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Original Research Paper

Short Term Results of Intramedullary rush nail for fracture of shaft humerus

Orthopaedic

KEYWORDS: Humerus fractures, Intramedullary nailing, Plating.

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ABSTRACT

Introduction: Shaft humerus fractures constitute major portion of upper limb fractures and are more common in younger age group as higher velocity trauma is more common in this age group as well as in aged ones. Treatment modalities are closed reduction and casting, open reduction with plating and closed reduction with intra medullary rush nailing or interlocking nailing. Each method is having merits and demerits.

Aim and Objective: To assess the outcomes of humerus fractures treated with intra medullary rush nails.

Material and Methods: Prospective study of 30 patients having shaft humereus fractures treated with intramedullary rush nailing between duration of September 2014 to October 2016.

Results: Total 30 patient having shaft humerus fractures and treated with intramedullary rush nailing. Amongst them 25 were male and 5 being female. Most of the patients in our series belong to the economically productive young age group between 18 to 60 years with an average of 43 years. Marked variation in age:sex ratio reflects consideration of Indian society in which females are mostly household dwellers and the males the wage earners concerned with outdoor activity. Most common mode of fracture is fall down. 20 among them were on right side and 10 were on left side. Majority 16 patients (53.3%) had fractures in middle third and next to it are lower third 12 patients (40 %) and least in upper third i.e. 2 cases (6.66 %). In our series mean radiological time for union is 12.4 weeks. Fractures of Oblique and spiral oblique type are having faster union compare to transverse type. In 3case (10 %) Plating and bone grafting was done afterwards. Complications like impingement in 5 (15%) patients, non-union in 1(3.33%) of patients and revision surgery in 1(3.33%) of patients.

Conclusion: In contrast to the open reduction and plating this is very easy to perform, economical and minimal invasive method with comparable results. This method can be used for temporary buying time for soft tissue healing.

INTRODUCTION:

Fracture of shaft of humerus results from high energy trauma or direct fall on arm. They have been treated conservatively since ages with good results. But with them prolonged limb immobilization, constant cooperation and repeated hospital visits are the obvious demerits. Now a days Open reduction and plate fixation is used as common method for fixation having high union rate but it is associated with demerits like extensive soft tissue damage, infection, nerve damage and poor result in osteoporotic bone.

Intramedullary nailing with a conventional K nail, Rush nails and Enders nails have been used with varied results but with them rotational stability is not achieved so early mobilization cannot be done. Advantage of intramedullary nail is closer to the normal mechanical axis and act as a load-sharing device if there is a cortical contact. The nails are subjected to lower bending forces and thus less likely to fail through fatigue.

Aims and Objectives:

- To study the results of fixation of the fractures of the shaft of humerus by intra medullary rush nail.
- To study the effect of this method on shoulder and elbow joint function.
- To study the incidence of complications
- To know the incidence of secondary procedures like bone grafting or plating in case of failure of this method

MATERIALS AND METHODS

- This is a retrospective study comprising of 30 patients presented with shaft humerus fracture treated with intra medullary rush nails. The sample of study was conducted in the time period from September 2014 to October 2016. The etiology as well as the indications and patient characteristics were wide ranging in age. The mean age of the patients was 43 years. Among them 25 were male and 5 were female. All patients are thoroughly evaluated clinically and radiologically.

Inclusion Criteria:

- Diaphyseal fractures of humerus (Transverse, oblique, comminuted, segmental fractures)
- Closed as well as compound Gustillo type 1 and 2 fractures
- Adult patients between 18 to 60 years of age
- Fracture without radial nerve palsy
- Absence of any other fracture in same limb

Exclusion criteria:

- Age more than 60 years
- Proximal fractures within 2 cm of surgical neck and those within 5 cm of junction of diaphysis and metaphysis distally on both AP and lateral radiographs.
- Compound Gustillo type-III fractures.
- Pathological fractures
- History of conservative treatment of humerus shaft fracture
- Pediatric patient
- Patient on Immunosuppressive therapy

PROCEDURE:

- Routine preoperative investigations like proper Antero-posterior & lateral X-rays, routine blood investigations, pre-anaesthetic checkup etc. Analgesics, immobilization & prophylactic antibiotics as indicated. Adequate local debridement and proper antibiotics in case of compound wound. Patient lies in supine position with arm kept on radiolucent arm support. Under aseptic precaution, entry with awl taken under C-arm guidance from lateral epicondyle of humerus and proper size rush nail passed with reduction maintained. With mini open approach on medial side, entry taken from medial epicondyle with taking care of ulnar nerve and rush nail passed. A 2 cm incision was taken after palpating the acromion and the greater tuberosity. The anterior part of rotator cuff was dissected to enable a placement of curved awl at the proposed site of entry. Rush nail passed under C arm guidance. If the medullary canal size permits then another rush nail passed from lateral epicondyle.

