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Original Research

Humeral interlocking nail and compression plating in fracture of shaft of humerus

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ABSTRACT:

Background: Fractures of humeral shaft are commonly encountered by orthopaedic surgeons, accounting for approximately 3% of all fractures. The present study was conducted to compare humeral interlocking nail andcompression plating in fracture of shaft of humerus cases. **Materials & Methods:**52 cases with fracture of shaft of humerus were divided into 2 groups of 26 each. Group I underwent internal fixation by humeral interlocking nail and group II underwent internal fixation by dynamic compression plating, with or without bone grafting. Mode of injury, range of elbow joint movements,and complications in both groups were recorded. **Results:** Mode of injury was RTA in 20 in group I and 17 in group II, fall in 4 in group I and 6 in group II and violence in 2 in group I and 3 in group II. The difference was significant (P< 0.05). The range of movement pre- operatively in group I was 8-128 degree and in group II was 4-130 degree and post- operatively in group I was 4-134 degree and in group II was 5-130 degree. Complications were shortening seen in 2 in group I and 3 in group II, non- union 1 in group I and 2 in group II, superficial infection 2 in group I and 1 in group II, deep infection 1 in group I and 2 in group II and implant failure 1 in group II. The difference was non- significant (P> 0.05). **Conclusion:** Dynamic compression plating found to be superior method of stabilizing diaphyseal fractures of humerus.

Key words: Dynamic compression plating, Humerus, Interlocking nail

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INTRODUCTION

Fractures of humeral shaft are commonly encountered by orthopaedic surgeons, accounting for approximately 3% of all fractures. Treatment of these injuries continues to evolve as advances are made in both operative and non-operative management.[1] Most humeral shaft fractures can be managed non-operatively with anticipated good to excellent results. The humeral shaft is totally covered with muscles and fracture fragments are well vascularised. Humeral shaft fractures result from direct and indirect trauma. Healing of the fracture like any other wound, depends upon blood supply.[2]

Most fractures of humeral shaft are treated non-operatively, although there are indications for primary or secondary operative treatment in some situations. The surgical indications are: Unacceptable reduction of fractures, associated vascular lesions, open fractures, radial nerve palsy, polytrauma patients, floating elbow and patients with obesity who are at risk for developing a varus angulations.[3]

Good to excellent results have been reported in most series of humeral shaft fractures treated closed or with open reduction and internal fixation.[4] Both patient and fracture characteristics, associated injuries, soft tissue status and fracture pattern need to be considered to select appropriate treatment. Open reduction and internal fixation (ORIF) with plates and screws continues to be considered the gold standard for surgical treatment given its lower complication rate and shorter time to union over intramedullary nailing.[5]

The present study was conducted to compare humeral interlocking nail andcompression plating in fracture of shaft of humerus cases.

MATERIALS & METHODS

The present study comprised of 52 cases with fracture of shaft of humerus of both genders. ALL were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 26 each. Group I underwent internal fixation by humeral interlocking nail and group II underwent internal fixation by dynamic compression plating, with or without bone grafting. Patients were subjected to routine history taking, clinical examination, pre-operative assessment followed by pre-operative and post-operativeradiographic examinations. Mode of injury, range of elbow joint movements, and complications in both groups were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Humeral interlocking nail	Dynamic compression plating
M:F	16:10	14:12

Table I shows that group I had 16 males and 10 females and group II had 14 males and 12 females.

Table II Comparison of mode of injury

Parameters	Group I	Group II	P value
RTA	20	17	0.04
Fall	4	6	
Violence	2	3	

Table II, graph I shows that mode of injury was RTA in 20 in group I and 17 in group II, fall in 4 in group I and 6 in group II and violence in 2 in group I and 3 in group II. The difference was significant (P< 0.05).

Graph IComparison of mode of injury

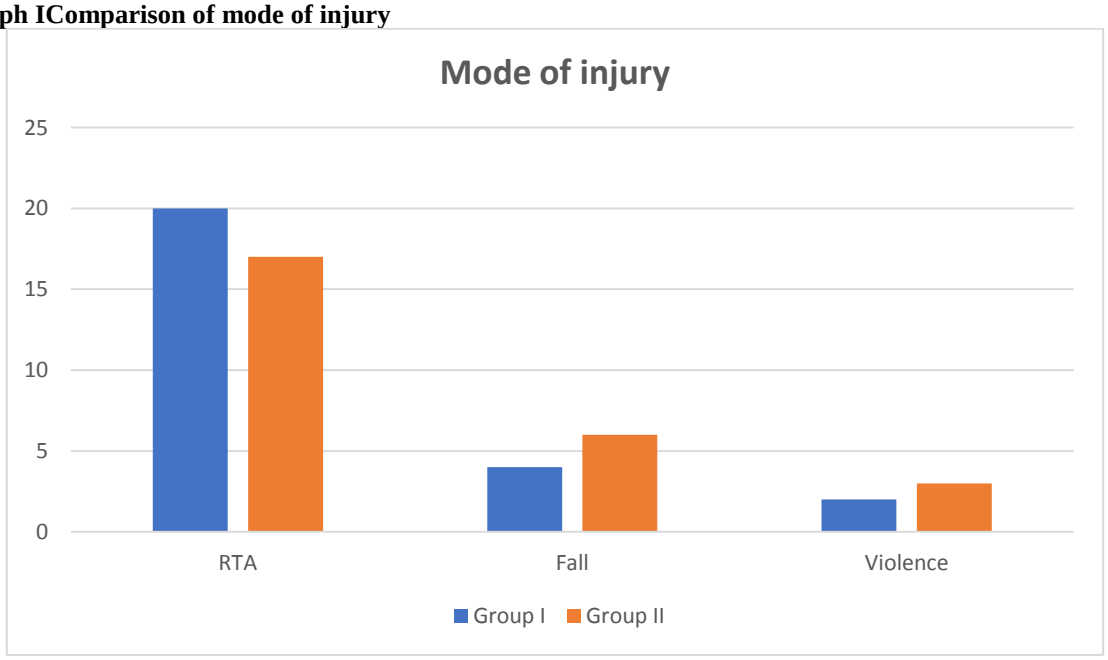

Table III Range of elbow joint movements

Range (in degree)	Group I	Group II	P value
Pre- op	8- 128	4-130	0.07
Post- op	4-134	5-130	0.06

