Section: Orthopaedics

Research

COMPARISON OF SINGLE EXTRA ARTICULAR HUMERUS PLATING VERSUS BIPILLAR PLATING IN DISTAL HUMERUS FRACTURE

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Abstract

Background: To compare single extra articular humerus plating versus bipillar plating in distal humerus fracture. **Materials and Methods:** One hundred thirty adult age ranged 20-55 years with history of distal humerus fracture in either gender was divided into 2 groups of 65 each. Group I patients were managed with single extra articular plating and group II patients with Bipillar plating. Parameters such as surgical time, blood loss, Mayo elbow performance score (MEPS) and post operative complication etc. was compared in both groups. **Result:** Group A comprised of 35 male and 30 female and group B had 36 male and 29 female. The mean surgery time was 94.2 minutes in group A and 176.3 minutes in group B. The mean blood loss was 172.4 ml in group A and 208.6 ml in group B. The difference was significant (P< 0.05). Mayo Elbow Performance Score was excellent in 60 in group A and 58 in group B, good 5 in group A and 7 in group B. The difference was non-significant (P>0.05). Post- operative complications observed were radial nerve palsy seen in 1 and 2, myositis ossification in 2 and 1, post operative infection in 3 and 4, non- union in 1 and 2 and plate impigment in 1 and 2 in group I and II respectively. The difference was non- significant (P>0.05). **Conclusion:** Single extra articular plating offered better good prognostic results than bipillar plating. Post- operative complications were also less in single extra articular plating.

INTRODUCTION

Distal humerus fractures in adults comprise 2.4% of all fractures and constitute about 33% of all fractures of humerus. As reported by studies, its incidence is 6.3/100000 per year.[1] The most common mode of injury is simple fall from height followed by road traffic accident (RTA) and the most commonly observed pattern of fracture was that of an extra-articular fracture accounting for just under 40% of all distal humerus fractures and 3% of all types of fractures in adults.[2] Distal third humerus fractures pose challenge to orthopaedic surgeon owing to its peri-articular location, small size of the distal bone fragments, and the osteopenic quality of the bone especially in geriatric population.[3]

Management of distal humerus fractures comprises of conservative nonoperative method such as plaster cast, plate osteosynthesis and bracing whereas operative management includes plating or medullary nailing. Management of extra-articular distal humerus fractures with locking intra-medullary nails is quite difficult.[4] The insertion of intra-medullary nails is difficult due to the flat cross section of the distal humerus with a narrow medullary canal. It increases the probability for comminution of the distal fragment during nail insertion.[5] The short distal fragment makes it difficult to achieve stable fixation with distal interlocking.[6] We planned present study to compare single extra articular humerus plating versus bipillar plating in distal humerus fracture.

MATERIALS AND METHODS

A sum total of one hundred thirty adult age ranged 20-55 years with history of distal humerus fracture in either gender reporting to Orthopaedic department of Government Medical College, Amritsar, between 2020 - 22 were enrolled after obtaining valid written consent. Institutional ethical clearance certificate was also obtained. Open fracture, osteoporotic patients and pathological fractures were not taken into consideration.

All patient related data such as name, age, mode of injury etc. was recorded in case sheet. Patients were divided into 2 groups of 65 each. Group I patients were managed with single extra articular plating and group II patients with Bipillar plating. Parameters such as surgical time, blood loss, Mayo elbow performance score (MEPS) and post operative

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complication etc. was compared in both groups. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Group A comprised of 35 male and 30 female and group B had 36 male and 29 female [Table 1].
The mean surgery time was 94.2 minutes in group A and 176.3 minutes in group B. The mean blood loss was 172.4 ml in group A and 208.6 ml in group B. The difference was significant (P< 0.05) [Table 2]
Mayo Elbow Performance Score was excellent in 60 in group A and 58 in group B, good 5 in group A and 7 in group B. The difference was non-significant (P>0.05) [Table 3].
Post- operative complications observed were radial nerve palsy seen in 1 and 2, myositis ossification in 2 and 1, post operative infection in 3 and 4, non-union in 1 and 2 and plate impigment in 1 and 2 in group I and II respectively. The difference was non-significant (P>0.05) [Table 4].

