RESULTS OF INTERLOCKING NAIL IN FRACTURE SHAFT HUMERUSSanjib Goswami¹, Prabin Ch. Gogoi²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: In today's world the incidents of fracture of the shaft of humerus or as a whole trauma to the extremities, is on the rise. More and more people are being affected because of urbanization and rapid growth of vehicular accidents. Fracture of the shaft of the humerus constitute approximately 3 to 5% of all fractures.¹ We assessed the role of locked intramedullary nailing as a primary stabilization procedure in terms of union, functional recovery and factors influencing the results. In a group of 22 patients with humeral diaphyseal fracture stabilized with primary unreamed humeral locked nail, the overall union rate was 90.9% without any additional procedure. Full range of elbow movement was achieved in all cases, however full range of shoulder movement could not be achieved in 3 patients (13.6%). Our study establishes the fact that closed antegrade interlocking nailing offers a safe and reliable method of fixing humeral shaft fractures with excellent union rates within an acceptable period (12 weeks).

KEYWORDS: Intramedullary nail, Fracture shaft of humerus.

INTRODUCTION: Trauma to the upper extremity often presents a real challenge to the orthopaedic surgeons and until recently injuries to the upper extremity did not receive as much attention in the literature as those to the lower extremity, they often result in considerable disability. Severe functional impairment often results in the upper extremity when fracture healing is accompanied by sequelae like contracture, loss of motion of the adjacent joints and other soft tissue compromise, even though the bone itself has healed satisfactorily.

Approximately 3 to 5% of all fractures are of humeral shaft.¹ over the past few decades the management of the fractures of the humeral shaft has seen a variety of conservative and surgical treatment. These have included hanging casts, shoulder spicas, u-slabs, functional bracing among the conservative methods and intramedullary kuntcher's nailing, rush nailing, compression plating and now locked intramedullary nailing.

The development of interlocking nail systems for the fracture shaft of humerus has dramatically broadened the indications for intramedullary nailing. It provides stable fixation and because of closed technique of insertion it causes very negligible damage to the local fracture biology thus conforming to the concept of biological osteosynthesis.

In view of the increasing incidents of complex humeral fractures in this region, the study is hereby attempted to identify the role of unreamed locked nailing in the management of such injuries in our setup and group of patients.

MATERIALS AND METHODS: This is a prospective study based on 22 consecutive cases with humeral diaphyseal fractures stabilised with primary unreamed humeral locked nailing in the dept. of orthopaedics, Fakhruddin Ali Ahmed Medical College and Hospital from March 2012 to August 2014 and followed up for a minimum period of three months.

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The inclusion criteria of this study were-recent fractures (Within 3 wks. post trauma), adult patients, closed and open Gr. I and II fractures and unstable fractures, stable fractures with loss of acceptable reduction after conservative treatment and polytrauma patients. Proximal fractures within 2cms of surgical neck and distal fractures within 5cms of the junction of the diaphysis and metaphysis were not included. Additionally, open gustilo type III, fractures in children and adolescents and pathological fractures were also not included in our 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 complains 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 complains like pain were also taken into account.

RESULTS: The results were analysed taking into consideration of the criterias such as clinical and radiological union, shoulder and elbow function, and resumption of work by the patient. Shoulder range of motion was evaluated in five planes. Maximum number of cases was observed in the age group of 31 to 40 yrs. Male (77.3%) patients dominated our study. Incidence of injury was more on left hand side (63.6%). Radiologically we had 7 cases with transverse fracture, 10 cases with oblique, 3 comminuted and 2 segmental fractures (Table-1). Two of our patients developed radial nerve palsy postoperatively, one of which recovered spontaneously within 20 wks. 50% of the case was operated within 2 wks. of injury. All fractures were stabilized with solid humeral interlocking nails of 6mm, 7mm, and 8mm diameter of varying lengths from 22cm to 28cm. Open reduction was carried out in 3 cases where after an adequate trial of closed reduction we failed to negotiate the nail across the fracture site. Two cases were left unlocked distally in the initial period of our study thinking it to be sufficiently stable. These two cases went for delayed union.

The period of fracture union ranged from 10 weeks to 16 weeks with an average period of 12.2 weeks. As regards to functional assessment of patients, 3 patients (13.6%) had disturbed shoulder function leading to shoulder stiffness. Elbow function was not disturbed in any case.

DISCUSSION: The management of fractures of humeral shaft is always a challenging problem to orthopaedic surgeon, as they are frequently associated with multiple injuries, leading to complications like shortening, malunion, nonunion, infection, etc.⁽²⁾ The aim of treatment in these fractures is to achieve length and alignment and produce favorable environment for bone and soft tissue healing. Most of the humeral shaft fractures can be treated by conservative methods. Operative methods are considered to avoid complications like delayed union and nonunion. Operative stabilization is required in certain fractures including those among patients with unsatisfactory closed reduction and multiple injuries. Plate osteosynthesis has 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.

Results of this 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.

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This is due to impingement of proximal nail tip or proximal locking screw, due to adhesive capsulitis or due to rotator tears. In most of the studies with antegrade nailing, 85% to 100% of patients regained their normal shoulder function.

CONCLUSION: Our study, though in a limited number of patients and for a short follow up, establishes the fact that there is a definite role of unreamed locked nailing in the modern management of the fractured humerus, as reflected by the excellent union rates within an acceptable period. Majority of complications and difficulties encountered by us were in the initial stages of the study. There is a general reluctance among trauma surgeons to accept interlocked nailing for fracture of shaft of humerus. This reluctance stems from the fact that everyone is very familiar with open reduction and DCP fixation which has given excellent results and hence is loathe changing over to another technique. Besides this, there is very real concern about rotator cuff pain and shoulder stiffness and also damaging the radial nerve while passing the nail in a blind manner across the fracture site. From our own results and from the published literature, it is evident that excellent results can be achieved by closed interlocked intramedullary nailing of humeral shaft fractures.

Pattern of fracture	Number of patients	Percentage
transverse	7	31.8%
oblique	10	45.5%
comminuted	3	13.6%
segmental	2	9.1%

Table 1: Frequency Distribution of Cases According to type of Fracture

Study	No. of patients	Commonst site	Number of cases	Percentage
Griend et al. ³	36	Middle third	23	63.9%
Rommens et al. ⁴	39	Middle third	14	35%
Rodriguez. ⁵	20	Middle third	10	50%
Present study	22	Proximal third	12	54.6%

Table 2: Comparison of commonest level of injury in various studies

Study	Number of patients	Fracture type	No. of cases	Percentage
Bell et al. ⁶	38	comminuted	20	51.3%
Griend et al. ³	36	transverse	20	55.6%
Rommens et al. ⁴	39	transverse	20	51.25%
Rodriguez. ⁵	20	Short oblique	10	50%
Tingstad et al. ⁷	83	Transverse or oblique	53	64%
Present study	22	oblique	10	45.5%

Table 3: Comparison of commonest type of fracture in various studies

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Study	Number of. Patients	Excellent range of mobility	Percentage
Bell et al. ⁶	38	38	100%
Griend et al. ³	36	30	85.4%
Rommens et al. ⁴	39	38	96.6%
Rodriguez. ⁵	20	19	95%
Gongol and Mracek. ⁸	32	31	97%
Bhat et al. ⁹	37	31	91.89%
Present study	22	19	86.36%

Table 4: Comparison of Mobility of Shoulder and Elbow Joints in Various Studies

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