal fixation by volar plating ,x ray at regular interval (6 weeks, 3 months, 6 months and 1 year) were obtained for assessment of volar tilt, radial inclination, radial height, ulnar variance, and functional outcomes were evaluate using Modified Mayo Wrist score **Results** – following observation were made, mean volar tilt was 11.68 ± 1.07 ,with P value 0.05 ; mean radial height 22.47 ± 1.23 with P value 0.05; mean ulnar variance was -1.27 ± 0.60 , with P value 0.05 ; the mean radial inclination were 12.49 ± 1.14 with p value 0.05. In this study modified mayo wrist score is used for functional outcomes with mean of 84.76 ± 6.7 P value >0.05. **Conclusion**- Open reduction and internal fixation by volar plate in intra articular distal radius fracture provide good to excellent results and effective in the maintainance of distal radius anatomy.

KEYWORDS

Volar plating, Distal end radius, Modified Mayo Wrist Score, x-ray

INTRODUCTION-

Distal radius fractures are one of the most common injuries encountered in orthopedic practice. They make up 8%–15% of all bony injuries in adults^[1]. Fractures of distal radius usually occur as a result of high energy trauma in younger individual with good bone density and are associated with substantial articular and periarticular tissue injury. Besides, these fractures are also reported in elderly osteoporotic patients^[2]. The majority of these fractures (57% to 66%) are extra articular (AO type A), 9% to 16% are reported as partial articular fractures (AO type B) and 25% to 35% are reported as complete articular fractures (AO type C). Anatomic reduction with stable fixation is usually the treatment of choice for displaced intra-articular fractures^[3]

Intra Articular

Barton's fracture is the displaced intra- articular coronal plane fracture-subluxation of dorsal lip of the distal radius with displacement of carpus with the fragment^[4].

Chaffuer's fracture was described as originally occurring due to backfire of the car starter handles in older models. It involves an intra-articular fracture of radial styloid.^[5]

Die-punch fracture depressed fracture of the lunate fossa of the articular surface of the distal radius^[6].

If these fracture are not assessed properly and not treated on time, angulation, shortening and articular incongruity may lead to permanent deformity and loss of function.^[7]

MATERIALANDMETHOD-

The research was carried out in the department of orthopaedics, GSVM medical college, Kanpur, Uttar Pradesh during November 2020 to November 2022. Individual giving consent and Patients whose age is above 18 yrs , skeletally mature with AO type B1,B2,B3,C1,C2 and C3 fractures of distal end radius and presenting within 3 weeks of injury were included. Patients who were below 18 yrs , distal end radius fracture associated with other injuries in the same extremity , pathological fractures, distal end of radius fracture associated with neurovascular deficit, open fracture, AO type A fracture, bilateral fractures, and more than 3 weeks old fractures were excluded. Ethical clearance was obtained before beginning of the study.

Total 21 patient of intra-articular distal radius fracture were taken . who underwent open reduction and internal fixation by volar plating ,x

ray at regular interval (6 weeks, 3 months, 6 months and 1 year) were obtained for assessment of volar tilt, radial inclination, radial height, ulnar variance, and functional outcomes were evaluate using Modified Mayo Wrist score.

Surgical Technique-

We used Modified Henry Approach in all patients.

- 1.Patient's upper extremity was prepared, draped after giving anaesthesia, tourniquet inflated.
2. 8 cm incision was made over volar aspect of forearm between flexor carpi radialis and radial artery, extended distally at the wrist crease in a 'V' shaped manner.
3. Deep incision was carried to the sheath of flexor carpi radialis. Sheath was opened and forearm deep fascia incised to expose the flexor pollicis longus.
4. Flexor policies longus was swept ulnarly to expose pronator quadratus.
5. Pronator quadratus was incised along the radial border of the radius in 'L' shaped manner and then elevated to expose the fracture.
6. After successful fracture reduction, proper size juxta articular volar plate was placed and fixed by using 2.7 mm screws in distal fragment and 3.9 locking screws in proximal fragment.
7. Pronator quadratus was sutured back, wound closed in layers and splint was applied.



Fig 1. Fracture fixation using Volar Plate.

