ISSN: 2581 – 3633
PubMed - National Library of Medicine - ID: 101745081

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at:www.ijmacr.com

Volume – 6, Issue – 1, February - 2023, Page No. : 449 - 454

Efficacy of Interlocking Nail for Diaphyseal Shaft Fracture of Humerus

[1]Dr. A Venkata Naveen, Assistant Professor, Department of Orthopaedics, Katuri Medical College, Guntur, Andhra Pradesh, India.

[2]Dr. D Vamsi Krishna, Assistant Professor, Department of Orthopaedics, Katuri Medical College, Guntur, Andhra Pradesh, India.

[3]Dr. R SarfarazHussain, Junior Resident, Department of Orthopaedics, Katuri Medical College, Guntur, Andhra Pradesh, India.

[4]Dr. KankanalaVinay Kumar, Consultant, Guntur, Andhra Pradesh, India.

Corresponding Author: Dr. R Sarfaraz Hussain, Junior Resident, Department of Orthopaedics, Katuri Medical College, Guntur, Andhra Pradesh, India.

How to citation this article: Dr. A Venkata Naveen, Dr. D Vamsi Krishna,Dr. R Sarfaraz Hussain, Dr. Kankanala Vinay Kumar, "Efficacy of Interlocking Nail for Diaphyseal Shaft Fracture of Humerus", IJMACR- February - 2023, Volume – 6, Issue - 1, P. No. 449 - 454.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Operative management for the fractures of the shaft of the Humerus has gained a newlease with the discovery of an intramedullary interlocking device. This is because ofnegative experiences with conservative treatment for certain types of fractures andtechnicalchallengeswithplatingin somecases. The study deals with the efficacy of intramedullary interlocking nailing for Humerus shaft fractures by assessing its fracture healing and functional recovery of the patient.

Aim and objectives: To study the functional outcome of closed reduction and internal fixation of diaphyseal fractures of the Humerus with intramedullary interlockingnail.

Materials and Methods:25 patients were included in this study and assessed for a period of 2 years and functional (ASES functional scoring system) and radiological outcome was evaluated at 6th week, 3rd month and 6th month

Results: In our study of 25 patients, according to P.M. Rommens et al criteria, 20 were excellent, 2 moderate and 3 had poor outcome. Average initial pre operative VAS score was 7.8 and post operative 6th month was reduced to average of 1.5. By using the ASES scoring system average 6th month score was 48.

Conclusion:

Closednailingisanexcellentleastinvasivesurgicaloptionavailable to manage humeral shaft fractures with early fracture consolidation and better union rates. It decreases the hospital stay, provides early Rehabilitation and lessens morbidity. It is ideal in patients with polytrauma and osteoporosis.

Keywords: Humerus shaft fractures, Intramedullary Nailing, Diaphysis fractures, ASES (American Shoulder and Elbow Surgeons).

Introduction

3% of all bony injuries are humeral diaphysis fractures.[1,2] The majority of patients will recover with appropriate conservative treatment, but a small percentage will need surgery for the best outcomes.

A wide range of radiographic malunion can be tolerated with little functional loss due to the vast range of motion in the shoulder and elbow and the minor impact of shortening.[3]

All humeral diaphyseal fracture types underwent internal fixing methods. The two methods for internal fixing in humeral fracture shafts are intramedullary nailing and plate osteosynthesis.

The following benefits of interlocking nails for fracture fixation:

• Quick mobilisation.

• Lower infection rates and

• Has no negative effects on the biology of bone repair.

In order to handle Humerus shaft fractures, this study aims to ascertain the functional effect of interlocking nails.

Aims and objectives

To study the functional outcome of closed reduction and internal fixation of diaphyseal. Fractures of the Humerus with intramedullary interlocking nail.

Material and methods

Sample size: 25

Period of study is 2 years. It is a prospective study.

Inclusion criteria

1. Patients with traumatic fracture shaft of Humerus, 2cmsbelowthesurgicalneckto 3 cms above olecranon fossa.
2. Ageabove18years
3. Segmental fractures
4. Compound fracture Gustilo's classification type I

Exclusion criteria

1. Patientswhoarenotwilling for the study
2. Presence of open Physis
3. Compound fractures of Gustilo's type II & III
4. Medicallyunfitforsurgery
5. Fractureswithneurovasculardeficits

Figure 1: Entry point with bone awl.