Table 1: Patients distribution

Groups	Group A	Group B
Method	single extra articular plating	Bipillar plating
M:F	35:30	36:29

Table 2: Comparison of parameters

Parameters	Group A	Group B	P value
Surgery time (mins)	94.2	176.3	0.01
Blood loss (ml)	172.4	208.6	0.05

Table 3: Comparison of Mayo Elbow Performance Score (MEPS)

MEPS	Group A	Group B	P value
Excellent	60	58	0.26
Good	5	7	
Fair	0	0	
Poor	0	0	

Table 4: Comparison of post- operative complications

Complications	Group A	Group B	P value
Radial nerve palsy	1	2	0.17
Myositis ossification	2	1	
Post operative infection	3	4	
Non union	1	2	
Plate impigment	1	2	

DISCUSSION

The main aim of management of distal humerus fracture is to achieve a stable and fully functional elbow joint.[7] Post-treatment outcomes sometimes included painful range of motion, elbow stiffness and weakness in the limb.[8] Operative management with intramedullary nailing is not much useful for fixation in the distal extra articular humerus fragment as it does not provide adequate stability to the joint.[9] Dual plating is generally accepted for management of such fracture patterns, as it provides a more stable type of fixation.[10,11] This results in early range-of-motion (ROM) of the elbow. It is however associated with much soft tissue dissection and longer mean operating time, having disadvantage of development of non-union and post-operative infection.[12] We planned present study to compare single extra articular humerus plating versus bipillar plating in distal humerus fracture.
Our results demonstrated that group A comprised of 35 male and 30 female and group B had 36 male and 29 female. Anand et al,[13] performed a study of evaluating clinical and radiological outcome of single extra articular humerus plating versus bipillar plating planned for distal humerus fractures. All the operated patients were followed up for a mean time of about 13 months. Clinical, physiological and ortho-radiological assessment was performed to observe and evaluate fracture stabilization and reduction and fracture healing and callus formation and range of movements. The Mayo Elbow Performance Score and visual analogue scale were used to assess functional outcome.
We observed that the mean surgery time was 94.2 minutes in group A and 176.3 minutes in group B. The mean blood loss was 172.4 ml in group A and 208.6 ml in group B. Kumar et al,[14] performed internal fixation of distal third extra-articular humeral fractures in 22 adult patients using 2–3 lag screws neutralized with a single 4.5- mm locking compression plate with only two screws in the distal fragment. Fractures united in all 22 patients with minimal complications. The mean time to union of fracture was 13 weeks. The Mayo elbow score and the DASH scores were in the excellent and good category in all patients at final follow-up. It is possible to obtain excellent outcomes in distal third fractures using only a single 4.5-mm LCP with two-screw (4-cortices) purchase in the distal fragment.

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Mayo Elbow Performance Score was excellent in 60 in group A and 58 in group B, good 5 in group A and 7 in group B. Ring D et al,[15] compared the use of functional bracing and plate fixation for extra-articular distal-third diaphyseal fractures of the humerus. They concluded that for extra-articular distal-third diaphyseal humeral fractures, surgical treatment achieves more predictable alignment and potentially quicker return of function but risks iatrogenic nerve injury and infection and the need for reoperation.

Post- operative complications observed were radial nerve palsy seen in 1 and 2, myositis ossification in 2 and 1, post operative infection in 3 and 4, non-union in 1 and 2 and plate impingement in 1 and 2 in group I and II respectively. Sarmiento et al,[16] treated 85 extra-articular comminuted distal-third humeral fractures with a functional brace. The non-union rate in their series was 4 % and the malunion rate was 16 % (varus angulation in the majority). A decrease in the range of motion at the elbow and shoulder was another significant problem in their series. Stewart et al,[17] proposed that fractures of the distal-third humerus shaft should not be treated by hanging cast because angulation is difficult to control.

CONCLUSION

Single extra articular plating offered better good prognostic results than bipillar plating. Post-operative complications were also less in single extra articular plating.

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