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- The medullary cavity was filled with Rush nails of calculated length in the sizes ranging from 2 mm to 4 mm. A minimum of two and maximum of four Rush nails could be negotiated within the medullary canal. Care was taken to avoid distraction at the fracture site. Post-operatively, humerus U slab was given for about six weeks. Gentle shoulder and elbow mobilizing exercises are started after six weeks and Rotational exercises are avoided until bridging callus is visible.

Results:

- In this study, 25(83.33%) were males while 5 (16.67%) were females. Average age group among the patient was 43 years.
- Most common mode of trauma was fall down in 22 patients (73%). 20 patients had injury on right side while 10 had on left side injury.
- 4 patients had associated injuries. 1 patient had chest trauma, 1 had compound tibia fracture and 2 were having head injuries.
- 26 of the 30 patients had closed fracture while 2 had compound grade 1 and 2 had compound grade 2 of gustillo type fracture.
- 16 patients (53.3%) had middle third shaft humerus fracture,12 patients (40 %) had lower third and 2 patients (6.66 %) had upper third, among them 1(3.3%) was segmental.
- 25(83.33%) out of 30 had radiological signs of union at 12 weeks. 2 (6.7 %) had signs of delayed union at 12 weeks that required bone grafting at fracture site later on. While 3(10%) had signs of nonunion at 12 weeks and these patients required removal of rush pin with plating and bone grafting.
- 9(30 %) patients had complication in terms of impingement of rush pin that can be treated by either punching or removal after 10 to 12 weeks. While 1 (3.3%) patient had broken the rush nails and required removal of rush pin and plating and bone grafting.
- None of the patient has elbow or shoulder stiffness at 1 year follow up.
- None of the 30 patients had signs of infection among the series.

Discussion:

The humeral shaft fractures account for 3% -5% of the skeletal injuries. The treatment modalities are varied. Plating requires considerable disruption of the soft tissue and major exposure while locking nail has to pass through the rotator cuff. Amongst the various intramedullary devices used for the fixation of humeral fractures are Rush Nails, Kuntcher nails, Ender nails, interlocking nails. Rush Brothers who initially used elastic nails in the surgical treatment of the proximal diaphyseal fractures. The inherent stability achieved was based on the principle of "three point fixation". The flexibility of the nails and crowding of the medullary canal with multiple nails provide stability at the narrowest part of the diaphysis.

As far as we used this method is simple operative technique with traditional equipment which does not require special technical expertise .This method has least complications, and lastly cost effectiveness. This method can be used for temporary buying time for soft tissue healing in compromised soft tissue as an internal splint and definitive fixation can be done after healing of soft tissue. Nonunion and impingement at shoulder can be prevented if postoperatively the fracture is not distracted.

However when this method used one has to take precautions to prevent shoulder and elbow movement restriction by proper countersinking nails at entry point , careful dissection of rotator cuff to prevent its damage, irrigation of entry point site to remove reamed bone debris and proper post-operative physiotherapy and rehabilitation.

WG Gadegone et al in his study sample size was 188 among them 186 united and 2 had incidence of nonunion [20]

M. W. Chaarani et al in his study sample size was 37 patients having union in all patient without residual stiffness of shoulder or elbow [21}

While in this study sample size was 30 with delayed union in 3 and nonunion was in 2 cases and complete union in 25 cases.

CONCLUSION:

- Intramedullary rush nailing for diaphyseal fractures of humeral shaft combines the advantages of the minimally invasive surgery, minimal instrumentation, cost efficient implants, a relatively safe learning curve, minimum morbidity and significantly lower complications.

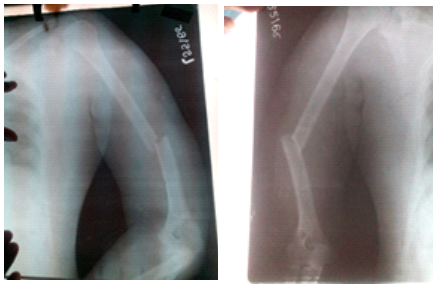

Figure 1. 20 Year Male Patient Having Right Side Lower 3rd Shaft Fracture

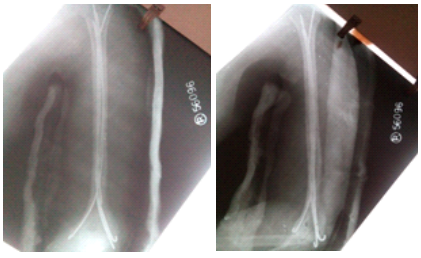

Figure 2 Immediate post-operative x ray

Figure 3 Fracture gets united at 12 weeks

- 25 year male pt. Rt side, comminuted, segmental humerus fracture treated with rush pins.

Figure 4 Full range 0f motion at elbow and knee

Figure 5 12 weeks follow-up

Figure 6 Removal of one rush pin and plating

Figure 7 union at 22 weeks

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