National Journal of Clinical Orthopaedics

ISSN (P): 2521-3466
ISSN (E): 2521-3474

www.orthoresearchjournal.com
2019; 3(2): 115-119
Received: 21-02-2019
Accepted: 25-03-2019

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Study of functional outcome of fracture of proximal humerus with philos plate using Mippo technique

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DOI: https://doi.org/10.33545/orthor.2019.v3.i2b.19

Abstract
Proximal humerus fractures are commonly debilitating injuries and are increasing in elderly population regarding treatment controversies still exists. In our study all patients were treated with locking plates by mippo technique.
Study type: Prospective study
Materials and Methods: Study is conducted in KR Hospital, Mysore between November 2016 to July 2017. In our study total 19 patients were included (11 males and 8 females), all patients were preoperatively treated with shoulder immobiliser. After getting anaesthesia fitness all fractures were treated with anterolateral deltoid splitting approach and fixed with locking plates. Outcome was assessed by the constant murley score and followed up at 1, 3, 6 and 9 months.
Results: Among the 19 patients 3 patients were lost in follow up. 1 patient had deep infection. 1 patient had axillary nerve paresthesia, recovered spontaneously. 1 patient had varus collapse at 4 months.
Conclusion: MIPPO technique for proximal humerus fracture is easy to operate through anterolateral deltoid splitting approach and gives effective stabilization of fracture with locking plate, it allows for the early postoperative mobilisation.

Keywords: functional outcome, philos plate, mippo technique

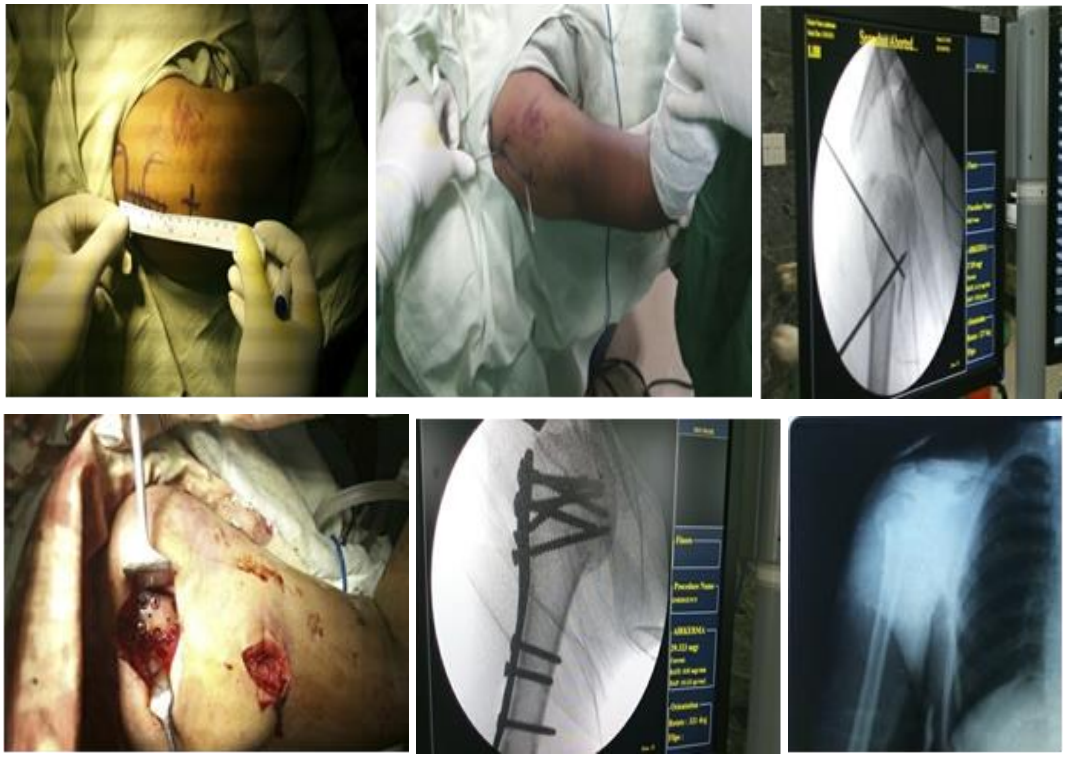
Introduction
Proximal humerus fractures are common and debilitating injuries and incidence of them are increasing especially in elderly. They account for about 4%-5% of all injuries to appendicular skeleton (1). They are the third most common fractures in elderly population after hip and distal radius fractures (2). Mechanism of injury is high energy injuries like road traffic accident, sports injuries, fall from height or gunshot wounds in adolescents and young adults however in elderly low energy injuries like domestic falls are more common. The treatment goal is to achieve a painless shoulder with full functional outcome.
Regarding treatment of proximal humerus fractures controversies still exists whether to do conservative or operative management. Various operative procedures are carried out like percutaneous pinning, tension band wiring, plating, rush nailing, arthroplasty.
In 2005 Gardner described splitting approach for the treatment of proximal humerus (4). Recent method of internal fixation is with locking plates. Locking plates provides rigid fixation and more angular stability compared to other method of operative treatment of proximal humerus fractures and helps in early mobilization and physiotherapy which leads to achieve a painless shoulder with good functional outcome. The locking plate enables rigid fixation even in osteoporotic bone an allows early mobilization, low mechanical failure, increases So we decided to study& evaluate the results of internal fixation Fixation which with locking plates using MIPO technique has several advantages of less soft tissue stripping, better preservation of blood supply, direct visualization of greater tuberosity, less chances of infection and early wound healing with less time consumption and in recent years MIPPO has been extensively used to treat proximal-humerus fractures (6-12).