Table III shows that range of movement pre- operatively in group I was 8-128 degree and in group II was 4-130 degree and post- operatively in group I was 4-134 degree and in group II was 5-130 degree. The difference was non- significant (P> 0.05).

Table IV Complications in both groups

Complications	Group I	Group II	P value
Shortening	2	3	0.07
Non- union	1	2	0.05
Superficial infection	2	1	0.041
Deep infection	1	2	0.05
Implant failure	0	1	0.17

Table IV shows that complications were shortening seen in 2 in group I and 3 in group II, non- union 1 in group I and 2 in group II, superficial infection 2 in group I and 1 in group II, deep infection 1 in group I and 2 in group II and implant failure 1 in group II. The difference was non- significant (P> 0.05).

DISCUSSION

Humeral shaft fractures account for roughly 3% of all fractures and have bimodal distribution. One group consists of mostly young males of 21 to 30 years age group and the other of older females of 60 to 80 years.[6] The predominant causes of humeral shaft fractures in young age group are high energy traumas and in case of second group mainly simple fall or rotational injuries.[7]Anterior plating is a simple, safe, and effective treatment for humeral shaft non-union. It does not require radial nerve visualization or extensive soft tissue dissection, and the healing time is similar to that of other methods used for treating humeral shaft non-union.[8] This is an alternative approach to osteosynthesis of humeral shaft non-union, in which the plate is placed on the anterior surface of the bone. The biological benefits of less damage to the soft tissues via an approach that uses a plane between nerves certainly contributed to good results.[9]The present study was conducted to compare humeral interlocking nail andcompression plating in fracture of shaft of humerus cases.

In present study, group I had 16 males and 10 females and group II had 14 males and 12 females. The mode of injury was RTA in 20 in group I and 17 in group II, fall in 4 in group I and 6 in group II and violence in 2 in group I and 3 in group II. Hashib et al[10] in their study 15 cases (Group-A) underwent internal fixation by humeral interlocking nail and 14 cases (Group-B) underwent internal fixation by dynamic compression plating, with or without bone grafting. All cases, except one from each group returned to their previous occupation. Both these cases developed non-union. They were able to perform daily activities but not able to resume their occupation. Thus the functional result was good in 92.3% of cases and poor in 7.7% of cases of either group. 4 cases in group-B (30.8%) managed by dynamic compression plating developed infections. In this study complications were also observed. Two of them were superficial infections that responded well to antibiotics and dressings and later healed well and united. Two cases developed discharging sinuses and subsequently infected union. Later the plate was removed and sinus tract excised. The sinus tract healed but left unsightly scar marks over the arm. Only one patient (7.7%) of group-A developed deep seated infection and subsequent non-union. 3 cases of group-A (23.1%) developed shortening ranging from 1.5cm to 4cm. All these cases were cases of old non-union with sclerotic bone ends which had to be nibbled and refreshed. Shortening developed in 2 cases (15.4%) of group-B. One non-union was seen in each group. While the screws of one dynamic compression (7.7%) went loose, no implant failure occurred in interlocking nails. One case (7.7%) of group-A developed axillary nerve injury, which might be attributed to the fact that the incision extended 6-7 cm beyond the acromion process. Only one case in group-B developed 10o angulation.

We found that range of movement pre- operatively in group I was 8-128 degree and in group II was 4-130 degree and post- operatively in group I was 4-134 degree and in group II was 5-130 degree. Ghosh et al[11]conducted a study in which forty percent of cases were in the age group 31-40 years with males outnumbering females. Motor vehicle accidents (63.3%) were most frequent cause. Right humerus was more frequently (66.6%) involved. Maximum patients (40%) were operated within 4-6 days after injury. Out of 30 patients of plate group complications were: Infection-6.6%; delayed union-13.3%; shoulder movement restriction-13.3%; elbow movement restriction-6.6%. Out of 30 patients of nail group complications were: Splintering of fracture end-6.6%; infection-6.6%; delayed union-26.6%; shoulder movement restriction-13.3%; elbow movement restriction-6.6%; shoulder pain-46.6%. Maximum number of fractures (73.3% in plating group and 60% in nailing group) clinically united in the interval of 11-13 weeks. Maximum number of patients had radiological union in period of 12-16 weeks (73.3% plate group and 66.6% nail group). There was no significant difference between the two groups. On functional assessment, excellent results were obtained in 22 patients (73.3%) in locking plate group and 18 patients (60%) in locking nail group.

We found that complications were shortening seen in 2 in group I and 3 in group II, non- union 1 in group I and 2 in group II, superficial infection 2 in group I and 1 in group II, deep infection 1 in group I and 2 in group II and implant failure 1 in group II. Puri SR et al[12] suggested that open reduction and internal

fixation with a DCP remains a better treatment option for fractures of the shaft humerus. Fixation by IMN may be indicated for specific situations, but is technically more demanding and has a higher rate of complications

CONCLUSION

Authors found that dynamic compression plating found to be superior method of stabilizing e diaphyseal fractures of humerus.

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