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EINTRAMEDULLARY INTERLOCKING NAILS: A TREATMENT OPTION FOR CLOSED DIAPHYSEAL HUMERAL FRACTUR

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ABSTRACT

Objective: Outcome of intramedullary interlocking nails in the treatment of closed diaphyseal humeral fracture at Liaquat university hospital Hyderabad/Jamshoro. **Materials and methods:** Study was performed in Orthopaedic surgery department & traumatology Unit-II, LU HMS Jamshoro/ Hyderabad from February 2011 to July 2013. It is an observational and cross sectional study. All the cases who were admitted for type A-I₂, A-II₂ and A-III₂ closed diaphyseal fracture of humerus assessed by X-rays and clinical examination, cases with minor head injuries, 20-40 years of age and fracture duration less than 2 weeks were selected. Complete routine laboratory investigations were carried out and all the selected cases were underwent intramedullary interlocking nails treatment. After treatment cases were discharged within 7 days and were followed weekly 4 times and then monthly follow-up visits were advised up-to 6 months, all the data regarding outcome in the term of postoperative pain, complications and hospital stay was recorded in the Performa. **Results:** The 38 patients of closed diaphyseal fracture of humerus were underwent intramedullary nails. Majority 26/(68.5%) were male. Mean age was 35.4±7.5Years. The commonest source of humerus fracture in this study was RTA. Postoperative moderate pain was seen in 10(26.3%) patients, severe pain was noted in 4(10.5%) patients. Postoperative complications seen as Infection in 1/(2.6%) patients, nonunion was in 1/(2.6%), severe impingement in 3/(7.9%)cases, Adhesive capsulitis was noted in 2/(5.2%) individuals and in 01(2.6%) cases implant was failed, while no Iatrogenic palsy of radial nerve was noted in any cases. Hospital stay period ranged from 1 to 7 days, and majority of cases were discharged between 1-4 days, while only one cases was found more than 7 days of the hospital stay. **Conclusion:** The intramedullary nail is the best treatment option for the fracture of humerus, with very low rate of complication and can be learnt easily.

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INTRODUCTION

Humeral shaft fractures are commonly accounting for about 3% of total fractures³. This fracture may be treated non-operatively with high-quality outcomes in majority of patients⁴. Non-operative therapy needs a long time for immobilization, which bears a prolonged stiffness risk of shoulder joint. Furthermore, nonunion later than conservative therapy of such fractures occurs in about 10% patients and therapy of this state may be very tricky⁵. There is increasing curiosity in handling even humeral simple fractures by DCP, fixation or IM nailing so as to prevent these troubles and to let prior mobilization and quick go back to work⁶. Interlocking intramedullary nail is the most popular device for achieving fracture stabilization. Close intramedullary interlocking nail treatment of humeral shaft fractures is used in therapy of manifold trauma cases, overlying burns fractures, osteopenic bones cases, pathological & segmental fractures⁷. In transverse or short oblique fracture, AO compression plates can be used. Internal fixation as well as open reduction generally guarantees high probability of anatomic union and reduction. Though its drawbacks include requirement for wide dissection and risk of infectivity, radial nerve injury, the probable mechanical malfunction in osteoporotic bone as well as potential requirement for removal of plate at an afterward date. Intramedullary nailing needs a lesser amount of disruption of soft tissue as well as preserve fracture hematoma. Nevertheless the intramedullary nail application has been related to post-operative stiffness and pain of shoulder because of impingement from major implantations. Seidel presented 100 percent union in 80 fractures series managed by locked humeral nails placed in by closed methods. Chapman³ concluded nails present expected stabilization and eventually fixing of fracture. A randomized controlled study carried out at KGMU Lucknow, proved that intramedullary nail may be believed as better surgical choice for diaphyseal fracture management of humerus because it presents a short union period and lower prevalence of severe complications such as infectivity.