Patients and Materials
We treated 19 patients of 11 male and 8 females between November 2016 to july 2017 who underwent MIPPO technique for fracture proximal homers for 2 part (5patients), 3 part (9patients) and 4 part (5patients) fractures.

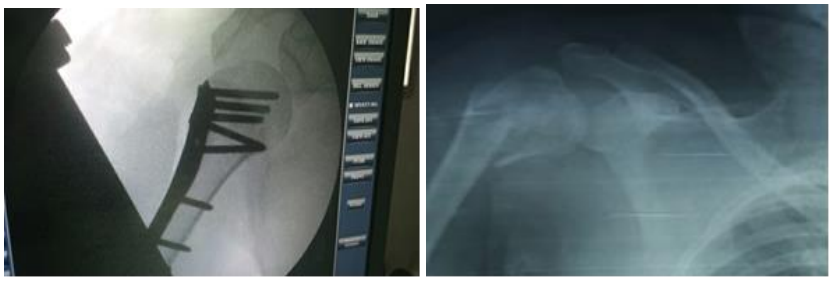
Patients with compound fractures, undies placed fractures, Fractures associated with neurovascular deficits, Patients not willing for surgery Fractures associated with dislocation were excluded.

Average delay between injury and surgery was 3days (range: 1-10). All procedures were performed under general Anesthesia with the patient in beach chair position. A lateral longitudinal incision was proximally made, beginning at the anterolateral tip of the acromion, and extending at a maximum of 5cm distally. Deep dissection was performed through avascular deltoid raphe13. Non absorbable sutures were passed through the insertion sites of the subscapular is, supraspinatus, and in Fras piñatas tendons. These sutures were used for mobilization and reduction of the tuberosities14. If necessary, k-wires were used for in direct reduction of the humeral head or for temporary fixation of tuberosity. The axillary nerve was palpated blindly by the index finger through the incision15. Full exploration of the axillary nerve was not performed. Sub muscular tunnel was prepared underneath the axillary nerve, using a blunt elevator .Plate was inserted percutaneous fr16. Location of the distal incision was determined according to the length of the plate, under Fluoroscopic control. The distal plate was palpated on the mid shaft of the distal homers. Position of the proximal plate was checked under fluoroscopy. Two kwires were inserted through the first row on the plate, using locking drill sleeves to fix the plate to the humeral head. These kwires also provided information about the position of the most proximal screws. Fixation was started distally with a 3.5-mm cortical screw as a positional screw to indirectly reduce the shaft. Proximal fixation was performed, using at least 43.5mm locking screws. If metaphyseal commination was present, along infero medial cancer screw (IMCS) was inserted through the fourth row in the plate17. Additional 2 or 3.5-mm locking screws were inserted distally to complete fixation. No absorbable sutures were tied to anchor holes to fix the tuberosity fragments and to counter balance the deforming forces on the fracture. No additional fixation was performed for the tuberosity's. Postoperatively patients were discharged after 1week with Sling immobilization and passive and active assisted range of motion exercise were begun immediately. Serial radiographs were taken at 4weeks, 3 months and 6 months and 9 months duration. Outcome was reviewed with bony union, complication, range of motion for flexion, abduction, and function outcome was assessed by constant merely score.

