



CLINICAL OUTCOME OF FRACTURE SHAFT OF HUMERUS MANAGED WITH INTERLOCKING NAIL

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ABSTRACT

Background: Management of fracture shaft of humerus can be with cast, plate osteosynthesis or with intramedullary nailing. In this study we have analyzed the outcome in terms of time for union rates, functional results and complications of humeral shaft fractures managed with closed antegrade interlocking nailing. **Methods:** This is a prospective study comprising of 25 patients with acute fractures of shaft of humerus managed with antegrade interlocking nailing in a tertiary care hospital. There were 15 females and 10 males with an average age of 38.7 years (24-64 years). All the patients were followed up for an average period of 6 months and results were analyzed. **Results:** 23 (92%) fractures united with an average time of 14.26 weeks (11-16 weeks), 2(8%) fractures resulted in nonunion. Nail impingement was seen in 2 (8%), shoulder stiffness in 1 (4%). Functional results were excellent in 21(84%), moderate in 2(8%) and poor in 2(8%). **Conclusion:** Closed antegrade interlocking nailing offers an effective technique of fixing fractures of humeral shaft, with early fracture stabilization and good union rates.

KEYWORDS : Closed Interlocking nail; Fracture shaft humerus; Fracture union; Non-union

INTRODUCTION

Fractures of shaft of humerus are commonly encountered by orthopaedic surgeons, representing between 3% - 5% of all fractures¹. The modalities of treatment of fracture shaft of humerus are close reduction & cast application, open reduction & plate osteosynthesis and close or open reduction & 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.² 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. So, aim this study to evaluate the final outcome of twenty five cases, in terms of advantages, difficulties, complications and to prepare guidelines for the treatment of fracture shaft of humerus.

MATERIAL AND METHODS

The study was conducted in a tertiary care hospital in the department of Orthopaedics. Study comprises of total 25 patients. It includes the patients attending the OPD, Emergency or admitted as Indoor patients in our hospital.

Inclusion Criteria:

- Age group : Skeletally matured patients
- Gender : Male and female patients.
- Closed shaft of humerus fracture
- Patients who are willing to participate in the study
- Patients who are fit for surgery

Exclusion Criteria:

- Skeletally immature patients
- Open fractures
- Undisplaced fractures
- Grossly comminuted fractures (bag of bones)
- Fractures associated with neurovascular deficits
- Patients not willing for surgery
- Pathological fractures

Study was initiated after approval from Institutional Ethical Committee. Informed consent from each patient was taken. 25

adult patients with traumatic fractures of humeral shaft treated with closed antegrade intramedullary interlocking nailing were studied with the objective to study the functional outcome after interlocking nail for fracture shaft of humerus, the time of union and the union rates and to study the complications after treatment of fracture shaft of humerus with interlocking nail. Patients having fractures classified into type II and type III compound by Gustilo Anderson and/or those having associated radial nerve palsy were excluded from the study. All the cases were treated by closed intramedullary interlocking nailing in antegrade manner. Assessment of the patient was done on the basis of clinical and radiological union, range of motion at shoulder and elbow joints and subjective complaints like pain in the shoulder and elbow joints. Shoulder and elbow functions were graded excellent, moderate or poor depending upon the loss of range of motion in any direction, subjective complaints like pain were also taken into account.

RESULTS

Our study had 25 cases of fractures of shaft of humerus treated by closed antegrade intramedullary interlocking nailing. All the patients were followed for a minimum period of 6 months. The following observations were made. Age range of our patients was from 24 years to 64 years with an average of 38.7 years. The majority of patients 15(60%) were females and 10(40%) were males. Right side was involved in 16(64%) patients and left side in 09(36%) patients. Road traffic accidents was the commonest mode of injury accounting for 18(72%) patients, the remaining 7(28%) patients presented with the history of fall. In our study, 15(60%) patients had fracture at middle third of shaft of humerus, 6(24%) patients had fracture at proximal third of shaft of humerus and 4(16%) patients had fracture at distal third of shaft of humerus. 12(48%) patients had transverse fracture, 8(32%) patients had oblique fracture, another 3(12%) patients had comminuted fracture and 2(8%) patient had spiral fracture. (Table 1) Most of the patients were operated within a week of trauma on an average, time interval was 5.8 days.

Pattern of Fracture	Number of Patients	Percentage
Transverse	12	48
Oblique	08	32
Comminuted	03	12
Spiral	02	8

The period of fracture union ranged from 11 weeks to 16 weeks with an average period of 14.26 weeks, except 2(8%) cases which went for non-union. As regards to functional assessment of patients, shoulder function was excellent in 21(84%) patients, moderate in 2(8%) patients and poor in 2(8%) patient. Elbow function was excellent for all patients. The overall functional results (Figure 1) were excellent in 84% cases (21 patients), moderate in 8% cases (2 patients) and poor in 8% cases (2 patients).