MATERIALS AND METHODS

This study took place in department of Orthopaedic surgery and traumatology Unit-II, LUHMS Jamshoro/ Hyderabad, from February 2011 to July 2013. This study comprised of 38 cases admitted through casualty department of orthopaedic Unit-II, LUHMS Jamshoro/ Hyderabad, as well as from outpatient department. It is an observational and cross sectional study. All the cases who were admitted for type A-I-₂, A-II-₂ and A-III-₂ closed diaphyseal fracture of humerus assessed by X-rays and clinical examination, cases with minor head injuries, 20-40 years of age and fracture duration less than 2 weeks were selected. Complete routine laboratory investigations were carried out and all the selected cases were underwent intramedullary interlocking nails treatment. The cases having severe comorbidities were excluded to evaluate the accurate outcome of intramedullary interlocking nails. All the selected patients were underwent intramedullary interlocking nails and after treatment cases were discharged within 7 days and were followed weekly 4 times and then monthly follow-up visits were advised up-to 6 months, all the data regarding outcome in the term of postoperative pain, complications and hospital stay was recorded in the Performa. SPSS V.16.0 was uses for data analysis.



FIG:1. Humeral Shaft Fracture.

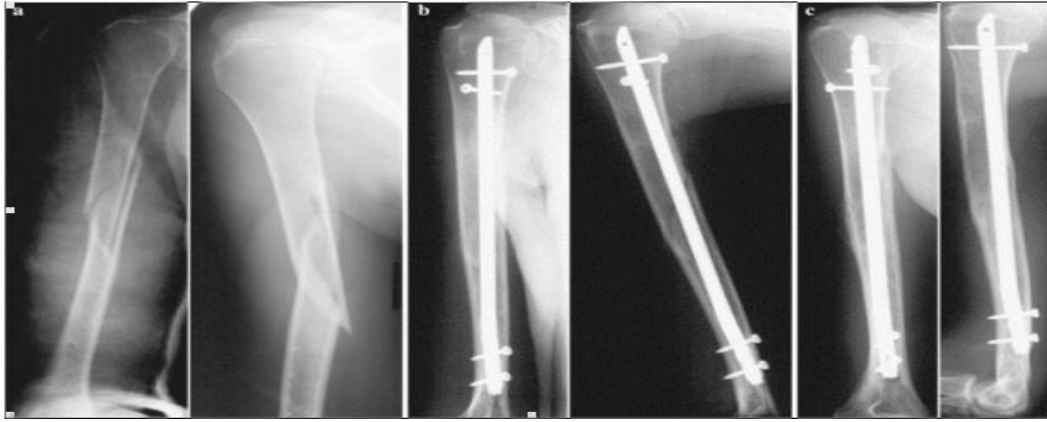


FIG:2. Humeral Fracture Treated With Intramedullary interlocking Nail.

RESULTS

In this study 26/ (68.5%) were males and 12/(31.5%) females, mean age was 35.4±7.5Years. The commonest cause of humerus shaft fracture in this study was RTA in 21/ (55.2%) cases following by 11 (28.9%) patients had humerus shaft fractures due to falling and 06/ (15.8%) patients had shaft fractures through assault.

Pattern of fracture in this study was as; oblique fractures were in 19 (50%) patients, Transverse in 11 (29%) cases as well as Spiral fractures were found in 8 (21%) cases. FIG: 1.

Post-operative pain severity in each group was noted. Mild pain was in 24 (63.1%) patients, moderate pain was seen in 10(26.3%) patients, and severe pain was found in 4 (10.5%) cases. FIG: 2.

The complications seen in this study as: Infection in 1/ (2.6%) cases, nonunion was in 1/ (2.6%), severe impingement in 3/(7.9%) of the patients, Adhesive capsulitis found in 2/(5.2%) Patients and implant failure was found in 01 (2.6%) case, while no Iatrogenic palsy of radial nerve was found. TABLE II

Hospital stay period ranged from 1 to 7 days. Majority of the cases 29/(76.3%) were discharged between 1-4 days, 8/(21.1%) cases were discharged between 5-7 days, while only one cases was found more than 7 days of the hospital stay. TABLE III

TABLE. No.1. Demographic variables (n=38).

