

## Locking Plates in Intra Articular Bicolunar Distal Humerus Fractures in Adults

<sup>\*1</sup>Dr. M . Lakshmi Narayana, <sup>2</sup>Dr. G. Veera Reddy,

<sup>1</sup>Assistant Professor- Osmania Medical College – Hyderabad – Telangana.

<sup>2</sup>Assistant Professor – Osmania Medical College- Hyderabad- Telangana.

Corresponding author: \*Dr. M . Lakshmi Narayana

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**Abstract:** treatment of distal humerus intra articular fractures are more problematic as humerus becomes more wider going to distally and become narrow, small fragments with thin bone, less bone mass, weight of the forearm causing distraction of fragments, poor purchase in this area causing more implant failure problems. Distal humerus having complex anatomy, articular margin should be maintained anatomically if they are not maintained anatomically movements will decrease and arthritis will develop and pain causing decreased quality of life that causing economical, functional, psychological effect on the patient and family.

Elbow joint goes into stiffness easily if early mobilization is not done because of brachialis muscle which is in anterior compartment close relation with capsule it will lift from the bone along with periosteum and also scaring of the capsule, contracture of the brachialis causing stiffness so achieving good results in these fractures requires more stable implants so that early mobilization and anatomical reduction can be done. This is a prospective study of 30 patients selected .only bicolunar intra articular distal humerus fractures of AO classification c1 and c2 are selected treated by bicolunar plating with 3.5 mm locking recon and locking compression plates results are evaluated in radiological union, early return to work, complications and mayo elbow scoring criteria.

**Keywords:** bi columnar ,intra articular , distal humerus , locking plates ,adults.

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### I. Introduction

Bi columnar Intra articular distal humerus fractures in adults are less common account to 2% to 6%<sup>1</sup> and one third of humerus fractures. it having bimodal distribution of age ,more common in young age in between 18- 30 years and more common in above 50 years of age. In young age it is mainly by road traffic accidents and sports injuries ,in old age it is by trivial trauma by domestic falls . these fractures are increasing because of more industrialization and migration to cities and increased motor vehicle culture. And increased life expectancy causing more old age groups leading to more number of fractures. As in these area fractures the bone quality is poor ,fragments are very thin and small, elbow joint is sensitive as it go early into stiffness<sup>2</sup> .complex articulations of elbow joint bones and their vasculature causing avascular necrosis , osteoarthritis and painful stiff elbow so that financial physical psychological impact on the patient and family.

And more number of geriatric fractures with osteoporotic bones ,and increasing expectations of the patients requiring more stable anatomical reduction .so that early mobilization with less complications is possible , for that requiring rigid and stable implants. 3.5 mm Locking plates on both columns gives stable fixation ,locking plates<sup>5</sup> which are used in these fractures are locking recon plates and locking compression plates and pre contoured plates . locking recon and compression plates are bent as required the pre contoured plates<sup>3</sup> are fixed . in this study we used locking recon and locking compression plates. The screws in the locking plates they lock in the holes of the plates<sup>4</sup> . so that there is no movement in between plate and screws giving rigid constrain. So that less implant loosening more stable fixation is possible in these implants.

In the past these fractures are treated by conservatively by cuff and collar, slab and casing , and internal fixation by k wires , cancellous screws , one third tubular plates ,conventional non locking plates . the conservative method having no accurate reduction and long immobilization time leading to more complications k wire fixation also having no anatomical alignment and poor purchase of the bone loosening and prolonged immobilization giving poor results . and one third tubular plates also having poor purchase leading to poor results in conventional non locking plates the purchase of the screws is less and also there is motion at screw and plate interface leading to loosening and implant failures are more in this group.

### II. Materials And Methods

This is a prospective study containing 30 patients studied in between june 2013 to may 2016 only AO type c1 and c2 fractures , 18 to 70 years age group , within 4 days old ,no associated complications , isolated intraarticular bicolunar distal humerus fractures are selected . in our study 21 patients are males 9 are females , 10 fractures in 18 to 30 age group ,6 are 30 to 50 age group , 14 are in 50 to 70 age group . the females are

more on above 50 age group , 20 are in right sided,10 are on left sided, 16 fractures are due to high energy trauma ,14 are due to simple fall. 18 are AO c1 fractures 12 are AO c2 fractures, 28 are simple and 2 fractures are grade one compound .

