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FUNCTIONAL AND RADIOLOGICAL OUTCOME OF VOLARBARTON FRACTURE TREATED WITH VOLAR T - PLATE

Orthopedics

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ABSTRACT

INTRODUCTION-fracture of distal radius constitude one of the most common skeletal injuries treated boy orthopedicssurgeons.vast majority of fracture of distal radius are articular injuries that result in distruption of both radio-carpal and radio-ulnar joints.the optimal method of obtaining and maintaining an accurate restoration of distal radial anatomy remains a topic of considerable controversy. Barton's fracture, named after the American surgeon John Rhea Barton, is a fracture of the distal end of the radius that involves the dorsal or volar rim and extends into the intra-articular region. Such intra-articular fractures are uncommon, and they are usually associated with either low or high-energy trauma. They constitute only 1.3% of the distal radius fractures. Various forms of treatment have been described in literature. These include closed reduction and plaster application, percutaneous pinning, external fixation, open reduction and internal fixation (ORIF) with Kirschner wire and ORIF with a buttress plates and screws. These options are differentiated based on their ability to reinforce and stabilize the three columns of the distal radius and ulna.

Aims and objectives-To evaluate and analysis of functional outcome of fracture distal end radius volar barton type treated with volar-T plate.

Methods and materials-30 skeletal mature patients selected who presented with fracture volar barton type on the basis of opd and emmergency admissions in MB Govt Hospital Udaipur. All patients were treated operatively with volar T plate by volar henery approach and had regular followup of 6 month for there functional and radiological outcome.

Result- In our study functional assessment reaveled 30; excellent results,50;good and 13.3;fair with6.6 poor results and complication encountered were finger and wrist stiffness 3case[10;],infection1case[3.33], tourniquet palsy 1case[3.33] and collapse of fracture,1case[3.33]

Conclusion-Patients treated with volar T plate had better outcome with well maintaned radiological parameters and and functional parameter showed significant improvement during follow up period and complications were very less and insignificant.

KEYWORDS

INTRODUCTION:

Fractures of the distal radius constitute one of the most common skeletal injuries treated by Orthopaedic surgeons. These injuries account for one sixth of all fractures evaluated in emergency room. Vast majority of fractures of distal radius are articular injuries that result in disruption of both radio-carpal and radio-ulnar joints. Better understanding of the spectrum of distal radius fractures has led to changing concepts of treatment.

Barton's fracture, named after the American surgeon John Rhea Barton, is a fracture of the distal end of the radius that involves the dorsal or volar rim and extends into the intra-articular region. Such intra-articular fractures are uncommon, and they are usually associated with either low or high-energy trauma. They constitute only 1.3% of the distal radius fractures. Various forms of treatment have been described in literature. These include closed reduction and plaster application, percutaneous pinning, external fixation, open reduction and internal fixation (ORIF) with Kirschner wires, and ORIF with a buttress plates and screws. These options are differentiated based on their ability to reinforce and stabilize the three columns of the distal radius and ulna. Closed reduction is usually easy to achieve but difficult to maintain. Conservative treatment is usually unsuccessful, and it is also fraught with complications, such as early osteoarthrosis, deformity, subluxation, and instability. Several studies have been reported on the effectiveness of surgical treatment. Plating allows direct restoration of the anatomy, stable internal fixation, a decreased period of immobilization, and early return of wrist function. Buttress plates reduce and stabilize vertical shear intra-articular fractures through an antiglide effect, whereas modern locking plates address metaphyseal comminution and/or preserve articular congruity/reduction. With locking plates, intra-articular fractures are directly reduced; with buttress plates, the plate itself helps reduce the intra-articular fracture. Complications associated with plating include tendon irritation or rupture and the need for plate removal7. Restoration of the distal radius anatomy within established guidelines yields the best short- and long-term results.[1]

AIMS AND OBJECTIVES

- To evaluate the functional and radiological outcome of volar Barton's fracture treated by open reduction and internal fixation with buttress plate.
- To discuss the results and complications

MATERIAL AND METHODS

A comprehensive study had been conducted in the Department of Orthopaedics, R.N.T. Medical College & Hospital, Udaipur between Jan. 2016 to Aug. 2017. Study included 30 cases of volar Barton fractures treated with buttress plate and screws.

Inclusion criteria:

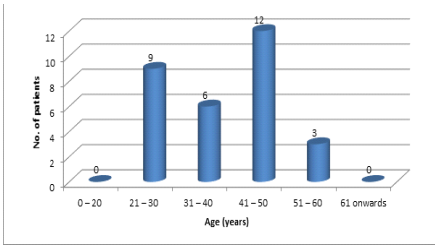
- Only Fernandez type II (intraarticular fracture produced by shearing) were considered.

Exclusion criteria :

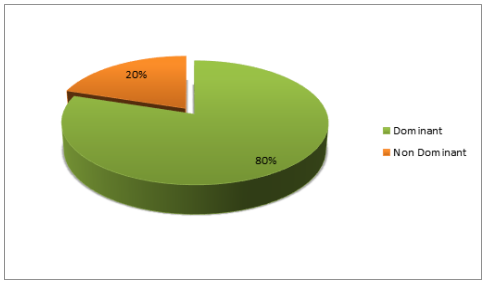
- Age < 18 years
- Open fractures (Gustilo Grade ≥ 2)
- Pathological fracture
- Fracture > 2 weeks old

RESULTS & OBSERVATION :

AGE DISTRIBUTION



DISTRIBUTION OF SIDE INVOLVED (DOMINANT V/s NON DOMINANT HAND)