Figure 2: Proximal locking over jig

Figure 3: Distal locking with free hand technique.

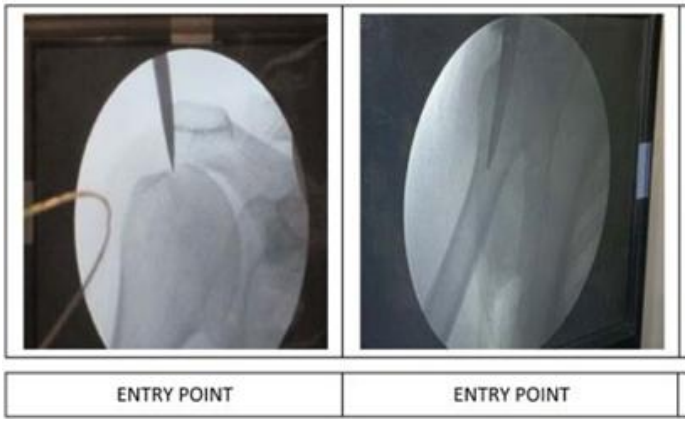

Figure 4: Intra Operative C arm Pics

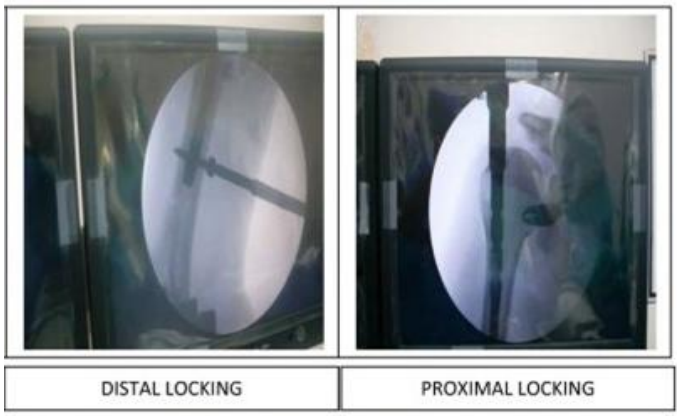

Figure 5: Intra Operative C arm Pics

Figure 6:Final Closure

In this study operative modality of interlocking nailing was used (Closed Reduction and Internal Fixation)

Procedure

Patient in supine position with bolster between the scapulae. A 2-3 cms incision was made from the anterolateral edge of acromion obliquely forward, and the deltoid muscle was split longitudinally with its fibres which exposes the subacromial bursa and rotator cuff. Stab incision of 1 cm given to rotator cuff as medial as possible near the apex of humeral head. Entry point was made using the hand awl.

Then fracture is reduced using image intensifier. Guide wire is then passed through the fracture to the distal fragment. The canal is reamed if required. Selected nail is then inserted in to its final position. Fracture is maintained when the nail is inserted. Nail is placed 5 mm below the articular surface proximally, and should be 1-2 cms proximal to olecranon fossa. Back thrust to elbow reduces fracture before distal screw placement. Nail was then locked proximally with the use of targeting device and distally using locking screws. Jig is removed, rotator cuff was repaired. Thorough wound wash was given and closed in layers. Sterile dressing applied.

Postoperative care

Intramedullary interlocking nailing is done with the aim of providing early active mobilization of the limb. Antibiotics are given up to the third postoperative day. Analgesics were administered for one week after surgery. After surgery, none of the patients experienced radial nerve palsy. On the 10th or 12th post-operative day, the sutureswere removed**.**

Patient is explained about the passive and active range of motion exercises and is made to execute the same as the pain permits. This includes pendular motion exercises and the supported and active abduction exercises involving the shoulder and flexion exercises involving the elbow. Weight lifting is promoted in a graded manner with time.

On average, the patientwas discharged on the 10^{th}-14th post-operative day.

Serial radiographs are taken at monthly intervals in two perpendicular planes to note for the fracture union.

Follow-up

Follow up was done at 6th week, 3rd month, and 6th month. X rays were taken at regular follow-ups. Shoulder and elbow range of motion was assessed. Clinical and radiological union– of the fracture sitewere noted.

Figure 7:Case X rays

Figure 8: Range of Movements

Assessment of outcome

Final evaluation was done at 6th month based on P.M. Rommens et al. criteria[4]and ASES scoring and VAS scoring.

Observation and Results

All 25 patients with diaphyseal fractures of the Humerus were managed within tramedullary interlocking nails.

