

Comparison of Antegrade and Retrograde nailing in Treatment of Diaphyseal Fractures in Humerus in Rural Population

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Introduction : Fractures of the humeral shaft account for about 1-3% of all fractures. Conventionally these fractures are treated by Conservative methods, which leads to union at the fracture site but patients have to live with the sequelae of stiff joint and functional disability, Fracture disease While Plating has advantages of good Union rates and Low complication rates, it is associated with problems like surgical exposure leading to soft tissue damage, disturbing the fracture Hematoma, periosteal stripping, muscle stiffness, iatrogenic nerve Injury. Intra medullary nailing offers an answer to all these problems. The earlier Intra medullary Rush and Ender's Nail provided poor axial or rotational stability and required additional forms of stabilization With the development of Intra medullary Locking nails, the problems of Rotational instability have been avoided Considering the above factors, we decided to undertake a study to compare the objective and subjective outcomes of Antegrade and retrograde technique of nailing in fracture shaft humerus in rural population

Materials and Methods : Study was conducted at department of Orthopaedics, during May 2011 to May 2014. 20 patients with diaphyseal fractures of humerus were treated with interlocking nail by Antegrade and Retrograde technique **Inclusion criteria** – All Male and Female patients above the age of 20 years, fit for surgery. All Closed fractures and Compound Grade 1 and grade 2 Fractures (transverse, oblique, spiral). Fractures in which the Conservative methods have failed. Segmental Fractures **Exclusion Criteria** – Grade 3 compound fractures with Severe co morbid medical condition. After assessing the patients with thorough history and clinical examination, routine investigations along with radiographs of arm were taken to assess fracture pattern, bone quality and canal diameter. Selection of the patient was done Randomly regarding the operative procedure to be undertaken.

Till surgery, affected arm was primarily splinted in a U-Slab. After Pre anesthetic evaluation, patients were taken for surgery.

Procedure – 1. Antegrade Nailing. Under suitable anesthesia, in supine position, a bolster is kept under the ipsilateral scapula to achieve 30 degree extension of the shoulder. Through an Anterolateral approach, an incision is made longitudinally just inferior to the anterolateral corner of the acromion 5 cm distally. Splitting the supraspinatus tendon, entry portal was made at a point just medial to the tip of greater tuberosity and 0.5 cms posterior to the bicipital groove. After achieving reduction with the guide wire, Nail of appropriate length is mounted on the jig and pushed under C arm guidance. Proximal locking was done using jig while distal locking was done by free hand technique.

2. Retrograde Technique. Under suitable anesthesia, patient is placed in a lateral position on a radiolucent table, the shoulder is flexed and abducted at 90° and elbow is flexed at 90°. A straight midline incision is taken from the tip of the olecranon and extended proximally for about 6 cm. Through Triceps splitting approach, an oval entry point is taken approximately 2 to 2.5 cm proximal to tip of olecranon. Entry point is enlarged with bone awl and reamers. Suitable size nail is mounted on jig. Nail is gently pushed inside, without any hammering. Under C-Arm guidance closed reduction was achieved and nail was passed in proximal segment. Distal locking was done using jig after impaction of fracture. Post operatively, a sling was used and passive and active mobilization of the shoulder and elbow was started from the second post operative day. Patients were discharged on the 14th day with instructions to do mobilization and were called for follow up on 4, 8 and 12 weeks Serial follow up radiographs were taken. Assessment of shoulder and elbow movements were done. Clinical & Radiological union assessed. Patient data collected & maintained using standard Proforma.

Observations & Results Most common age group involved was 30-45 (45%). Males are involved more common (75%) than females (25%). The mode of injury was RTA in 18(90%) cases and in 2(10%) fall in a well. 12 were closed (60%), 5 Grade 1 compound(25%) and 3 cases of Grade 2 compound(15%) fracture Using OTA-AO Classification, 9(45%) of 12-A2 type, 5(25%) 12-A3 type, 3(15%) 12-B2 type and 3(15%) 12-A1 type. Using Anatomical level of fracture, 6 were Proximal, 10 were Middle and 4 were Lower third

fracture 18 Patients were operated within first one week while 2(10%) were operated after 10 days of trauma. Average time taken for Antegrade Nailing was 75 mins while that for Retrograde nailing was 100 mins In antegrade group ROM of Shoulder was accessed for all patients at the end of 12 weeks . 7 of 10 patients had 120 to 150 degree abduction, 100 to 120 degree of flexion. 30 to 50 degrees Extension with normal rotations. 3 of 10 in antegrade nailing showed reduced abduction around 110 to 140 degrees and flexion of 90 to 110 degrees with normal Rotations. None of antegrade nailing cases showed any elbow stiffness.. In retrograde group there were 3 out of 10 cases where Elbow flexion was restricted to 110 -120 degrees. There was no restriction of Extension at Elbow joint. No restriction of movements in Shoulder joint was

Excellent	Good	Fair	Poor
Solid Bony Union	Solid Bony Union	Solid Bony Union	Non-Union
No Pain/ Impairment of function	No Pain/ Impairment of function	Mild pain, satisfactory function for light duties	Persistent pain & impairment of function.
No Loss of ROM at shoulder & Elbow	Limitation of ROM at elbow or shoulder of <20°	Limitation of ROM at elbow or shoulder of >20° <40°	Limitation of ROM at elbow or shoulder of >40°