RESULTS-

Functional outcome by Modified Mayo Score at different time interval-
At 6 week.-- 42.38 ± 10.32

At 3 month.--59.28±11.54

At 6 month-- 74.04±11.54

At 1 year.--84.76±6.7

Radiological Outcome-

The mean volar tilt was 11.68±1.07 (range 11°±5°). For comparison between different time interval we used analysis of variance single one way ANOVA, there was no statistically significance relationship between different time interval (F value 0.65 and P value >0.05)

The mean radial inclination was 22.47±1.13 (range 22°±5°). For comparison between different time interval we used analysis of variance single one way ANOVA there was no statistically significance relationship between different time interval (F value 0.65 and P value >0.05)

The mean ulnar variance was -1.27±0.60 (range 0.7mm±-1.5mm). For comparison between different time interval we used analysis of variance single one way ANOVA there was no statistically significance relationship between different time interval (F value 0.65 and p value >0.05)

The mean radial height was 12.49±1.14 (range 14mm±1mm). For comparison between different time interval we used analysis of variance single one way ANOVA there was no statistically significance relationship between different time interval (F value 0.02 and p value >0.05)

DISCUSSION-

The intraarticular and comminuted extraarticular fracture of distal end radius remains a challenging problem for orthopaedic surgeons. Intra articular fracture of distal radius almost always require ORIF for which various type of implant are used. LCP is one of the implant which provide relatively stable construct.

The advent of distal radius locking plate has provide several solution to these problems. Direct visualization and manipulation of the fracture fragment appear to be the greatest advantage of ORIF.

The use of LCP for distal radius fracture has shown rapid recovery in movement and function because wrist movement can begin early and there is no loss of reduction, which allows for early return of wrist ROM and strength. Kapoor et al^[8] reported that open reduction and internal fixation provides the best anatomical restoration with patients less likely to develop arthritis in future.

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The current study was undertaken to evaluate outcome of intraarticular distal radius treated by open reduction and internal fixation by locking buttress plate. Use of locking buttress plate in distal radius fracture provided good to excellent result and was effective in the correction and maintenance of distal radius anatomy. Intraarticular step-off, volar tilt, radial length and radial inclination were better in patient treated with ORIF. It avoided bridging the radiocarpal joint and allowed for early joint movement.

The mean age of patients in our study was 36 years comparable to Catalano et al^[9] and Jupiter et al^[10]

In our study, male predisposition of 80% is comparable to Jupiter et al, Catalano et al^[9] and Bradway et al^[11]. The higher incidence among males could be attributed to a more active work group with a greater involvement in high energy trauma and RTA. Right side involvement was predominant (57%) which is comparable to Jupiter et al and Bradway et al^[11]. RTA (62%) was the most common mode of injury. Distal radius fractures occur as a result of high energy trauma in younger individuals and low energy trauma is more frequent in older population because of osteoporosis.

In our study, 57% patients showed very good functional outcome, 33%

showed good result whereas 10% showed fair outcome. Our functional outcome is comparable with Jupiter et al^[10] and Bradway et al^[11]. In our study, all AO 23B type fractures had very good outcome while 23C fractures had fair to good results. Hence, most patients of intra-articular distal radius had good to excellent functional outcome at 6 months after locking plate fixation. Radiological evaluation of our study is comparable with Orbay et al^[12], Anakwe et al^[13], Jupiter et al^[10], Fitoussi & Chowet al^[16], Williksen et al^[14] and Fakoor et al^[15]. Final radiological parameters at one year follow-up in our study were volar tilt 11°, radial length 12mm, radial inclination 26° and ulnar variance -1 mm. Wrist range of movement of patients in our study is comparable to Jupiter et al^[10], Orbay et al^[12], Fitoussi & Chow et al^[16] and Anakwe et al^[13]. Wrist ROM at 1 year follow-up in our study was palmar flexion 74°, dorsiflexion 64°, ulnar deviation 24°, radial deviation 23°, supination 74° and pronation 76°. LCP fixation was beneficial for elderly patient with osteoporosis with early improvement in mobility and function. Moreover, early recovery was linked to low risk of complication as in other studies. In our view, restoration of the articular architecture resulted in good range of motion.

CONCLUSION-

We conclude that use of volar locking plate in intraarticular distal radius fracture provides good to excellent result and effective in the maintenance of distal radius anatomy. (Intraarticular step off, volar tilt, radial length, radial inclination). It allow early wrist joint movement owing to its fixation strength.

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