VOLUME-6 | ISSUE-4 | APRIL - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

Original Research Paper

FIXATION VERSUS CONSERVATIVE TREATMENT FOR ULNAR STYLOID FRACTURE AND ITS FUNCTIONAL OUTCOME

Orthopaedic

KEYWORDS: Hartmann's pouch, diverticulum, gall bladder, Phrygian cap, cholelithiasis.

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ABSTRACT

INTRODUCTION: The distal ulna represents the fixed point around which the radius and the hand act in daily living. The significance of distal ulnar fractures is often not appreciated and often results in inadequate treatment in comparison to its larger counterpart; the radius. There is little guidance in the current literature as how to manage these fractures and their associated injuries. The relationship of the ulnar styloid to the stabilizing ligaments determines whether a specific fracture type is likely to result in DRU joint instability.

AIM: To compare functional outcome of ulnar styloid fracture fixation versus conservative treatment

DURATION OF STUDY: 2 Years

OBJECTIVES: Wrist Range of movements, pain relief, returns to normal activities and work, radiological union of fracture.

MATERIAL AND METHODS: Interventional, Comparative and Prospective, 18 conservative -16 operative.

Inclusion criteria: Patients with displaced styloid fracture, >18 years of age.

Exclusion criteria: Patients with Undisplaced styloid fracture, Compound fracture.

In operative K wire fixation with below elbow cast for 6 weeks.

RESULT: out of 18 conservative 14 patients has nonunion and rest 4 shows union.

In operative group out of 16 patients 12 has union and 4 has nonunion. After one year follow up both groups has full range of movements.

CONCLUSION: present study shows ulnar styloid fracture fixation is useful in union of fracture but functional outcome is same after 1 year follow up in both the groups.

INTRODUCTION

Distal ulna fractures often concomitantly occur with distal radius fractures. [1-3] The incidence of distal ulna fractures is lower than that of distal radius fractures, and their treatment method is still controversial.

Fractures of the distal radius are amongst the most common skeletal injuries of childhood and adolescence.4,5 In adults, up to 70% of distal radius fractures are associated with an ulnar styloid fracture. [6-8]

Close reduction and cast immobilization has been the mainstay of treatment of these fractures but malunion of fracture and subluxation /dislocation of distal radio ulnar joint resulting in poor functional and cosmetic results is the usual outcome. The residual deformity of wrist adversely affects wrist motion and hand function by interfering with the mechanical advantage of the extrinsic hand musculature. It may cause pain, limitation of forearm motion, and decreased grip strength as a result of arthrosis of the radiocarpal and distal radioulnar joints.[9]

The distal ulna represents the fixed point around which the radius and the hand act in daily living. The significance of distal ulnar fractures is often not appreciated and often results in inadequate treatment in comparison to its larger counterpart; the radius. There is little guidance in the current literature as how to manage these fractures and their associated injuries.

The management of acute ulnar styloid fractures is based on the long-term effect that they may have on the stability of the distal radioulnar (DRU) joint. The relationship of the ulnar styloid to the stabilizing ligaments determines whether a specific fracture type is likely to result in DRU joint instability.

The static stability of the DRU-joint is achieved by the bony congruity between the sigmoid notch of the radius and the ulnar head and the ligaments which hold the joint together. [10-12] The ulno-radial ligament represents the transverse, peripheral part of the Triangular Fibro-Cartilage Complex (TFCC). 10-16 The ligaments run from the fovea of the ulnar head and the base of the ulnar styloid to the dorsal and palmar edges of the sigmoid notch on the distal radius. [7,13-15,17] The ulno-radial ligament is the major stabilizer of DRU-joint in the dorso/palmar direction.[18]

Ulnar styloid fractures seldom occur alone. More than 40% (range 21–61%) of distal radius fractures have an associated ulnar styloid fracture.[19-25] This increases to 86% if the radial fracture is intra-articular.[26] If the ulnar styloid fracture is associated with a distal radius fracture, the ulnar styloid fracture will reduce with reduction of the distal radius in many cases.[27] In such circumstances they can be treated with an above elbow cast for 6 weeks.[28] Obviously, exact restoration of the radius fracture around the sigmoid notch is of paramount importance for DRU-joint stability.

Nonunion is a common finding in fractures of the base of the styloid. The base of the styloid process serves as an anchor for the triangular fibrocartilaginous complex (TFCC) and therefore nonunion of the styloid process following fractures may jeopardize the outcome of otherwise correctly treated distal radius fractures. However, ulnar styloid fractures and their outcomes have been studied in adult populations with rather heterogeneous results.[29]

In some reports non-union is associated with chronic ulnar wrist pain and pathologies of the TFCC. Moreover, ulnar styloid fractures in adults have been shown to be a predictive factor of worse functional outcome for distal radius fractures. In contrary, other authors have reported identical functional outcomes in isolated distal radius fractures when compared to distal radius fractures associated with ulnar styloid fractures.[7]

Hence the present study was conducted to compare functional outcome of ulnar styloid fracture fixation versus conservative treatment.