Variables	No. of patients /(%)
AGE (mean+SD)	35.4±7.5
GENDER	
Male	26(68.5%)
Female	12(31.5%)
MODE OF INJURY	
RTA	21(55.2%)
Fall	11(28.9%)
Assault	06(15.8%)

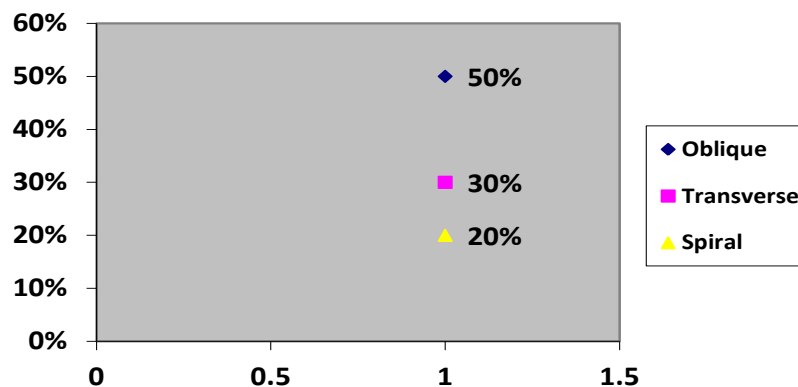


FIG: 1. Radiographic findings (n=38).

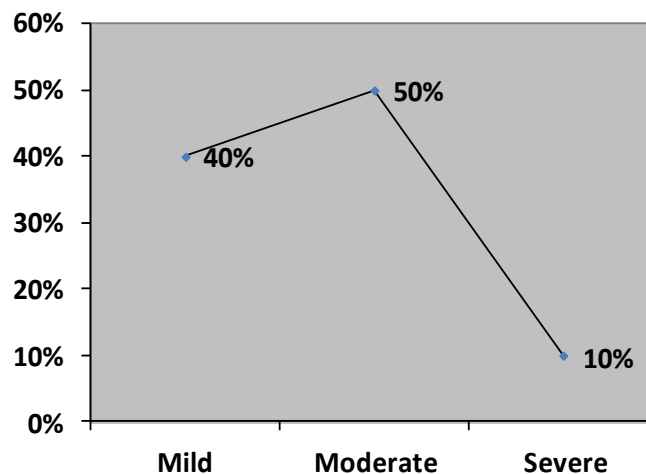


FIG: 2. Severity of Postoperative Pain (n=38).

TABLE. No. II. Post-Operative Complication (n=38).

Variables	No. of patients/(%)
Infection	1/(2.6%)
Iatrogenic radial nerve palsy	0
Non Union	1/(2.6%)
Severe Impingement	3/(7.9%)
Adhesive Capsulitis (shoulder)	2/(5.2%)
Implant failure	1/(2.6%)

Table III: Showing Hospital Stay (n=38).

Hospital stay	No. of patients /(%)
1 to 4 days	29(76.3%)
4 to 7 days	8(21.1%)
< 7 days	18(2.6%)

DISCUSSION

Humerus diaphyseal fractures are certainly not subjective to “golden standard treatments. Though an extensive creativity is present in developing novel methods and implantation for such fractures fixation, diverse patterns of fracture and circumstances make clinical studies problematical to be contrasted with and much frequently the treatment decision is led mostly through personal practice, which is associated to very subjective preference⁸.

On one aspect we see common worries towards operative therapy of these fractures⁹. Alternatively, when agreeing to a symptom for internal fixation, a number of authors rather choose plating as a regular procedure for fractures of humerus, others support nailing. Considering literature all opinions find support, which exhibits that no specific answer is there. Chapman et al¹⁰ contrasted the radiographic and clinical outcomes for locked plates and intramedullary nails applied in humeral diaphyseal fractures treatment. They declared from their outcomes that cases needing surgical therapy of a shaft fracture of humerus, intramedullary nailing presents expected techniques to achieve fracture stabilization and at last healing.

