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A CLINICAL STUDY OF FIXATION OF FRACTURE OF SHAFT OF HUMERUS WITH INTERLOCKING NAIL

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ABSTRACT: the aim of the present study is to evaluate the results of closed interlocking intramedullary nail in the management of fractures of shaft humerus. 20 humeral shaft fractures were treated by closed reduction and intramedullary interlocking nailing in the department of orthopaedics, government medical college, government general hospital, anantapuramu from November 2010 to Aug 2012. The cause of fracture was RTA in 17 cases and fall in 3 cases. Age incidence varied from 20 years to 60 years, 14 were male 6 female. Out of 20 cases in 18 cases fracture united by 3 to 4 months. 2 non-unions occurred after 6 months., Excellent results were obtained in 40% of the cases, good results in 20% of the cases, fair results in 25% and Poor results in 15% of the cases. Most common complication was shoulder stiffness occurring in 5 cases. We conclude that interlocking nailing for humerus shaft fractures is an effective means of fixation. The most common complication is shoulder stiffness which can be minimized by preventing proximal protrusion of nail, proper repair of rotator cuff and early rehabilitation.

KEYWORDS: Humerus, interlocking nail.

INTRODUCTION: As many other fractures, humerus fractures can be managed conservatively or surgically. The two modalities of internal fixation in fracture shaft of humerus are plate osteosynthesis and intramedullary nailing. Intramedullary nail is a better implant biomechanically. Nails are subjected to smaller bending loads and are less likely to fail due to fatigue. They act as load sharing and stress shielding devices. Cortical osteopenia that occurs right adjacent to the ends of plates is rarely seen with intramedullary nails; thus, refracture after implant removal is seen less often. This treatment method has been the subject of controversy since its inception because of concern of damage to medullary circulation, possibilities of fat embolism and a lack of understanding of the biomechanical principles of intramedullary interlocking nail fixation. we tried to evaluate the results of interlocking nailing of humerus fractures in this study.

MATERIALS AND METHODS: This study was undertaken in the department of orthopaedics, government medical college, anantapuramu during the period - November 2010 to August 2012. patients in the age group: 20 to 60 years, closed and type 1 compound fractures humerus were included in the study. Fractures in children, Type 2 and 3 compound fractures, Pathological fractures, Fractures of lower and upper end humerus were excluded from the study. The duration between the occurrence of injury and internal fixation is within three to four days in all 20 cases. All cases were treated by closed interlocking nailing in an antegrade manner. The patients were regularly followed up at intervals of 6 weeks each and radiographs taken.

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The anatomical and functional results were evaluated based on shoulder and elbow range of motion, radiological appearance of fracture healing, and complications if any. (Naiman, PT Schein, A. J. Et. al 1970). Results were classified into excellent, good, fair and poor.

RESULTS:

ANALYSIS OF 20 CASES:

Age in years	No. of cases	Percentage
20-30	6	30%
30-40	5	25%
40-50	5	25%
50-60	4	20%

TABLE 1: AGE DISTRIBUTION

Sex	No. of cases	Percentage
Male	14	70%
Female	6	30%

TABLE 2: SEX DISTRIBUTION

Side	No. of cases	Percentage
Left	12	60%
Right	8	40%

TABLE 3: SIDE OF FRACTURES

Among 20 cases 30% of the cases involved upper 1/3rd, 55% involved middle 1/3rd and 15% involved lower 1/3rd shaft humerus.

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A. O. Type	No. of cases	Percentage
A1	5	25%
A2	1	5%
A3	4	20%
B1	2	10%
B2	4	20%
B3	2	10%
C1	2	10%
C2	0	0
C3	0	0

Table 4: A. O. Type Classification

Type A1 fractures were most common constituting 25%, A2 fractures were 5%, A3 were 20%, B1 were 10%, B2 were 20%, B3 were 10%, C1 were 10%.

Type of Complication	No. of cases	Percentage
Restriction of Rom of shoulder	5	25%
Infection	0	0
Bursites	0	0
Subacromial impingement	2	10%
Delayed union	0	0
Non Union	2	10%

Table 5: Post-operative complications

Results	No. of Cases	Percentage
Excellent	8	40%
Good	4	20%
Fair	5	25%
Poor	3	15%

Table 6: Results

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Excellent results were obtained in 40% of the cases, good results in 20% of the cases, fair results in 25% and Poor results in 15% of the cases.

X-RAYS

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DISCUSSION: The main indications of intra medullary nailing are segmental fractures, pathological fractures,³² patients with multiple fractures and non-union.²⁶ The advantages of intramedullary interlocking nailing are minimal surgical exposure, better biomechanical fixation, minimal disturbances of soft tissues and early mobilization of neighboring joints.

The technique of interlocking nailing represents the newer approach of the treatment of humeral fractures. Interlocking nailing also avoids complications like lack of rotational control, migration of nail and requirement of supplementary bracing.

In this series Road Traffic Accidents accounted for 17 cases and 3 cases were in accidental fall category. There is a male preponderance of the fracture representing 14 patients and 6 female cases which works out to a ratio of 2.3:1 and the occurrence of the fracture in productive and active age group is very high representing 11 cases. Most of the fractures occurred on the left side, 12 cases representing 60% and the right side was 8 cases representing 40%. Majority of the fractures occurred in the middle third i.e. 11 cases (55%) followed by upper third i.e. 6 cases (30%) and lower 1/3rd 3 cases (15%) shaft of humerus.

All the nails were inserted antegrade through the entry point just medial to greater tuberosity. All these fractures were fixed using a humeral nail of sizes 6, 7, 8 mm diameter and of appropriate length calculated intraoperatively.

Radiological union was defined as the presence of bridging callus of the cortices in two orthogonal views. Delayed union was defined as failure of fracture union to occur by 4 months. Nonunion was defined as failure of fracture union by 6 months.

Out of 20 cases in 18 cases fracture united by 3 to 4 months. 2 non-unions occurred after 6 months. None of the cases had splintering of fragments at the fracture site during nail insertion into distal fragment. Overall union rate 90% & nonunion rate is 10%.

The main concerns in antegrade intramedullary interlocking nailing of humeral shaft fractures are with shoulder stiffness. Previous reports have implicated injury to the rotator cuff, disruption of the articular cartilage or adhesive capsulitis as a result of antegrade entry. In the antegrade approach, it is essential to ensure that proximal end of the nail is deep to the articular surface of head of humerus to reduce impingement.

Two cases of non-union, two cases of shoulder impingement and five cases of shoulder stiffness were observed.

Among the 20 cases 60% of cases had good to excellent functional rating. 40% of the cases having shoulder problem.

So our study shows that early fixation of fracture by closed reduction and internal fixation with intramedullary interlocking nail had resulted in early fracture union and early return to the functional and occupational activities

CONCLUSIONS:

- Humeral interlocking nail is an effective means of fixation of acute humeral fractures in patients with multiple fractures.
- The secure fixation provided enables early post-operative rehabilitation both physically and psychologically.
- Distraction at the fracture site should be avoided.

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- Shoulder stiffness is a significant problem in antegrade nailing, which can be minimized if care is taken to prevent proximal protrusion of the nail to reduce impingement, proper repair of the rotator cuff and early rehabilitation

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