AIM AND OBJECTIVES

Aim:

To compare functional outcome of ulnar styloid fracture fixation versus conservative treatment

Objectives:

(1) To compare the union rates with ulnar styloid fracture fixation

VOLUME-6 | ISSUE-4 | APRIL - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

(2) To compare the clinical outcome associated with this treatment modality
a. Wrist Range of movements
b. Pain relief
c. Return to normal activities and work
d. Radiological union of fracture

MATERIAL AND METHODS

STUDY AREA: Bharati vidyapeeth deemed University Medical College and hospital, Pune

STUDY SUBJECTS: Patients with ulnar styloid fracture.

STUDY TYPE: Interventional, Comparative and Prospective

SAMPLE SIZE: 15 conservative -15 operative

STUDY DURATION: 1 year - 1st September 2015 to 31st August 2016

Inclusion criteria
1. Patients with displaced styloid fracture
2. Age criteria: >18 years.

Exclusion criteria
1. Patients with Undisplaced styloid fracture.
2. Compound fracture.

METHODOLOGY OF STUDY:
1. Detailed history, clinical examination and investigations will be done as mentioned in the Performa.
2. Management of the patients
3. Follow up of the patients
4. Compilation of data and its analysis will be done
5. The duration of study will be 1 years

Patients will be divided into two groups, conservative and operative. In operative group ulnar styloid fixation done with k wire and below elbow cast will be applied for 4 to 6 weeks followed by cast and k wire removal and physiotherapy for wrist. In conservative treatment below elbow cast will be applied without fixation of ulna styloid for 4 to 6 weeks followed by cast removal and physiotherapy.

OBSERVATIONS AND RESULTS

Table 1: Distribution of patients according to Range of movements at different intervals:

Range of Movements	Groups	Group C (n=18)	Group F (16)	P value
Wrist flexion (deg.)	At cast Removal	34.12 ±9.91	25.1± 9.12	P>0.05
	3 months	47.71 ±11.87	48.12 ±12.12	P>0.05
	Final Follow up	58.13 ±8.93	59.32 ±9.38	P>0.05
Wrist extension (deg.)	At cast Removal	25.10± 9.12	26.13 ±9.87	P>0.05
	3 months	44.50 ±12.12	47.53 ±11.87	P>0.05
	Final Follow up	51.32 ±9.38	53.13 ±8.93	P>0.05
Radial deviation (deg.)	At cast Removal	11.10± 2.12	12.1± 3.23	P>0.05
	3 months	16.5 ±4.12	17.3 ±3.73	P>0.05
	Final Follow up	21.32 ±3.38	22.43 ±3.11	P>0.05
Ulnar deviation (deg)	At cast Removal	21.13 ±9.87	22.1± 9.12	P>0.05
	3 months	27.53 ±11.87	28.5 ±12.12	P>0.05
	Final Follow up	36.13 ±8.93	37.32 ±9.38	P>0.05

(P>0.05 Statistically Not Significant)

In the table above range of movements was described among study groups. It was observed that wrist flexion, extension, radial and ulnar deviation showed no statistical difference among two study groups. (P>0.05)

Table 2: Distribution of patients according to DASH score:

DASH SCORE	Group C	Group F	P value
At cast Removal	13.11±2.34	16.34±4.36	P>0.05
3 months	14.43±5.15	15.91 ±6.53	P>0.05
Final Follow up	26.18±7.13	27.42 ±7.15	P>0.05

(P>0.05 Statistically Not Significant)

In the table above DASH score at different time interval was described among study groups. It was observed that DASH score at different time intervals in Group P and Group T was not statistical difference. (P>0.05)

Table 3: Distribution of patients according to complications:

Complications	Group C (n=18) (%)	Group F (n=16) (%)	Total (n=34) (%)
Malunion	01 (05.55)	00 (00)	01 (02.94)
Nonunion	14 (77.78)	04 (25.00)	18 (52.94)
Deformity	01 (05.55)	00 (00)	01 (02.94)
Infection	00 (00)	02 (07.50)	02 (07.50)

In the table above complications was described among study groups. It was observed major complication in Group C was nonunion (77.78%) followed by malunion (5.55%) and deformity (5.55%) It was observed that major complication in Group F was nonunion (25%) followed by infection (7.50%)

DISCUSSION

The present study was observational prospective study undertaken to assess compare functional outcome of ulnar styloid fracture fixation versus conservative treatment.

The study was conducted during the period of September 2015 to August 2016 at Bharati vidyapeeth deemed University Medical College and hospital, Pune, Maharashtra.