RADIOLOGICAL UNION

ANTEGRADE NAILING

Weeks	Number	Percentage
10-12 weeks	2	20%
12-14 weeks	5	50%
14-16 weeks	3	30%
16-18 weeks	0	00%

RETROGRADE NAILING

Weeks	Number	Percentage
10-12 weeks	2	20%
12-14 weeks	4	50%
14-16 weeks	3	30%
16-18 weeks	1	10%

RESULT

ANTEGRADE NAILING

Score	Number	Percentage
Excellent	6	20%
Good	3	50%
Fair	1	10%
Poor	0	0%

RETROGRADE NAILING

Score	Number	Percentage
Excellent	7	50%
Good	2	30%
Fair	1	20%
Poor	0	0%

Sr. No.	Complication	Antegrade Technique	%	Retrograde	%	Total
1.	Intra op posterior cortex communiton	0	0%	1	10%	1
2.	Infection	0	0%	0	0%	0
3.	Radial Nerve Palsy	1	0%	0	0%	1
4.	Delayed Union	0	0%	1	0%	1
5.	Non Union	0	0%	0	0%	0
6.	Shoulder Stiffness	2	20%	1	10%	2
7.	Elbow Stiffness	0	0%	1	10%	1
8.	Shoulder Pain	2	20%	0	0%	1
9.	Elbow Pain	0	0%	1	0%	1

• CASE 1

Antegrade Nail

Pre operative

Post operative



CASE 1

Antegrade Nail

After 4 weeks

After 12 weeks



CASE 1 Antegrade Nail



CLINICAL PICTURE

• CASE 2

Antegrade nail

Pre Operative

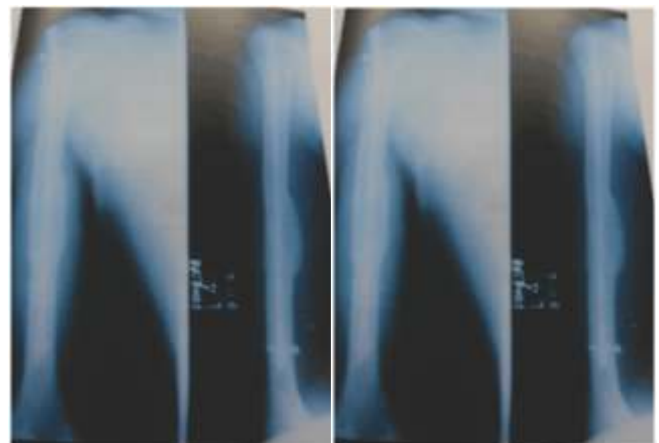
Post Operative



• CASE 2

Antegrade nail

After 12 Weeks



• CASE 3

Retrograde Nail

Preoperative

Postoperative



• CASE 3

Retrograde Nail

After 4 weeks



Clinical picture

•CASE 4

Retrograde Nail

Pre operative

Post operative



•CASE 4

Retrograde Nail



After 12 weeks

Discussion : Historically, as stated by Sir John Charnley, fracture of shaft humerus is considered as easiest among long bone fractures.^[1]

Certain anatomical considerations make it unique.

As humerus is a non-weight bearing bone, the large Range of Movement provided by shoulder & elbow can tolerate rotational malalignment to certain extent. Shortning also to a certain extent is acceptable.^[2]

Large muscle mass surrounds humerus, hence blood supply is abundant and minor deformities can be concealed.

When indicated, the modalities for operative intervention are plating, nailing like Enders, Rush Nail and locked nails.^[3,4,5]

Each method has it's own indications, limitations, advantages and disadvantages.

Locked intramedullary nails are load sharing devices, minimally invasive, control rotation better than flexible nails, allow early mobilization of joints and achieve rigid fixation^[6,7,8]

While the standard Intramedullary nailing with Antegrade technique has disadvantages like damage to rotator cuff & deltoid, shoulder pain, shoulder stiffness, impingement syndrome & proximal migration

of nail, it is the method of choice in polytrauma patients being less time consuming and because of its ease.^[8,9]

Retrograde nailing on the other hand has disadvantages like risk of posterior cortex comminution, Elbow stiffness, pain and stiffness at Elbow joint, distraction at fracture site, it is suitable in the patients with wide medullary canal and in patients with pre existing shoulder problems

Conclusion

Though it is a small series of 10 cases each by both the techniques, yet following conclusion can be derived -

When indicated, internal fixation of fractures of the shaft of humerus with interlocked intramedullary nail gives good results

The reliable secure fixation provided enables early post operative rehabilitation

The advantages of a closed over an open procedure like, short operative time, immediate post operative mobilization of patients, the biomechanical advantages and low complication rate of the interlocking nail make it a preferred procedure for fixing fracture of the shaft of the humerus.

With proper patient selection, Antegrade and retrograde nailing have similar treatment results, including healing rate and eventual functional recovery. Age, Condition of the patient, Level of Fracture and Diameter of the medullary canal are the keys for proper selection of the procedure.

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