ORIGINAL ARTICLE

Compare the Functional Outcome of Dynamic Compression Platting and Locked Intramedullary Nailing for Primary Surgical Fixation of Non-Pathological Fractures of Humeral Shaft in adults

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ABSTRACT

Aim: To compare the functional outcome of dynamic compression platting and locked intramedullary nailing for primary surgical fixation of non-pathological fractures of humeral shaft in adults.

Methodology: A total of 200 patients of either gender of age group 16-60 years having non-pathological fracture shaft of humerus undergoing primary surgical fixation were included. Pathological fractures of humeral shaft were excluded. In group A, patients were undergone dynamic compression platting and in group B, patients received intramedullary nailing.

Results: Mean age was 39.21±10.46 years. Male patients were dominant (81.5%) than the females (18.5%). Nonunion rate with intramedullary nailing was 2% and with dynamic compression platting was 7% (p-value=0.088).

Conclusion: Both intramedullary nailing and dynamic compression platting are equally appropriate for treatment of non-pathological fracture shaft of humerus in terms of nonunion.

Keywords: Fracture, intramedullary nailing, surgical fixation, morbidity.

INTRODUCTION

Fracture of the shaft of the humerus is documented for 1% to 3% of all fractures[1]. Generally, conservative management is adopted in these cases but there is an increasing trend towards surgical stabilization. Surgical management of humeral shaft fractures has been significantly facilitated by the development of new implants[2] but it is unclear that which of the different surgical option should be used. Surgical fixation includes plating, nailing or by external fixation[3].

Intramedullary nailing is performed by exposing either the upper or lower end of the humerus away from the fracture site and the nail is inserted into the medullary canal from the top of the shoulder (antegrade nail) or the bottom (retrograde nail). The nail is then stabilized by interlocking screws in both ends. A statically locked nail (nail fixed with interlocking screws at either end for the rotational stability) provides good rigidity against torsional forces, maintains length and preserves soft tissues at fracture site. In dynamic compression plating, the fracture is stabilized with a plate and fixed with locking screws[4].

Previous trials compared the functional outcome of intramedullary nailing and dynamic compression plating are of the view that union is significantly higher in patients treated with intramedullary nailing as compared to compression plate[5].

This study has been designed to make a comparison of these two surgical interventions as there is controversy in utilization of these two techniques, so that recommendations can be given regarding their use in treatment of fracture shaft of humerus and better health care management.

MATERIAL AND METHODS

A total of 200 cases (100 in each group) with non-pathological fracture shaft of humerus undergoing primary surgical fixation of either gender between 16-60 years were included in the study while pathological fracture shaft of humerus were excluded from the study. The study was conducted at Department of Orthopaedics, Allied hospital, Faisalabad during September 2014 to March 2015. Informed consent was taken from each participant of the study. Patients were divided in to Group A and Group B using computer generated random number table. Patients in Group A were undergone dynamic compression plating for fracture shaft of humerus patients in Group B were undergone locked intramedullary locking for fracture shaft of humerus. Information was collected by myself and comprised age, sex, address, contact number and non-union after surgical intervention. Follow-up was done at one month, third month and six month by calling the patients for examination for non-union. Non-union

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rate was measured at 24 weeks. All the collected data was computed on SPSS version 16 and analyzed. Mean and standard deviation was calculated for all quantitative variables i.e. age. Frequency and percentage was calculated for all qualitative variables like gender and non-union. Chi-square test was applied to compare non-union for both groups. P-value ≤ 0.05 was taken as significant.

RESULTS

Out of 200 cases, mean age was 39.21±10.46 years. Minimum age was 20 years while maximum age was 59years, 163(81.5%) patients were male and 37(18.5%) were female. In group A, 82(82%) patients were male and 18(18%) were female. In group B, 81(81%) patients were male and 19(19%) were female with p-value=0.856. Out of 200 patients, 9(4.5%) patients had nonunion and 191(95.5%) had union. In group A, 7(7%) patients had nonunion and 93(93%) had union. In group B, 2(2%) patients had nonunion and 98(98%) had union. There is no significant difference between two groups with p-value = 0.088.

Distribution of nonunion

Non union	Group		Total
	Dynamic compression plating	Intra medullary nailing	
Yes	7(7%)	2(2%)	9(4.5%)
No	93(93%)	98(98%)	191(95.5%)
Total	100	100	200

Chi-square value = 2.91, p-value = 0.088

DISCUSSION

Our study revealed that majority of the patients belong to age <40 years (57.5%). There were mostly male patients (81.5%) than the females (18.5%). Nonunion was observed in 11(11%) patients in DCP group and 2(2%) patients had nonunion in intramedullary nailing group.

Putti AG et al[5] demonstrated that male gender was dominant than females. They observed 0% nonunion rate with intramedullary nailing and 6% nonunion rate in patients treated with dynamic compression platting. They were of the view that both management modalities have good functional outcome, these findings are in agreement with our study.

Another study by Wali MG et al[6] conducted a study on internal fixation of shaft humerus fractures by dynamic compression plate or interlocking intramedullary nail. They evaluated 50 patients in which male patients were in majority (82%). Common age was 37 years. They observed that the nonunion rate after 6 months was similar in both intramedullary nailing and dynamic compression platting group i.e., 8%. They concluded that intramedullary nailing is an effective alternative to plating in shaft humerus fractures as it has comparable results regarding union rate and complications which supports the results of our study.

Another study by Changulani M and others[7] in a randomized controlled trial compared the use of the humerus intramedullary nail and dynamic compression plate for the treatment of diaphyseal fractures of the humerus. They recorded that 39 males and 8 females average age between 30-40 years. They recorded that 12.5% nonunion was found with dynamic compression platting and 14.28% in patients with intramedullary nailing. They concluded that Intramedullary Nailing is a better surgical option when compared to DCP for the treatment of diaphyseal fractures of the humerus. It may be due the fact that it offers a short union time and lower rate of serious complications such e.g. infection. However, there appears to be insignificant difference between intramedullary nailing and dynamic compression plating regarding functional outcome and the frequency of union of the fracture, it supports the results of this study.

Dai J et al[7] compared dynamic compression plating with locked intramedullary nailing for humeral shaft fractures. They reported that there was no significant difference in nonunion intramedullary nailing and dynamic compression platting. They were of the view that complications were more common in patients treated intramedullary nailing as compared to dynamic compression platting and both are equally effective regarding union, these findings also supports our results.

Another study[8] recorded 13% nonunion rate with intramedullary nailing and 8% with dynamic compression platting and concluded that both the techniques are appropriate for the management of humeral shaft fracture, these findings are also supporting our results.

Both intramedullary nailing and dynamic compression platting are equally appropriate for treatment of non-pathological fracture shaft of humerus in terms of nonunion. Both treatment modalities are effective alternative to each other and can be used as better health care management for treatment of humeral shaft fracture.

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