Table 1: Mean value of pain value (VAS scoring)

PRE-OPERATIVE	7.022
POST-OPERATIVEat6thmonth	1.37

Table 2: Functional assessment (P.M Rommenset al. criteria)

Score	Excellent	Moderate	Poor
Noofcases	20	02	03

ASES score

The ASESscore attained on averagewas48 at the end of 6th month.

Discussion

The operative goal of treating humeral fractures is to achieve proper length, alignment and also rotational stability while also creating a favorable environment for bone and soft tissue recovery.

Intramedullary interlocking nailing is one of the choices for treatment of humerus shaft fractures. But the earlier studies show mixed results compared with plating because of earlier nail designs. Earlier nail designs like seidelnail had its complications like too large nail head, rotational instability and intraoperative fracture due to insecure distal locking mechanism.

The purpose of this study was to study the functional outcome and effectiveness of closed reduction and internal fixationwiththe intramedullary interlocking nail for the fractured shaft of the humerus. Closed reduction and internal fixation with intramedullary interlockingnailswereusedtotreat25humerusfractureshaftfractures.

ASES score

In our study, the average ASES score achieved was 48. McCormack RG et al.achieved an ASES score of 47 when treating humeral shaft fractures with inter locking nailfixationandascoreof48whentreating withDCP.

Overall results

In our study, 20patients with excellent results, two patients with moderate results, and three patients with poor results.

Table 3: Comparison With Other Studies

Series	Total No Of Case	Modality	Overall Results
Sahurletal[5]	69	Nailing	88%
Mccornack Et Al[6]	44	Nailing	89.48%
Crates & Whittle Etal[7]	73	Nailing	94.5%
Cox Et Al[8]	37	Nailing	87.9%
Our Study	25	Nailing	80%

Conclusion

Interlockingintramedullarynailingisoneofthenoveloptions fordiaphysealfractures of the Humerus. In cases of osteoporosis, comminuted fracture, poly trauma, where the primary goal is to reduce operating time and early mobilisation, it is better to use Intramedullary Interlocking Nailing. The concept of biological fixation in terms of un reamed nailing, closed reduction, static locking, and fracture site compression promotes early and adequate fracture union. Closed nailing preserves the fracture hematoma, which reduces the time required for a fracture to console date and achieves a high rate of fracture union.

Closed nailing is an excellent least invasive surgical option available to manage humeral shaft fractures with early fracture consolidation and better union rates. It decreases the hospital stay, provides early rehabilitation and lessens morbidity. It is ideal in patients with poly trauma and osteoporosis.

References

1. Zuckerman J.D. and Koval KJ "Fractures of the shaft of the Humerus", Chapter 15 in Rockwood and Greens Fractures in Adults Vol, 1,41"Ed.Rockwood C.A. Jr, New York: Lippincott-Raven Publishers, 1996, 1025 pp.

2. Calton C."HistoryofOsteosynthesis"chapter-2tr\AQ/AslFInstrumentsand Implants. 2nd Ed., Texhammar R.J. and Colton C L, New YorkSpringer-Verlag.1999, 3pp.

3. Chandler R, N, "Principles of internal Fixation" Chapter–3inFracturesinAdults. Vol1, 4"1 Ed., Rockwood C.A. Jr et al., Philadelphia. Lippincott-Raven, 1996, 159ppA.

4. Rommen's. J. Verbrugge, P, L Bross" Retrograde Locked Nailing of Humeral Shaft Fracture". JBJS (Br.1995:77-8.84-89.

5. Sahu RL, Ranjan R, Lal A. Fracture Union in Closed Interlocking Nailing Humeral Shaft Fractures. ChinMedJ2015; 128:1428-32.

6. McCormack RG, Brien D, Buckley RE, McKee MD, Powell J, Schemitsch EH. Fixation of fractures of the shaft of the humerus by dynamic compression plate or intramedullary nail. A prospective, randomised trial. J Bone Joint Surg Br 2000; 82:336 9.

7. Crates J, Whittle AP. Antegrade interlocking nailing of acute humeral shaft fractures. ClinOrthopRelat Res 1998; (350):40 50.

8. Cox MA, Dolan M, Synnott K, McElwain JP. Closed interlocking nailing of humeral shaft fractures with the Russell-Taylor nail. J Orthop Trauma 2000; 14:349-53.