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Results of humerus interlocking nails in fracture shaft humerus

KEYWORDS: Severe Spasticity, lower extremity, spinal cord, drezotomy

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ABSTRACT ***INTRODUCTION***

Fractures of the shaft of humerus have been treated conservatively since ages, withgood results. Sir John Charnley in his treatise " The closed treatment ofcommon fractures " even states " it is perhaps one of the easiest major long bone fractures to treat by conservative methods."

Surgeons are now trying to balance the disadvantage of conservative and operative management by minimal surgical intervention(biological fixation by closed intramedullary nailing). Rotatory and torsional stability and alignment are most reliably achieved by transverse locking screws at each end, thus allowing early mobilization and its obvious advantages.

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AIMS AND OBJECTIVES

To study the results of fixation of the fractures of the shaft of

humerus by rigid interlocking intramedullary nailing.

INTRODUCTION

Trauma has been the leading cause of morbidity and mortality is onthe rise in the present age. The victim of bony injury faces prolongedimmobilisation and loss of wages and it's a tough time for the entirefamily. Besides, the patients often may have to live with the sequelae ofstiff joints and functional disability (the fracture disease). Fractures ofthe shaft of humerus have been treated conservatively since ages, withgood results.Early restoration of joint motion return to normal physiologic function and minimal morbidity is now regarded as ideal fracture treatment. Though plate fixation has given high rates of union, it requires extensive surgery, with stripping of the soft tissues from bone, increase chances of infection or nerve damages, less secure fixation in osteopenic bone and delayed mobilisation of shoulder and elbow. The present study attempts to highlight the use interlockingintramedullary nailing of the humerus and evaluate the results andcomplications related to the procedure.

AIMS AND OBJECTIVES

To study the results of fixation of the fractures of the shaft ofhumerus by rigid interlocking intramedullary nailing.To study the effect of this method on shoulder and elbow jointfunction.To study the incidence of complication with this method.

REVIEW OF LITERATURE

Thompson and **Mikkelsen** 49 of the university of CopenhagenDenmark in 1998, treated 48 fractures with the interlocking nail andemphasized, the importance of countersinking the tip of the nail in thehumeral head to avoid impingement of the shoulder. All fractures unitedand only in 5 of the 12 nonunions did the procedures fail. Pathologicalfractures were all effectively treated.In 1999 **Lal, Sharmer et.at.** 51 of the Safdarjung Hospital NewDelhi, reported a study of 22 patients treated by interlocked humeralnails. 71% patients showed radiology nonunion by 8 weeks, 95% by 16weeks. No case of wound infection or refracture occurred. Theyconcluded that the unreamed humerus nail is a better alternative than theDLP.

Treatment modalities

Most closed fractures of the human shaft can be treated successfully with closed methods; union rates of more than 90% are often
reported. Multiple closed techniques are available, including the
following.
Traction
Hanging arm cast
Coaptation splint
Velpeau dressing
Abduction humeral / shoulder spica cast
Functional brace

Surgical fixation using plates and screws

Open reduction and internal fixation(ORIF) with direct fractureexposure often yield near anatomic alignment. The rates of non-union andhardware failure necessiting revision range from 0% to 7% (9,18).theROM of the elbow and shoulder predictably returns after plate fixation;when complete motion is not obtained ,it is often the case that otherassociated skeleton or neurologic injuries exists.

Surgical fixation with intramedullary implants

Intramedullary fixation has gained popularity in this setting. Initialreports revealed that there was a higher nonunion rate with such fixationthan with conservative treatment or with ORIF with plates and screws.

Surgical fixation with external fixators

Traditionally, external fixation of humeral shaft fractures has beenlimited to open fractures. The open wound should be

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treated in anappropriate manner and, for Gustilo grade I or II wounds, followed byORIF or unreamed intramedullary nailing. For grade III wounds, externalfixation is the treatment of choice.

