Original Article

Treatment of Humeral Fracture

Current Pattern and Outcome of Closed Diaphyseal Humeral Fracture Treated With Intramedullary Interlocking Nail

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ABSTRACT

Objective: To determine the current pattern and outcome of the closed diaphyseal humeral fracture treated with intramedullary interlocking nail.

Study Design: Descriptive study

Place and Duration of Study: This study was carried out at Orthopedic Department of Liaquat University Hospital Hyderabad and PUMHS Benazirabad Nawabshah from March 2011 to February 2012.

Materials and methods: All the 40 patients with closed diaphyseal humeral shaft fracture between the ages 15-45 years were included in the study. All the patients after counseling and diagnosed as case with closed diaphyseal humeral shaft fracture on the basis of clinical examination and X-rays. Closed intramedullary nailing management procedure was used for closed diaphyseal humeral shaft fracture regarding with clinical presentation, preoperative findings and functional outcomes were documented including postoperative complications.

Results: Total 40 patients were selected in this study with humeral fracture. Male were found in majority. From types of fractures transverse fractures were most common 45% and road accidents were seen in majority. Most common complication was post operative pain in 40% of cases; Excellent results were found in the 55% of the cases while good in 20%, fair in 10% and 5% results were noted poor in the patients

Conclusion: In the conclusion of this study the closed *i*ntramedullary interlocking nailing procedure is the very good method for treatment of fracture shaft of humerus including with very good outcome.

Key Words: Intramedullary interlocking nail, diaphyseal humeral fracture

INTRODUCTION

Humeral fractures presents about 3% of all fractures.[1] About 30% of these injuries need to be treated surgically.[2] Humeral fractures mostly resulting of the direct force during impact, road traffic accidents and crush injuries. Indirect forces like fall on elbow side or extended arm or contractions of strong muscular, may produce the humeral fracture. The most frequent site of the fracture is between the middle and the distal third of the humerus.[3,4] Since of close anatomic assosiation among humerus and radial nerve, nerve injuries are common and mostly associated to spiral fractures. Occurrence of radial nerve injury is 6%–15% reasoned by this fractures.[5] Humeral uncomplicated fractures are frequently managed conservatively. Commonly operative methods used are the dynamic compression plate (DCP) and intramedullary nail for humeral fractures.[6,7] These procedures having clinically very good outcome. Nowadays these surgical procedures are used for the treatment of humeral fractures and also having some advantages and disadvantages mechanically and anatomicaly.[8] Visualization of plating with fixation, that's known as an exact anatomically decreases and defense of radial nerve, may decrease the chance of malunion but needs of large intraoperative exposure related to soft-tissue stripping.[8] Regular improvement in propose of IMN has guaranteed the clinical submission of intramedullary nail fixation in treatment of fractures of humeral shaft. Many reports suggested that IMN is standard surgical procedure.[9,10] Intramedullary nail having benefit of closed insertion procedures, whole periosteal blood supply, and load-sharing involuntary properties. The IMN can reduce the effects of stress shielding at the fracture site and lower the incidence of re-fracture after implant removal.[8] A major complication is the rotator cuff impairment of IMN, that's may lead to shoulder impingement and shoulder movement restriction. Iatrogenic damage of radial nerve throughout ante grade nailing is main problem during procedure.[8] Purpose of this study to determine the results of diaphyseal humeral fracture by closed Intramedullary nailing and whether it is safe and reliable method.

MATERIALS AND METHODS

This descriptive study was contains 40 patients and was carried out at Orthopedic Department of liaquat University Hospital Hyderabad and PUMHS Benazirabad Nawabshah with the duration of time March 2011 to February 2012. Both male and female were included in the study between the ages of 15 to 45

years. All the patients with closed diaphyseal humeral shaft fracture on the basis of clinical examination and X-rays were included in the study. All the patients after counseling for study and taking written consent were included in this study. All the cases with open fracture, associated with severe chest or abdominal injuries, pathological fractures and malunited fractures with neurological deficit were excluded from the study. In this study closed *intramedullary nailing* procedure used for closed diaphyseal humeral fracture. All the patients lying on supine position with head rotated to contra lateral side. Longitudinal incision 1-3 CM was done centered over tip of greater tuberiosity, AWL passed just medical to the tip of greater tuberiosity 0.5cm posterior to basipetal groove to make entry point, reaming of proximal mataphysis of humerus with diameter of 8mm approximately 0.4 cm was done, closed reduction had achieved according C-arm guidance and guide wire was passed. Nail length was measured with subtracting exposed guide wire from total length of the guide wire. With proper length and diameter nail was passed till its proximal end was beneath the bone by 0.5cm to avoid the sub a cromial impingement, after that guide wire was removed and proximal and distal locking was done. Figure 1.

Figure No.1:

On the 1st post-operative day extremity was elevated on a Thomas arm splint or by suspension with abduction and external rotation at shoulder. On 2nd postoperative day passive movement was start including pendular exercise and assisted full forward flexion with the limit of pain, Figure 2. and from 7th day overhead abduction, external rotation and internal rotations were begun.

Figure No.2:

On the follow-up weakly in 1st month, fortnightly in 2nd and 3rd month and monthly up to 1 year clinical and radiological analysis was performed. Preoperative presentation of fracture, operative findings and management outcomes were documented including with postoperative complications. Detailed Clinical examination of the patient along with all base line investigations were done and recorded in Performa. All the data was entered and analyzed in the SPSS program version 16.0 simple frequencies and percentages of the qualitative data were computed.

