

Outcome in the Conservative Management of Shaft of Humerus Fracture in Functional Brace

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ABSTRACT

Background: Trauma is most common cause of fracture in young adults and in elderly, patients from standing fall can have fracture of humerus. Around 10% of long bone fractures are from Upper limb.

In this study we have observed the outcome of humeral shaft fracture managed with conservative treatment using functional brace.

Aim. To determine outcome of functional bracing of fracture of humeral shaft in a tertiary care hospital of Lahore.

Place of Study: This study was conducted at department of Orthopaedic surgery Jinnah Hospital, Lahore from April 2016 to April 2017.

Study design: Descriptive Case Series.

Duration of study: 1 year.

Sampling technique: Non probability / consecutive sampling.

Methods: It was determined by radiological healing till 12th week after the fracture.

Results: 89% to patients had adequate healing at 12th week while 11% of patients were unable to achieve good healing.

Conclusion: Conservative management of fracture shaft of humerus with functional brace is effective mode of treatment.

Keywords: Humerus, Fracture, Functional Brace.

INTRODUCTION

Fractures of the humeral shaft account for 1% to 6% of all fractures. Approximately 10% of all long bone fractures occur in the humerus. It tends to affect elderly patients after a fall from standing height. Patterns of fracture are predictable from the anatomy of the proximal humerus, the insertions of the rotator cuff on the tuberosities causing displacements of these segments and impacting on functional outcome. Preferably nonoperative management gives results that are sufficiently good. Indications of operative management include inability to obtain and maintain an acceptable closed reduction, open fractures, vascular injury, bilateral humeral shaft fractures and progressive or new onset of nerve palsy.

There is contradictory evidence of efficacy of non-operative conservative methods. In one study of 213 patients, the occurrence of nonunion (20.6% vs 8.7%; $P=.0128$) and malunion (12.7% vs 1.3%; $P=.0011$) was statistically significant and more common in the nonoperative group. So it was concluded that conservative treatment of humerus fractures had a significantly higher rate of nonunion

and malunion than surgical management. Functional bracing is now widely used in our hospitals for treating humeral shaft fractures conservatively. In a study of 108 humeral fractures treated with functional brace conservatively, union rate came out 97.2 % with mean duration of 12.16 weeks (range, 7.5-19 weeks).

Fig : Functional Brace



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MATERIALS AND METHODS

This descriptive case series was conducted in the Department of Orthopaedic Surgery, Jinnah Hospital, Lahore during period of 1 year from April 2016 to April 2016. The calculated sample size was 234 cases taken with 95% confidence interval and 5% margin of error. Non probability/consecutive sampling technique was used.

Inclusion Criteria:

- Age 16-60 years.
- Closed, Simple and unilateral fractures of shaft of humerus determined by X-ray.
- Patients of both genders.

Exclusion Criteria:

- Any neuronal/vascular injury determined by history and examination
- Open or compound fracture, determined by X-Ray.
- History of previous surgery or intervention for same fracture.
- Advanced osteoporosis as diagnosed by X-ray shoulder in Axial View.
- Any history of connective tissue disorder, pathological fracture, previous fracture of ipsilateral humerus, rheumatoid arthritis and osteoarthritis of shoulder.

Data collection procedure: After an informed consent 234 subjects coming to Emergency Department of Jinnah Hospital Lahore and fulfilling the selection criteria were included in the study using consecutive non-probability sampling. All patients were managed according to standard departmental protocols. The injured extremity was stabilized in U slab or hanging cast that held the elbow in 90°. If the acute symptoms subsided and the injured extremity was not swollen, a functional brace was applied and the patient was given a collar-and-cuff sling to wear. After application of brace, patients were followed on an outpatient basis on 2nd week and then every month for three months. At each visit, radiographic and clinical observations were made. After seeing clinical and x ray signs of good callus formation and healing, the brace was removed and time noted. The brace was worn at all times. Patients were instructed in the performance of pendulum exercises immediately after the application of the initial cast or splint, and exercises were continued after the application of brace. If there were no signs of callus formation in radiograph at 12 weeks (3 months) after fracture, it was treated with surgery according to department protocol.

Data analysis procedure: Data collected was entered and analyzed in the SPSS version 17. Results were projected using descriptive statistics e.g. mean with standard deviation in case of

continuous variables like age, frequency and percentages. In case of categorical variables like gender and radiological healing data was stratified for age and gender. Chi-square test was used post-stratification. P value < or = 0.05 was consider significant.

RESULTS

A total of 234 patients were included in this study to assess the outcome of fracture shaft of humerus treated conservatively with a functional brace. These cases were presented in emergency department of Jinnah Hospital, Lahore. All Patients were treated conservatively with a functional brace.

Distribution of age: Most of the patients in our study were of young age group between 19-35 (i.e., 46%). Second peak was between age 36-45 (i.e., 31%).

Gender of patients: Sex wise distribution shows 91% of patients were male while only 9% were of female gender.

Outcome (Fracture healing): Study shows that 208(89%) patients had adequate fracture healing at 12th week of treatment whereas 26(11%) patients were not able to achieve our parameters of healing at 12 weeks (Table 1). Our parameters were to see radiological healing at three cortices at 12 weeks.

Table 1: Fracture healing at 12 weeks

Fracture healing	n	%age
Yes	208	89
No	26	11

P-Value: <0.005

DISCUSSION

Fractures of humerus are a common problem. It accounts for 10% of all long bone fractures. Fracture pattern is predictable with a good knowledge of anatomy and precise history of events leading to fracture^{1,2}.

Treatment of humeral fractures has always been into debate. Some Surgeons like to manage their patients with conservative methods as they think that it is less invasive and equally effective method of treatment with less morbidity in reference to wound and anesthesia complications³. In a study conducted at Tribhuvan University teaching hospital Nepal, it was concluded that union rate for humeral fractures is 97.2% by treating conservatively using functional brace⁶ which is quite comparable with our study where we observed that healing was up to 89% in patients with humeral fractures.

Decision of surgery also largely depends on type and site of humeral fracture which should not be confused with collective outcome of operative management. Indications of operative management

include inability to obtain and maintain an acceptable closed reduction, open fractures, vascular injury, bilateral humeral shaft fractures and progressive or new onset of nerve palsy⁴⁻⁶.

Surgery is usually conducted when conservative treatment fails to achieve results⁷. In our study 26(11%) patients could not have good healing so they were subjected to operative treatment for their fractures.

Most of our patients 89% achieved good healing within 12th weeks after the conservative treatment which is comparable with a randomized control trial conducted by Awan et al which showed that average healing time was 10 to 18 weeks after conservative management of humeral fracture¹⁰. Whereas in a study conducted by Sarmiento et al. healing time for humeral shaft fracture was observed as 11.5 weeks¹¹.

This study provides sufficient amount of evidence that management of humeral fractures with functional brace is a good and efficient modality of treatment. So in view of this evidence, use of functional brace should be encouraged.

CONCLUSION

It is concluded from this study that the conservative treatment of fracture shaft of humerus using functional brace is an effective method of managing uncomplicated humeral fractures. In the light of this evidence, use of functional brace for fracture shaft of humerus should be encouraged.

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