MATERIAL AND METHODS

This is a retrospective study comprising of patients presented with shafthumerus fracture treated with humerus interlocking nail. The sample ofstudy was taken from the Pandit Dindayal Upadhyay Hospital in the timeperiod between September 2013 to October 2015.

Inclusion Criteria:

1. Diaphyseal closed fractures of humerus (Transverse, oblique, comminuted)as well as segmental without radial nerve palsy fractures,age >16 yrs,Absence of any fracture in same limb

Exclusion criteria:

1. Age more than 75 years, Compound grade-III fractures,Pathological fractures

Choice of Nails:

In our study we have Universal humerus nails available in diameters ranging from 6 to 8 mm. 6 mm nail is usually solid while 7 & 8 mm nails are cannulated,made up of 316L stainless steel.

Preoperative Protocol:

1. Routine preoperative investigations like proper Anteroposterior & lateral X-rays, routine blood investigations, preanaesthetic check up etc.

Operative Technique:

With the patient supine,

A longitudinal incision is made from the most lateral part of acromionand is extended distally centered over the tip of greater tuberosity. Using a small Kuntscher diamond shaped awl, entryportal is established just medial to the tip of greater tuberosity and isconfirmed with the Image Intensifier. The awl is gently advanced into the medullary canal by gentle hammering.The awl is removed and a reamer of 6 mm size is inserted through theentry portal up to the distal end of proximal fracture fragment. Next guidewire is inserted Appropriate sized nail as determined by measuring with another guidewire of same length is attached to the jig with the conical bolt in such away that bend of the nail is pointed medially. The nail is then insertedinto the entry portal and gently hammered,For proximal interlocking proximal aiming device is used. For distalinterlocking we used free-hand technique using image intensifier.

Outcome and analysis

All the patients of our series tolerated the surgery very well & patient compliance to our humerus interlocking nail was also reasonable.

Table 1.Time for radiological union.

Time required for radiological union	No.of cases
6 Weeks	0
8 Weeks	5
10 Weeks	9
12 Weeks	1
14 Weeks	5
16 Weeks	10
18 Weeks	0

Table 2.shoulder pain

Pain while working	No. of cases
Present	4(13%)
Absent	26(87%)

Discussion

Intramedullary nailing has theoretical advantages over othertechniques of internal fixation and has been used to maintain thealignment and length of the humerus (Rush and Rush 1950; Kuntscher1967; Durbin, Gottesman and Saunders 1983; Hall and Pankovich 1987).

Duration of radiological union:

In our series mean radiological union time is 12.4 weeks.

Series Union time

C.M.Robinson 18 weeks
H.Habernek 8 weeks
C.H.Jensen 6 weeks
Jinn Linn et al 8.2 weeks
Present series 12.4 weeks

Shoulder movement:

Result No.of cases

Excellent 24
Satisfactory 5
Unsatisfactory 1

Applying Modified Neer & Cofield classification of assessment of shoulder function in our study 24 patients were having excellent results,5 patients having satisfactory and 1 patient having unsatisfactory results.

No patients in our series had any elbow problem.

CONCLUSIONS AND RECOMMENDATIONS

Countersinking of nail into the head also avoids the problem of sub-acromial impingement.

As far as we used this method,it is simple reproducible operativetechnique with close reduction and security of fixation, leastcomplications, and lastly cost effectiveness. That is why this techniquebecomes an important modality to be considered in the management ofhumeral shaft fractures.

However when used one has to take following precautions:

To prevent shoulder movement restriction by :

>Proper countersinking the nail at entry point.
> Irrigation of entry point site to remove all reamed bone debris.
> Careful dissection of rotator cuff to prevent its damage.
> Early mobilization and proper post-operative physiotherapy and rehabilitation.

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Image 1.
Pre op x ray

Image 2.
16 weeks follow up

Patient came after 1 year with no infection and full range of shoulder movement.

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