EVALUATION OF FUNCTIONAL OUTCOME OF VOLAR BARTON DISTAL END RADIUS FRACTURES MANAGED BY INTERNAL FIXATION WITH VOLAR BUTRESS PLATE-A PROSPECTIVE STUDY

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ABSTRACT

Background and Objectives: The management of Volar Barton’s fractures either by operative or conservative means is a difficult problem. The present study was conducted with an objective to analyze the clinical and functional results of these fractures fixed internally using volar buttress plate.

INTRODUCTION

Of all the fractures of upper extremity the distal radius fracture is most common. Historically the description of distal radius is credited to Pouteau (1783) and Colles (1814). The real understanding of fractures came after advent of roentgenograms in 1895. Barton’s fracture defined in his own words is a subluxation of wrist, subsequent to a fracture through articular surface of the carpal extremity of the radius. Volar Barton’s fractures can satisfactorily been reduced and maintained in cast immobilization. When the marginal fracture is small but it involves a large portion of the distal articular surface of the radius, close reduction may be achieved but instability is characteristic and the position may be difficult to maintain. Since loss of reduction with subluxation of carpus is so common, Ellis recommended fixation of volar marginal fractures with buttress plate. In this study we present our experience of open reduction and internal fixation of Volar Barton’s fracture treated by volar buttress plate.

MATERIALS AND METHODS

After ethical clearance from institutional review board, the study was conducted between March 2013 to march 2015 at ERA’s lucknow medical college, lucknow. Twenty cases of volar barton fracture was operated using volar buttress plate for fixation of these fractures of distal end radius. All cases were operated within one week of injury. Patient was placed supine on an operating table with the forearm resting on hand table facing towards roof. Fracture was exposed using volar approach of Henry [figure 1]. Open reduction was performed and a kirschner wire was used to provisionally maintain the reduction before a definitive fixation with a 3.5 mm Ellis T plate [figure 2]. Below elbow plaster of Paris slab was given for 3 weeks and then active moment of wrist was started. Follow up was conducted at 3 weeks, six weeks, 3 months, 6 months and at one year of intervals. The functional outcomes were assessed using Mayo’s wrist scoring system. Patient with Volar Barton fractures were included in this study, Dorsal Barton fractures as well as patients with associated ipsilateral injuries of same limb were excluded from the study.

RESULTS

Patients were assessed clinically [figure 3 & 4] and radiographically [figure 5 &6]. Mode of injury was road side crash in fifteen cases and fall from height in five. Fractures were classified using A-O classification system. All cases were type B3 fractures of which ten were B3.3, five B3.2 and five B3.1 subtypes.

The mean duration of follow up was fifteen months with the mean age of 38.6 years. Fractures healed after a mean duration of 8.8 week [7 to 10 weeks]. Excellent results were obtained in 12 of 20 patients, good in 6 and fair in 2. Radiological assessment revealed an average volar angulation of 8.4 degree and ulnar angulation 20.5 degree. Superficial infection was noted in one patient. No neurovascular deficit was noted in any patient. Average active extension of wrist of 64 degree and active flexion of 69 degree was possible. Active radial and ulnar deviation was 17.8 and 25.8 degree respectively. Mean supination and pronation were 72.8 degree and 72...
degree respectively. The detailed results of all patients have been shown in the master chart.

Figure 1: fracture open by Henry approach.

Figure 2: buttress plate fixed.

Figure 3: Range of dorsiflexion of wrist

Figure 4: Range of ulnar deviation of wrist

Figure 5: Post operative x ray.

Figure 6: Post operative x ray.
DISCUSSION

Close reduction of Volar Barton’s fracture is usually easy to achieve but difficult to maintain due to an intact radio carpal ligament which is main deforming force. Although Kings reported no poor results, all patients had mild pain, weakness’ and some loss of motion at wrist joint.[3] To avoid residual articular incongruity of these fracture many authors have recommended internal fixation with different kind of implants including T- buttress plate, fixation with K wire, external stabilization and recently, use of locking plates. The present study was not designed to compare the results of various kinds of fixation but to present the results of T- buttress plate fixation. Our results are almost at par with those reported by Jupiter.[4] To avoid an ongoing controversy of nomenclature and classification of these fractures we have used A-O system which has described the most comprehensive classification so far devised for description of distal radius fractures. Our complication rate is less than other series. [Keating; Cooney; Van Leeuwen- et al].[5,6,7] Keating et al have reported some loss of initial reduction after surgery, mainly due to progressive radial shortening which has been contributed possibly due to degree of comminution of the fracture. We have in our series no such complications which could probably be contributed to external support by plaster of Paris for three weeks. The functional outcome is not totally dependent on quality of reduction and type of fixation of fracture. It is also dependent on how well and timely the physiotherapy of the patient has been started and also compliance of patient. De Oliveira in his study of twenty six patients has emphasized functional rehabilitation to be started immediately after surgery.[8] In their comparative study Dai M H et al have reported superior results of T-buttress plate over external or by percutaneous Kirschner wire fixation of Volar Barton’s fractures.[9] Nagi ON and Aggarwal AK have also reported good to excellent functional results using T-buttress for internal fixation these fractures.[10]

CONCLUSION

Hence we conclude that open reduction and internal fixation with T-buttress plate yields satisfactory results. However various comparative studies are still to be carried out to exactly pinpoint the significance between conservative vs. operative vs. different kinds of implants in use for fixation of these fractures.

REFERENCES

2. Ellis, James; Smith’s and Barton’s fractures, A Method of Treatment. J.Bone and Joint Surgery; Nov 1965; 724-727.