



## SURGICAL MANAGEMENT OF DIAPHYSEAL FRACTURE OF HUMERUS BY INTRAMEDULLARY INTERLOCKING NAILING IN OUR GOVERNMENT GENERAL HOSPITAL

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**ABSTRACT** **BACKGROUND:** Operative management of fracture shaft of the humerus can be with plate osteosynthesis or with intramedullary nailing. In this study, we have tried to analyze the outcome in terms of time for consolidation, union rates, functional results, and complications of humeral shaft fractures managed with closed antegrade interlocking nailing. The study was conducted in a government general hospital, Siddhartha medical college, Vijayawada.

**METHODS:** A series of 30 patients with acute fractures of the shaft of the humerus were treated with antegrade interlocking nailing during november 2017 to November 2019. There were 19 males and 11 females with an average age of 44.37 years (18-75 years). All the patients were followed up for an average period of 6.76 months, and results were analyzed.

**RESULTS:** 30 (100%) fractures united with an average consolidation time of 13.067 weeks (11-16 weeks). Functional results were excellent in 27(90%), moderate in 2(6.6%), and poor in 1(3.3%).

**CONCLUSION:** Closed antegrade interlocking nailing offers a safe and reliable method of fixing fractures of the humeral shaft, with early fracture consolidation and higher union rates. It provides early rehabilitation and reduces the hospital stay.

**KEYWORDS :** Fracture Shaft Of Humerus; Interlocking Nailing

### REVIEW OF LITERATURE

Humerus shaft fractures are 1-2% of all fractures occurring in the body [1,2] and 14% of all fractures of Humerus [3]. Up to the age of 60yrs diaphyseal Humerus fractures occur equally in men and women. After 60 yrs, these fractures are more common in women [4]. The most common reason for Humerus shaft fractures is fall, followed by motor vehicle accidents [5]. These fractures are treated operatively and non operatively. Acute, closed, uncomplicated fractures that occur in ambulatory, cooperative patients have high rates of union with good functional results if treated non-operatively [6]. Non-operative techniques are skeletal traction, Velpeau bandage, hanging cast, functional bracing [6] Operative treatment methods are plate osteosynthesis, [7] intramedullary nailing [8]. Biomechanically intramedullary nails are subjected to smaller bending loads and are less likely to fail by fatigue, and they act as load sharing devices, stress shielding with resultant cortical osteopenia is minimum. Re-fracture after implant removal is rare, and they do not require extensive exposure. With the use of an image intensifier without exposing the fracture site, these devices can be inserted in a closed manner, with minimal soft tissue scarring and low infection rates, which preserves the fracture hematoma, and provides early fracture consolidation with higher union rates. With the interlocking mechanism, they achieve rotational stability and provide early mobilization of the adjacent joints and decrease the morbidity. Due to reduced hospital stay and early return of the patient to his job, the financial burden on the family is less. Although closed intramedullary nailing with interlocking is a good treatment for fracture shaft humerus, it has some disadvantages including restriction, and painful shoulder movements in antegrade and that of the elbow in retrograde nailing. This study is to see the efficacy, fracture union time, complications associated with interlocking nailing and to study the functional outcome of the shoulder in the operated limb.

### MATERIALS AND METHODS

This is a prospective study consist of 30 cases of traumatic fracture shaft of Humerus treated in our government general hospital, Siddhartha medical college, Vijayawada from November 2017 to November 2019.

All cases were treated surgically with intramedullary interlocking nails. The study was initiated after approval from the Institutional Ethical Committee. Informed consent from each patient was taken.

### INCLUSION CRITERIA:

Age above 18 years. (skeletally mature adults ) Traumatic diaphyseal fractures of humerus (2 cm below the surgical neck and 3 cm above olecranon fossa.) Grade 1 compound fractures of the humerus.

### EXCLUSION CRITERIA:

Pre-existing shoulder or elbow disability, Concomitant ipsilateral shoulder or elbow injury, Pathological fractures, Neglected fractures of the Humerus, Grade 2 & 3 compound fracture of the Humerus, Preoperative radial nerve palsy, Patients medically unfit for surgery.