All the patients presenting to the OPD and Emergency department with history of trauma to ulnar styloid and diagnosed as having fracture of ulnar styloid were included as study population.

A total sample size of 34 patients divided into two groups with fracture fixation versus conservative treatment included in the study. All the subjects included in the study volunteered after proper consent and reported for follow up at right time.

The study was conducted after obtaining clearance from the ethical committee of the institute.

The data collection was done by using predesigned pretested questionnaire. The questionnaire consisted of two parts. The first part included socio-demographic details and complete medical and surgical history. The second part consisted of the functional outcome after follow up of one year.

A total number of 34 subjects enrolled for the study were divided into two groups; Group C with patients treated conservatively and Group F with patients were treated with fixation with K wire.

In the present study, it was observed that majority of patients were in age group 26-35 years (41.18%). It was observed that mean age in Group C and Group F was 36.33 ±12.12 and 35.81 ±13.02 years respectively. There was no statistical difference among age in two study groups.(P>0.05)

In the study done by Yi-xin Chen et al[29] on whether untreated ulnar styloid fracture influence the outcome of unstable distal radial

fracture observed mean age of 51.7±13.5 years.

In the study done by Kiyohito Naito et al[30] on non-operative treatment for distal ulna fractures found mean age of patients 74.1 years.

It was observed that majority of patients were male in Group C (72.22%) and Group F. The females in Group C and Group F were 27.78% and 18.75% respectively.

In the study done by Yi-xin Chen et al[29] the males were 50% and females were 50%.

The majority patients in Group C and Group F had history of fall i.e. 66.67% and 68.75% respectively. The RTA was observed in 33.33% and 31.25% patients in Group C and Group F respectively. There was no statistical difference in mode of injury among two study groups.(P>0.05)

The distribution of patients according to side of fracture showed that majority of patients had right sided fracture in Group C (72.22%) and Group F (81.25%).

It was observed that wrist flexion, extension, radial and ulnar deviation showed no statistical difference among two study groups. (P>0.05)

Among 34 patients, 16 (47.05%) had union of fracture ulna. It was observed that out of united fracture 4 (22.22%) were in Group C and 12 (75%) in Group F. It was observed that mean union time in Group C and Group F was 13.12± 2.11 and 11.14± 2.37 weeks respectively. There was statistical difference in two study groups related to union time. (P<0.05)

Similar findings were seen in study done by Kiyohito Naito et al[30] where among 62 of 106 patients (58%) had ulnar styloid fracture and 16 patients (26%) showed radiographic evidence of union of ulnar styloid fractures at the final follow-up visit In the study DASH score at different time interval was described among study groups showed that DASH score at different time intervals in Group P and Group T was not statistical difference. (P>0.05)

In the study PRWE, Pain at rest, Pain in motion and grip strength score at different time interval was described among study groups showed that PRWE, Pain at rest, Pain in motion and grip strength score at different time intervals in Group P and Group T was not statistical difference. (P>0.05)

In a prospective cohort of 138 patients by Kim et a[31] found a 59% nonunion rate for styloid fractures in total, with no difference based on location or displacement. When comparing outcomes between patients with and without radiographic union, there were no measurable differences in motion, strength, or functional scores at 3 months or at final follow-up at a mean of 23 months.

In the study done by Kiyohito Naito et al[30] there was no significant difference in the range of wrist motion, the grip strength, the PRWE-HK scores, and the wrist pain scores among patient.

Sammer et al[32] in a prospective cohort of 144 patients, looked specifically at the outcome of untreated ulnar styloid fractures a nonunion rate of 68% was reported, but neither the presence of union nor the presence, size, or displacement of an ulnar styloid fracture had any impact on functional scores, and no patients had DRUJ instability at follow-up.

It was observed that major complication in Group C was nonunion (77.78%) followed by malunion (5.55%) and deformity (5.55%) It was observed that major complication in Group F was nonunion (25%) followed by infection (7.50%)

Functional outcome scores for patients with nonunion of an ulnar styloid fracture are no worse than those that have united. It has also been found that ulnar styloid nonunion is not associated with DRU-joint instability. This is most likely explained by the fact that the nonunions have not been assessed to represent a destabilizing ligament injury but only a bony nonunion.

CONCLUSION

The present study compared functional outcome of ulnar styloid fracture fixation versus conservative treatment.

The outcome in both the type of treatment i.e. conservative and operative shows no difference. The complications like nonunion are more in conservative while infections are more in operative.

Functional outcome scores for patients with nonunion of an ulnar styloid fracture are no worse than those that have united. It has also been found that ulnar styloid nonunion is not associated with DRU-joint instability. This is most likely explained by the fact that the nonunion have not been assessed to represent a destabilizing ligament injury but only a bony nonunion.

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VOLUME-6 | ISSUE-4 | APRIL - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

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