CASE1 (Intraop)



CASE2 (Intraop)



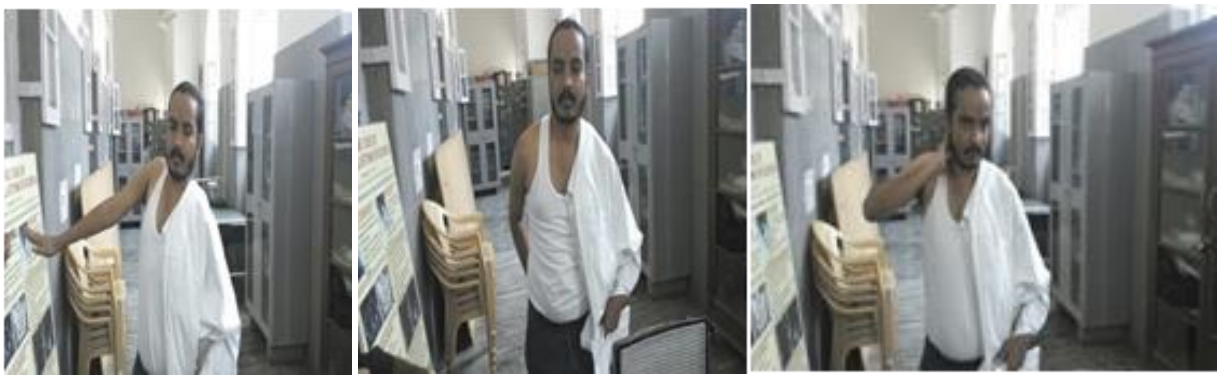
Results

In our study of 19 patients, three patients did not follow up till 9 months, and rest of the patients were followed for a duration of 9 months at 1 month, 3 months and 6 months and 9 months duration. One patient had deep infection for implant removal was done, one had axillary nerve injury in the form of paresthesia over proximal shoulder who recovered spontaneously after 4 months of operation, one patient had varus collapse and implant failure due to improper reduction.

Constant Morley Score was used to evaluate the patients for the functional outcome which ranged from 54.6+10.6 at 1 month follow up, 67.8+12.5 at the end of 3 months of follow-up and a score of 73.7+15.6 at the end of 6 months and a final score of82.7+14.6 at the end of 9 months with a forward flexion of 110-144 degrees and abduction of 90-135 degrees.

Patients were able to do daily routine activities without any difficulties. Fracture type, age of the patient and type of the fracture did not had significance in the final functional outcome.

CASE 1 (Postop)



CASE 2 (Post-operative follow up)

Discussion

In the recent years MIPO technique through deltoid split Approach has become the popular treatment for proximal Hummers fractures18. Here the plate is placed on the lateral part of the humerus head giving access to the greater tuberosity for reduction1 The deltoid splitting approach enables a more visualization of the greater tuberosity fragment for easier reduction and fixation in a shorter period of time. The locking plate provides rigid fixation especially in osteoporotic bones, increases torsional stiffness fatigue resistance and stability 20. When compared to the delta pectoral approach, there is less soft tissue stripping and less damage to the circumflex humeral artery and hence decreases the risk of complications. Avascular necrosis of head of humerus is a major complication after open reduction due to impairment of blood supply, and chances are less in MIPO technique 21, 22, 23 Axillary nerve is at a risk when the MIPO technique is done. It is localised approximately 5-6 cms distal to the acromion and as a result, incision should not be longer than 5cms and hence screw at 5th and 6th holes should be avoided24. The varus mal reduction has been reported in some patients in where the HAS was initially 130, and restoration of medial cancer is very important in order to prevent the varus collapse. Obtaining reduction in metaphyseal commented fractures and varus collapse is a technically demanding procedure and depends on surgeon's experience.

Conclusion

Minimum invasive plate osteon synthesis through anterolateral Approach for proximal homers fractures using locking.

Compression plate is found to be safe and effective means of fracture fixation that allow early return of functional range of movements with fewer rate of complications, but the initial difficulty in fracture reduction and is technically a demanding procedure.

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