In this series male were in the majority 68.5%, higher frequency of fracture within males noticeably correlated to males' life style, particularly, in our share of world. Mostly males are concerned in out-of-doors activities and young males are highly excited regarding life as well as careless drivers. Females generally have inactive life style and not much concerned about driving which is general cause. Though male to female proportion presented as 9.8:1 by Mirdad TM¹¹, 3.4:1 by Reyes-Saravia GA¹² and 1.3:1 by Akram R¹³.

We found mean age of the patients 35.4±7.5Years. Fractures were very widespread within decades of 3rd as well as 4th in this study. The further series also exhibited higher frequency of fractures within the age groups of younger. Nevertheless Tsai CH et al¹⁴ exhibited age varying from 9 to 82 year along females with mean age 50.8 years and males 31.7 years and mean age of 37 years was presented by Gadegone WG et al¹⁵.

This study exhibited the commonest mechanism for shaft fractures of humerus as RTA with 21/(55.2%) cases subsequently to fall from stature integrated 11/(28.9%) as well as assault within 06(15.8%) cases. Likewise by Memon FA¹⁶, 37 (63.7%) cases continued their injuries of soft tissue and fractures on account of RTA and 21 (36.2%) continued the similar suffering due to domestic fall. Presented by a study held by Putti AB¹⁷, from totally 34 cases the reason of injuries causing hospital stay was RTA in 28 (82.3%).

In a study led by Kingori J and Sitati FC¹⁸, from totally 42 humeral shaft fractures, 31(73.8%) were resultant to RTA whereas remaining were because of fall from stature 4(9.5%) and assault 2(4.7%) patients. The findings of this study are compatible to these studies. RTA is the commonest reason for the fracture of humeral shaft. Because of limited income sources, motorcycle is the major conveyance for middle class individuals, and in accidents, humerus is generally influenced.

In this study type of fracture was additionally sustained through x-ray which exposed Oblique fracture within 19(50%) patients, Transverse fracture within 11(29%) as well as Spiral fracture within 8(21%) patients. A study by Ayotunde OA et al¹⁹ on humeral shaft, presented that transverse fracture was commonest. Ring D et al,²⁰ observed commonest fractures spiral and oblique.

The complications observed in our study were infection in 1/(2.6%) cases, Infection is almost limited to open fractures within which injury is infected by organisms taken inside the body from outside. We did not observe radial nerve Iatrogenic palsy. whereas in other previous studies it is reported 7.7% to 10%,^{21,22}

In this study non-union was observed within 1(2.6%) patients, which were treated through bone ends freshening along with bone grafting. Retrospective studies of IMN fixation quote incidences of nonunion ranging from 0% to 8%.^{23,24} Fan Y et al²⁵ stated that non-union in 1(3.3%) patient in the IMN group..

In this study bonding agent capsulitis took place within 2(5.2%) patients and severe shoulder impingement presented within 3(7.9%) patients. Seidel's interlocking nailing produced superior outcomes, although shoulder function was unevaluated. Constant shoulder pain is frequent. The pain source could be rotator cuff disruption in its avascular region (contained by 1 cm of its placing inside to the higher tuberosity), causing reduced healing. Antegrade insertion can possibly lead to shoulder pain as well as adhesive capsulitis, however does not influence long-standing function.²⁶

Lengthier the hospital stay duration, higher the burden psychologically and financially on the patient. Ideal therapy must hence minimize the hospital stay duration. The stay in hospital in our study recorded as 1 to 4 days within 29/(76.3%) cases, 8/(21.1%) patients were observed within 4 to 7 days, whereas just one patient was observed above 7 days of stay in hospital. It is comparable to further studies offered by various authors as 5 days²⁷ within IMN and 7.5 days (5–14 days)²⁸.

CONCLUSIONS

Our assessment of 38 cases with fractures of humeral shaft that were managed via intramedullary interlocking nails presented following findings;

- Humeral fracture shaft is commonest in young males.
- RTA is most important contributing reason and motorcycle accident is main causative factor.
- Management through intramedullary nails is better technique to treat fracture humeral shaft. It has following benefits;
 - The outcomes of this technique of therapy are further predictable
 - The complication rate is extremely low.
 - The method can be taught easily.

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