ORIGINAL RESEARCH PAPER

Volume-7 | Issue-2 | February-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A RETROSPECTIVE STUDY OF RESULTS OF VOLAR BARTON'S FRACTURE TREATED WITH VOLAR PLATING

Orthopaedics

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ABSTRACT

Background: Intra-articular lower end radius particularly Volar Barton's fractures are more common in young adults and associated with significant deformity if not treated effectively. Open reduction with buttress plating is most commonly used modalitiy now a days.
Method: Retrospective analysis of 50 cases of volar Barton's fracture treated with volar plating with at least 12 months of follow-up were studied and results were obtained.
Results: All patients were having good radiological and functional result. 1 major complication and 6 minor complication were occurd.
Conclusion: conclusively from our study it is clearly evident that volar barton plate provides an effective form of therapy for volar barton fracture

KEYWORDS

volar Barton's fracture, buttress plate, Kirschner wire, Henry approach.

Introduction and Back ground

Volar Barton's fractures are more common in young people and that may occur due to either high or low energy injuries.[1,2] Such fractures are unstable and leads to deformity if not managed properly. Several methods are available for management of these types of fracture Including conservative and surgical.[3] However surgical treatment is mostly favoured because of good anatomical and functional results particularly plating [4]. Various surgical techniques have been reported in the literature. Closed reduction with external fixation & percutaneous Kirschner pinning and open reduction with volar buttress plating are two most common methods of fixation being used recently.[3] In this study results of open reduction and buttressing plate were obtained retrospectively and compared.

METHODS

50 patients of distal end radius of volar Barton's type i.e. AO type B3.1,AO type B3.2 and AO type B3.3 admitted from January 2017 to December 2017 & treated open reduction with buttress plating were studied and results were obtained. All the patient were admitted from emergency department and screened to rule out other possible injuries. After conformation of volar Barton's fracture all of the patients were operated within six to 48 hours (mean injury to operation interval 24 hours) by above mentioned method either under regional anaesthesia or general anaesthesia based on physical condition of the patients.

Surgical technique

A Modified Henry's approach was used that creates the plane between Flexor Carpi radialis tendon and radial artery [5]. After severing the fibres of pronator quaderatous fracture is reduced by using periosteum elevator under direct vision and fixed by using buttress plate put over volar aspect. After that wound is closed with suture and splint was given and wrist mobilization begins after suture removal at 2 weeks post operatively.

After starting active wrist range-of-motion exercises progressive heavy loading of the wrist was permitted. Patients were followed-up at the Outpatient Department after six weeks, three months, and one year and evaluated for radio graphical and functional results.

Functional evaluation of wrist is done with Gartland and Werely score and for anatomical evaluation radiographs were taken. Clinically a fracture union was defined as no pain or tenderness during daily activity with loading, and radio graphically defined when trabeculae had bridged the main fracture fragments.[6] Non-union was defined as a fracture that was still not united after one year of treatment.[7]

RESULTS

Mean age among patient was 38 (with SD +/-10) years .Most common cause of fracture was domestic fall (24) followed by road traffic accident (14) followed by sports injuries (8) and fall from height (4). 47 patients were having closed fracture while 3 patient having gustilo Anderson type 1 fracture [8]. Among the cases 4 patient were having injuries on another limb part as being poly trauma patient. Mean follow-up period was 12 months (SD +/-2).

All 50 cases were treated volar barton plating.

All fractures healed within three months and the union rate was 100%. There were no perioperative complications in either of cases. However there was 1 case of deep infection at wound that led to wound dehiscence and that was managed with multiple debridement and prolonged antibiotic injection and removal of implant at 2 months and 6 minor complication like stich line infection and sudeck's dystrophy were there. At one year follow up the mean volar inclination is 12.3 degree.

Table 1 results according to gartland and werely classification

Gartland Werely score	Plating group
0-2 (excellent)	10
3-8 (good)	22
9-20 (fair)	18
>20 (poor)	0

There was no case of non-union or mal-union (> 2 mm step-off of the joint surface, > 5 mm of radioulnar variance, > 10 degrees of dorsal inclination, and < 10 degrees of ulnar angulation).

DISCUSSION

Factors that favours fracture healing are anatomic reduction with adequate stabilization with proper supply of blood at fracture site.[9] Cancellous bone at distal end radius is associated with faster healing so cases of non-union at this area are very rare but poor fixation can result in mal union that is very common in this area following fracture. Volar Barton's fractures often produce volar subluxation of the carpus. The principle of treatment is mainly to provide anatomic reduction and stabilization. Malunited Volar Barton Fracture is very difficult to treat and if articular cartilage is damaged regeneration of it is not possible.[10,11]

Therefore, prevention of a malunited volar Barton's fracture is of prime important to avoid having to treat a malunion. In this study, plating achieved sufficient stability during the fracture healing process and associated with good results.

Plating treatment can reduce fragments more precisely and the fragments can be stabilized more securely. However, it requires opening the fracture site. If local swelling is serious, closure of the incision site may be very difficult, although the incision is usually not

large and the infection rate negligible. Additionally, the fracture healing process is not hindered due to the cancellous bone character. The success rate is therefore high.

Long-term results mainly depend upon the degree of arthrosis of the wrist as volar Barton's fractures involve the articular surface and the injured articular cartilage normally cannot regenerate. Therefore, the longer the follow-up, the lower the success rate. In the present series, the mean follow-up period was 1 year.

To avoid poor function of the joints, wrist and finger range-of-motion exercises should be implemented as early as possible. This is especially important for Barton's fractures that have intra-articular involvement. Once adhesion in the joint occurs, treatment becomes very complicated. Both intra- and extra-articular release techniques are very difficult.

In the present series, immobilization of the joints lasted no more than six weeks. This may be another factor that influenced the high satisfaction rating.

Conclusion:

Thus conclusively from our study it is clearly evident that volar barton plate provides an effective form of therapy for volar barton fracture, specially higher grades like AO type3c with concomitant distal radioulnar joint instability. Volar barton plating provide excellent joint congruity, maintenance of radial height, correction of volar tilt & radial inclination & provides more than acceptable range of wrist movements as compared to other mode of therapy for same type & class of fracture. In addition, incidence of various complications like malunion, chronic regional pain syndrome, arthritis, carpal tunnel syndrome which are frequently encountered in conservatively treated cases & problem of infection in case of external fixator are also avoided in plating. Long term studies may requires to further evaluate our results.

Images:

Image shows clinical as well radiographic images of volar barton fracture treated with butress plate

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