RESULTS

Total 40 patients with closed diaphyseal humeral shaft fracture were selected in this study, from all of them male found in majority 80% while female were noted 20%, mostly patients were documented in the age group of (15 to 45) years 50%, while 30% were in age group of (29 to 38) years and only 20% of the cases were found in the age group of (39-48) years of the age. Table 1.

Table. No. 1. Basic characteristics of the Patients. (n=40)

	Frequency	Parentage
Gender		
Male	32	80.0%
Female	08	20.0%
Age groups		
15-25	20	50.0%
26-35	12	30.0%
36-45	08	20.0%

Table. No. 2: Clinical pattern of the Patients. (n=40)

	Frequency	Parentage
Fracture location		
Left	22	55.0%
Right	16	40.0%
Bilateral	02	05.0%
Mode of injury		
Fall	08	20.0%
R.T.A	20	50.0%
Others	12	30.0%
Types of fracture		
Oblique	10	25.0%
Transverse	18	45.5%
Spirale	04	10.0%
Comminuted	06	15.0%
Location of fracture on humerus shaft		
Middle	22	55.0%
Proximal	14	30.0%
Lower	04	10.0%

On the clinical presentation fractures were found in majority at left side 55%, right side fractures were seen 40% and only 5% fractures were noted bilateral. Road

traffic accidents were found in 50% of the cases while falling patients 30% and 20% patients were comes with other different causes. According to types of fracture transverse fractures were seen most common 45%, Oblique fractures 25%, comminuted fractures 15% and patients with spiral fracture were 10%. Middle site fractures were seen 55% while 30% fractures were at proximal site. Table 2.

In this study most common complication was post operative severe pain in 40% of the cases and other complications as; Infection, Radial Nerve Palsy, Minimal Loss of Fixation, Delay union, Elbow stiffness and Shoulder stiffness 05.0%, 10.0%, 10.0%, 15.0% , 15.0% and 20.0% respectively. Table 3.

Excellent results were found in the 55% of the cases while good in 20%, fair in 10% and 5% results were noted poor in the patients. Table 4.

Table No. 3: Postoperative complications of the patients. N=40

Complications	Frequency	%age
Post operative severe pain	16	40.0%
Infection	02	05.0%
Radial Nerve Palsy	04	10.0%
Minimal Loss of Fixation	04	10.0%
Delay union	06	15.0%
Elbow stiffness	06	15.0%
Shoulder stiffness	08	20.0%

Table No.4: Outcome n=40

Results	No. of cases/%age
Excellent	22/(55.0%)
Good	12/(20.0%)
Fair	4/(10.0%)
Poor	2/(5.0%)

DISCUSSION

Femoral fractures are the very common fractures thats orthopaedic surgeons encounter, because that's fractures most often result due to high energy trauma, these are often related to concomitant injuries of internal organs. Femoral fractures resulting from the drawbacks of fast lifestyle and violence and these are main risks for mortality and morbidity in the cases with that's injury.[11,12] In the study of Zulfiqar et al reported that male were in majprity as compare to females, and most common age group of 20 – 30 years.[13] Johnson and Greenberg[14] also reported majority of males. Similarly in the present study male found in majority 75% while female were noted 25%, and mostly patients were documented in the age group of (15 to 25) years 50%, while 30% were in age group of (26 to 35) years and only 20% of the cases were found in the age group of (36-45) years of the age.

Crates et al, reported that majority of males in the study of acute humeral shaft fractures.[15]

Road traffic accident is the most common mode of injury in different studies a; in the study of Rommens et al[16] he reported that from 39 patients, 21 was with the history of road traffic accident. In the study of Tingstad,[17] reported that road traffic accident was most common mode of injury. Similarly in this study fractures were found in majority at left side 55%, right side fractures were seen 40% and only 5% fractures were noted bilateral. Road traffic accidents were found in 50% of the cases while falling patients 30% and 20% patients were comes with other different causes.

In the study of Marya KM et al[18] shows that middle third fractures of the forearm bones were 52 %. According to the Manjappa CN et al[19] 60% cases were with middle third region of diaphyseal fracture, 25 % case were with proximal third fracture and 15% cases had lower third fracture. As well as in present study transverse fractures were seen most common 45%, Oblique fractures 25%, comminuted fractures 15% and patients with spiral fracture were 10%. Middle site fractures were seen 55% while 30% fractures were at proximal site.

In the study of Erwin DENIES et al, reported complications in the patients those treated with intramedullary interlocking nailing method the radial nerve palsy 4.1%, hardware failure 8.1% and infections was 2.0%.[20] In this study most common complication was found as post operative severe pain in 40% of the cases and other complications as; Infection, Radial Nerve Palsy, Minimal Loss of Fixation, Delay union, Elbow stiffness and Shoulder stiffness 05.0%, 10.0%, 10.0%, 15.0% , 15.0% and 20.0% respectively

Excellent results were found in the 55% of the cases while good in 20%, fair in 10% and 5% results were noted poor in the patients. While in the study of Mohammad Naeem-Ur-Razaq reported that fracture union rate achieved at 32 weeks after the surgery was 97.83% while 34.04% cases had delayed union of the fracture.[21] In the above mentioned study of Zulfiqar et al,[13] mentioned that very excellent results 88% in the patients. There are many other studies reported very good results of IM interlocking in humeral fracture as; Deepah MK et al,[22] 92%, Klaus WK et al, [23] 91% and Solooki S et al, [24] showed excellent results in 94% of the patients.

CONCLUSION

On the basis of above mentioned observations in this study following conclusions can be made. Closed humeral interlocking nailing for diaphyseal humeral fracture gives good results and this is reliable secure fixation provides early postoperative rehabilitation both physically and psychologically with few complications.

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