Cases will be selected by diagnosis on history, clinical examination, and radiology. The patient who fulfills the inclusion criteria will be taken for study.

### RESULTS

- The mean age of the patients was 47years. Male preponderance was seen amongst the subjects [63.3%]. Most of the subjects sustained a fracture due to road traffic accidents [63.3%]. Of the 30 fractures level of injury, most commonly seen in the middle 1/3<sup>rd</sup> level [67%].
- Right side involvement is predominantly seen in our study. A transverse fracture is the most common pattern of injury that occurs in 40% of patients.
- Most of the patients operated within a week of trauma on an average of 6.2 days. The average time for the radiological union in this study is 13.067 weeks Range [11-16weeks], with the union rate of 100%. In this study, we observed 27/30 [90%] patients had excellent results, 2/30 [6.6%] patients have good results, 1/30 [3.3%] patient has poor results.

### DISCUSSION

Humerus shaft fractures treated conservatively often yield satisfactory clinical outcomes. Operative stabilization is needed in conditions like unsatisfactory closed reduction and multiple injuries. However, to get the rapid relief of symptoms and restoration of joint functions, surgery is preferred. Most of the operative methods for treating these fractures have acceptable rates of a union. Fractures treated with intramedullary nailing has advantages of fewer chances of radial nerve injuries, less soft tissue trauma, preserves fracture hematoma, which leads to early fracture consolidation and higher union rates. Complications like the migration of nail, lack of rotational control can avoid by using interlocking nails.

A most frequent criticism of antegrade intramedullary interlocking nail is its deleterious effect on shoulder function, and this is mainly due to the impingement of proximal end of the nail, adhesive capsulitis or due to rotator cuff tear. Both nail and proximal screws placed deep to the cortex to reduce impingement.

**Table 1: Comparison of male predominance in various studies**

STUDY	Total No patients	No. Of Male Patients	PERCENTAGE
Arun KN et al.	25	15	60%
S.Rawa et al.	25	20	80%
Ramji Lal Sahu et al.	78	64	83.33%
Prasanth Ganji et al.	12	10	83.33%
Sanjib Goswamy et al	22	17	77.77%
Present study	30	19	63%

**Table 2: Comparison of union rate obtained in various studies**

Study	No of patients	Delayed union	Non union	Overall union
Rodriguez et al.	20	1[5%]	-	95%
Jinn lin	48	-	-	100%
Shyam sunder et al.	37	-	3	91.8%
S. Rawa et al.	25	-	1	96%
Dr. Fardeen Sheriff et al.	30	-	1	96%
Prashanth et al.	12	-	1	83.3%
Arun KN et al	25	-	-	100%
Present study	30	1	-	100%

**Table 3: Comparison of the mobility of shoulder and elbow joints in various studies**

Study	No of patients	Excellent range of mobility	Percentage
Griend et al	36	30	85.4
Rommen's et al	39	38	96
Rodriguez	20	19	95
Arun KN et al	25	21	84
S. Rawa et al	25	17	68
Prasanth Ganji et al	12	11	91.66
Present study	30	27	90

## CONCLUSION

- Intramedullary interlocking fixation of diaphyseal fractures of Humerus is a simple technique with minimal exposure and less intraoperative blood loss and shorter operative time.
- The preservation of fracture hematoma, periosteum, soft tissue around the fracture that occur with close nailing has been proposed for high rates of union and good results, with no risk of iatrogenic radial nerve palsy. Shoulder stiffness is a significant problem in antegrade nailing, which can be minimized if care is taken to prevent proximal protrusion of the nail and proper repair of the rotator cuff and early institution of physiotherapy.
- Humerus nailing is associated with early return to the function of the extremity, low infection rate, and also very good pain relief in the pathological fractures. It is an acceptable alternative to the acute humeral shaft fractures in multiple injured patients.

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