DISTRIBUTION OF MODE OF INJURY

Mode of Injury	No. of cases	Percentage
Fall on outstretched hand	21	70%
Road traffic accident	9	30%
Total	30	100%

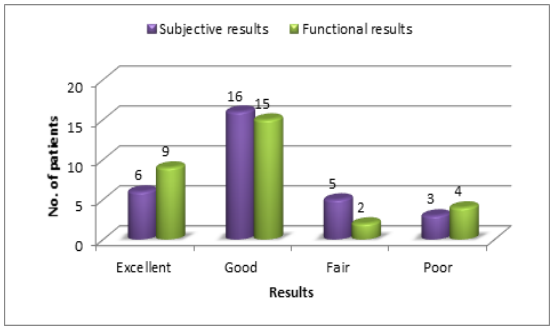
More than half of the patients i.e. 21 (70%) got their injury due to fall on outstretched hand and remaining i.e. 9 (30%) patients were injured due to road traffic accidents.

FUNCTIONAL AND SUBJECTIVE ASSESSMENT AT FINAL FOLLOW UP

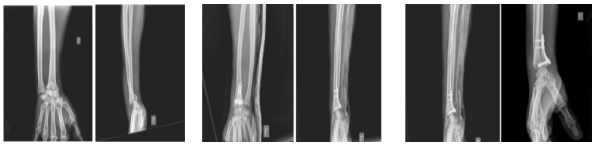
Results	Number of cases (%)	
	Subjective Results	Functional Results
Excellent	6 (20%)	9 (30%)
Good	16 (53.3%)	15 (50%)
Fair	5 (16.6%)	2 (6.6%)
Poor	3 (10%)	4 (13.3%)
Total	30 (100%)	30 (100%)

According to modified Gartland and Werly grading system, most of cases came up as good in subjective assessment with good functional results.

FUNCTIONAL AND SUBJECTIVE ASSESSMENT AT FINAL FOLLOW UP



CASE-1



JPRE-OPERATIVE X-RAYSPOST-OPERATIVE X-RAYSUNION AFTER 6 MONTHS

FOLLOW UP CASE-1

CASE-2

FOLLOW UP CASE-2

DISCUSSION :

30 patients were included in the study belonging to age group of 21 to 70 years with average age of 45 years. In the present study distal end radius fractures occurred maximum in the age group of 41-50 years i.e. 40%. This study shows an average age of 45 years, indicating that now a days young population get these fractures because of increasing incidence of motor vehicle accidents which is most common mode of injury in this group.

In our series males were predominant i.e. 27(90%), females were only 3 (10%). This male predominance can partly be explained by the fact that males are more commonly involved in road traffic accidents. This is also due to the fact that most females were reluctant to surgery. These findings are consistent with King (1975) and Melane (1984).

In this series 80% of patients were having right side involvement. The rates of right to left was 2.33:1. The predominance of right side was due to the fact that right hand was dominant in all cases. Other studies such as Donald et al. (1982), James (1991) also show more frequent involvement of dominant hand.

In our study all fractures were reduced and fixed anatomically and the union rate was 100%. The fracture healing process is not hindered due to the cancellous bone character. The success rate is therefore high. In long term complications only the 4 out of 30 patients showed restriction of range of movement due to slight finger contraction that were labeled as fair result. These observations are comparable to the study of Kapoor and co-workers (2000). They concluded that open reduction and internal fixation provide the best articular anatomy in highly comminuted fractures with a high union rate.

Postoperatively, median nerve function was not affected in any case in our study. This finding is consistent with that in the study of Zoubos et al. in 1997. Hence, we suggest that the release of the median nerve is not necessary in ORIF of volar Barton's fractures.

Volar plate fixation of unstable distal fractures has been described recently in literature. .Our results are comparable to the radiological

evaluation and functional assessments presented in these recent reports.

The course of the flexor pollicis longus tendon is close to the palmar rim of the distal radius. The plate placed very close to the wrist joint can support the palmar aspect of the articular surface. However, it sometimes causes flexor tendon impairment. To avoid rupture of the flexor pollicis longus tendons, care has to be taken especially in very distal fractures, type C3 fractures. Adequate image intensifier control to verify the extra-articular and subchondral position of screws and plate is also quite important. In our study, two patients suffered from rupture of the flexor pollicis longus tendon. If fracture instability demands distal placement of hardware, close follow-up investigations and hardware removal should be considered at the first sign of flexor tendon irritation as reported by Drobetz and Kutscha-Lissberg. This was also an important point for our study. T-buttress plate is useful for achieving good anatomical reduction, but care must be taken to avoid the complication of tendon rupture.

In our study at final functional assessment, the scores of 9 patients were excellent, 15 patients good, and 4 patients fair. Agarwal reported excellent results in 9 cases, good in 5, and fair in 2 out of 16 patients with intraarticular comminuted distal radial fractures treated with the Volar Plating.

Conclusion

We analyzed 30 cases of volar Barton fracture operated by various surgeons in our institute and able to conclude that:

- Most common mode of injury was fall on out stretched hand. Final result was analysed after an average follow up of 6 months. Anatomical and functional results were satisfactory in 80% cases fair in 13.3% cases and 6.6% cases had poor result. Complications were noted in 6 (20%) cases.

- Achieving and maintaining anatomical reduction is key stone for satisfactory outcome.

- Best functional results were obtained till 6 months of treatment.

Volar buttress T-plate fixation for intraarticular lower end radius fracture is an excellent method in young and old adults and ensures a strong, painless wrist with excellent motion and good strength with minimal complications.

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