**Inclusion criteria :**

- a) above 18 years
- b) below 70 years
- c) AO c1 and c2 fractures
- d) isolated fractures
- e) within 4 days old

**Exclusion Criteria :**

- a) AO c3 fractures
- b) associated fractures
- c) more than 4days old

**111 . operative procedure :**

After investigation of the patient .taking fitness Patient is posted for surgery under general anesthesia , lateral position arm is placed on a bloster . posterior approach to the elbow joint taking incision 7 cm above the elbow in the midline near to elbow curved laterally away from the tip of olecranon after that coming to midline of subcutaneous surface of the ulna .subcutaneous tissue dissected and triceps muscle is reflected along with the olecranon after olecranon osteotomy . the olecranon osteotomy is chevron shaped apex distally which is 3 cm from the tip of olecranon first with the drill holes are placed and cut with thin oscillating saw up to articular margin , with osteotome the lost articular part separated, the triceps is separated from the surroundings, medially ulnar nerve separated from the medial epicondyle , transposed anteriorly. the articular surface is now visible clearly . the articular fragments reduced anatomically and fixed preliminarily with k wires and this is fixed with the shaft by k wires , intra articular fragments are fixed with 4 mm cannulated cancellous screws or malleolar screws if comminution is more or loss of fragment, bone graft is placed and the articular congruity is maintained . if comminution is more causing decreased space at articular level loss of movement is more especially extension,

Then the columns are fixed the column which is having less comminution is fixed first , and the comminuted one is fixed last . the lateral pillar the plate is placed on the posterior side , for medial pillar plate is on medial column , the plates bent to configure the columns , we used mostly 90 – 90 fixation (orthogonal)<sup>6</sup>some preferred parallel plating. In case of loss of bone we put cancellous bone graft taken from iliac crest, on lateral side we put longer plate then the medial side to decrease more pressure on the bone and we check the olecranon fossa to see any hardware protrude into it and congruity of articular surface, extension of the elbow ,stability of the fixation .

Ulnar nerve transposed anteriorly ,olecranon fragment is now fixed with tension banding wiring, wound is closed in layers after putting suction drain .and posterior plaster slab is placed postoperatively arm is kept in elevated position. After 48 hours the drain is removed,after pain is decreased 5 days after occasional movements are allowed ,after 10 days suture removal and slab is discarded in good bone quality inAOc1 fractures we put cuff and collar elbow flexion extension movements are allowed. In old age patients were poor bone quality and fixation is less stable we continue the slab for two weeks and occasional movements allowed daily .

Serial postoperative x rays are taken at three weeks, six weeks ,three months and six months, patient is followed till two years period and observe the radiological union ,movements, pain, functional aspect return to his work.

### **III. Results**

All the 30 fractures were healed ,and are available for evaluation they were followed up for two years. Surgery time was 90 to 120 minutes , hospital stay was 10 to 25 days ,early movements started postoperatively fifth day onwards ,radiological union was achieved in 12weeks to 20 weeks and started to go work from 20 week onwards. In this study there were three superficial infections , healed after a course of antibiotics ,mild pain in 8 , moderate in 2 patients , movements 16 having 20 to 130 degree , 10 patients having 20 to 110 degree ,2 patients having 30 to 100 degree , 2 patients having 30 to 80 degree movements , all are doing near normal function . 26 patients are having good stability , 4 patients having moderate stability. scoring by mayo elbow scoring , 10 patients are excellent ,16 patients are good result ,2 patients are fair results, 2 patients are poor results . the poor and fair results moderate stable joints are mainly in old age patients.

#### IV. Discussion

Intra articular distal end humerus fractures the treatment is difficult as this area is more wider the bone is thin and bone quality is poor the fracture fragments are small . the elbow joint anatomy is complex and requiring accurate reduction . Elbow joint is more sensitive joint as it is easily go into stiffness as kept more than two weeks immobilization. the brachialis anteriorly closely related to capsule and early scaring of the capsule and contracture of the muscle ,mild myositis ossification in this area is more common so that elbow is easily go into stiffness requiring early mobilization for that required a stabile fixation. these fractures are not accurately fixed leading to loss of movements, and pain loss of function leading to osteoarthritis. So that financial, physical psychological burden on the patient and family. In the past these fractures are treated by conservatively in that non anatomical position, prolonged immobilization poor results are obtained. And after that internal fixation was done by using k wires here also anatomical reduction is not obtained requiring prolonged immobilization leading to poor results .later treated by one third tubular plate sand conventional non locking plates, these implants having poor purchase loosening and implant failures leading to poor results.

Present day more advanced plates locking plates are used .in this the screw is locked into the plate giving stable constrain there is no movement in between plate and screw so that locking plates giving more rigid fixation, and also more anatomical fixation can be attained putting double plates on both columns either 90-90 fixation are parallel plate fixation . because of accurate rigid fixation early mobilization possible so that low complication rate and good results so high patient satisfactory rates using these implants on both columns.

In studies like korner<sup>5</sup> et al, aslam<sup>8</sup> et al , goftam<sup>9</sup> et al , jupiter<sup>10</sup> et al , soon<sup>11</sup> et al ,self james<sup>7</sup> et al ,helfet<sup>12</sup> et al , have achieved good results with locking plates.

#### V. Conclusion

Intraarticular distal end humerus fractures double plating on both columns giving the best results , fracture fragments are small thin ,mostly osteoporotic , elbow is most sensitive joint going stiffness easily in prolonged immobilization so that implants having more purchase in the bone rigid , are used for early mobilization of the elbow. because locking nature of the screws into plates , good purchasing capacity these are the best implants in these fractures

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\*Dr. M . Lakshmi Narayana. "Locking Plates in Intra Articular Bicolumnar Distal Humerus Fractures in Adults." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.7 (2017): 54-56.