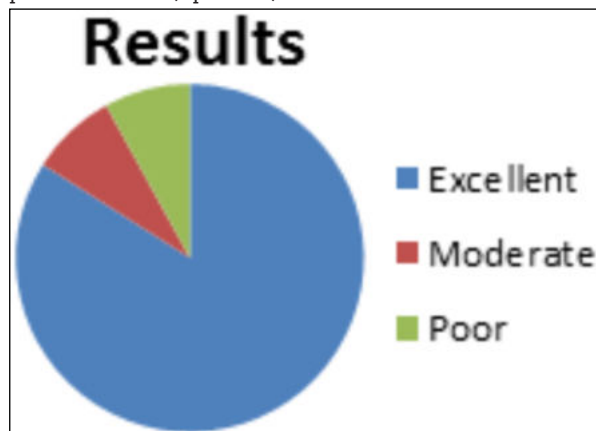


Figure 1: Showing Overall Functional Results

Following complication were noted during the study (Figure-2)-

Impingement: - 2(8%) patients had nail impingement of proximal end, as it was not buried completely into the bone.

Joint stiffness: - 1(4%) patient ended up with shoulder stiffness mainly abduction was affected.

Non-union: - 2(8%) patient was fixed in distraction at the fracture site. On follow up there were no signs of fracture union. The fracture ended in non-union.

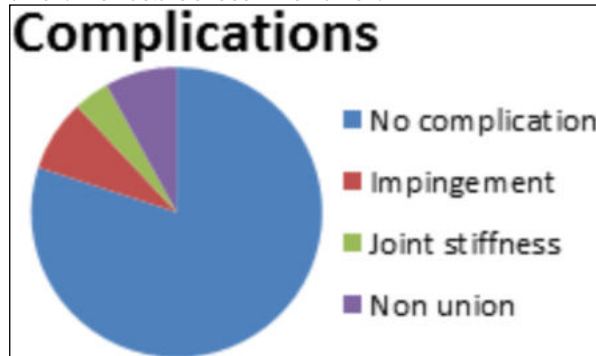


Figure 2: Showing Overall Complications

DISCUSSION

Management of fractures of the shaft of humerus, especially those which are proximal and distal shaft, is always difficult for surgeon to manage with good functional outcome. Many clinical and experimental studies have been performed in order to find an effective method of fixation for these fractures which finally lead to a stable, painless and functional elbow. They are very frequently associated with multiple injuries, leading to complications like shortening, malunion, infection, delayed union and non-union etc. The aim of treatment in these fractures is to achieve length and alignment and produce favourable environment for bone and soft tissue healing. Most of the acute humeral shaft fractures can be successfully treated by conservative methods. Operative treatment may be considered to avoid complications such as

malunion, delayed union, rotational deformity, shoulder and elbow stiffness, limb length discrepancy, psychological problems and long hospital stay. Operative stabilization is required in certain fractures, including those among patients with unsatisfactory closed reduction, and multiple injuries. Plate osteosynthesis has yielded high success rate but it needs extensive dissection with the risk of radial nerve damage and refracture after implant removal. Intramedullary nailing has the advantages of less soft tissue trauma and less chances of radial nerve injury, but the use of unlocked flexible nails had been complicated by poor rotational stability and slipping out of the nails causing joint irritation. Locked nailing overcomes these deficiencies and has produced satisfactory clinical results. Results of present study are comparable with other studies. Most of the operative methods for stabilization of humeral shaft fractures have acceptable rates of union. We attribute, early fracture consolidation and higher union rates to closed nailing technique, which preserves fracture hematoma. The most frequent criticism of antegrade humeral nailing has been its potentially deleterious effect on shoulder function. This can be due to impingement of proximal nail tip or proximal locking screw, due to adhesive capsulitis or due to rotator cuff tears.

Table 2: Comparison Of Union Rate Obtained In Various Studies

Study	No. of Patients	Type of Reduction	Delayed union	Non-union	Overall union
Bell et al ⁶	38	AO plating	-	1(3%)	33(97%)
Rodriguez ⁵	20	IM nailing	1(5%)	-	19(95%)
Rommens et al ⁴	39	Retrograde IM nailing	-	1	38(95%)
Jinn lin ⁸	48	IM nailing	-	-	100%
Tingstad et al ⁷	83	AO plating	-	5(6%)	78(94%)
Shyamsunder et al ⁹	37	IM nailing	-	3	31 (91.8%)
Present study	25	IM nailing	-	2	23(92%)

Table 3: Comparison Of Mobility Of Shoulder And Elbow Joints In Various Studies

Study	No. of Patients	Excellent range of mobility	Percentage
Bell et al ⁶	38	38	97
Griend et al ³	36	30	85.4
Rommens et al ⁴	39	38	96
Rodriguez ⁵	20	19	95
Gongol and mracek ¹⁰	32	31	97
Bhat et al ⁹	37	31	91.89
Present study	25	21	84

CONCLUSION

Based on our study we conclude that closed antegrade intramedullary nailing with an interlocking nail is a safe and effective method of treating fractures of shaft of humerus. It is excellent method of managing comminuted and unstable fractures of shaft of humerus. Closed antegrade interlocking nailing is an excellent least invasive surgical option available to manage fractures of shaft of humerus with early fracture stabilization and good union rates.

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