



## Clinical Study of Surgical Management of Fracture of Lower One Third of Humerus by Extra Articular Plating in Adults

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### ABSTRACT

#### INTRODUCTION:

Diaphyseal fractures of the humerus account for 1–3% of all fractures among adults and 20% of all fractures of the humerus<sup>1,2,3</sup>. The Extra articular distal humerus locking compression plate has been specifically designed to address these complex fractures. It is anatomically precontoured to be placed posteriorly along the central humeral diaphysis proximally and on the lateral supracondylar ridge distally. The increased locking screw density in the lateral column affords a strong fixation of the distal fragment

#### MATERIALS AND METHODS :

The present study was done in Mamata general and superspeciality Hospital, Khammam from October 2015 to September 2017. 20 cases of lower one third humerus shaft fractures were treated with open reduction and internal fixation with Extra Articular Distal Humerus Locking Compression Plates (EADHP).

#### RESULTS:

6 patients were (30%) in the age group of 18-35 yrs & 51-65 yrs each. 14(70%) were Male patients. 13(65%) Left side involved patients. 16(80%) patients sustained injury due to road traffic accident. 12 B1 Type was most common pattern. 18(90%) were closed fractures. 3(15%) were associated with multiple injuries. Mean of time for Fracture union in 18 patients (90%) was 13.9 weeks. 3(15%) patients developed post operative complications. Radial nerve neuropraxia 2(10%) cases and Superficial infection 1(5%) case. Average DASH score was 17.6 with range 12.5 to 33.5 points. Functional outcome as per Mayo Elbow Performance Score was excellent in 18(90%) cases; good in 2(10%) cases

#### CONCLUSION

As per AO principles that early operative intervention with Extrarticular Distal Humerus Locking Compression Plating (EADHP) on posterolateral column of humerus for distal

humerus fractures will result in excellent functional outcome.

**KEYWORDS:** Fracture of lower one third of humerus, Extra articular plating

### I. INTRODUCTION

Diaphyseal fractures of the humerus account for 1–3% of all fractures among adults and 20% of all fractures of the humerus<sup>1,2,3</sup>. There is a bimodal distribution with respect to the patient's age and gender. Peaks of incidence were described primarily in male patients in the 21 to 30 age and a larger peak in older females 60 to 80 years old<sup>4</sup>. The most common causes of these fractures were falls in the elderly population and sports injuries or road traffic accidents in the younger patients. The patients with an open humeral shaft fractures have often sustained high-energy trauma and have an increased incidence of radial nerve palsy, fracture comminution, ipsilateral upper extremity fractures and systemic injuries. Appropriate treatment should be based on a classification that describes the fracture pattern, easily reproducible and allows development of treatment guidelines

The Extra articular distal humerus locking compression plate has been specifically designed to address these complex fractures. It is anatomically precontoured to be placed posteriorly along the central humeral diaphysis proximally and on the lateral supracondylar ridge distally. The increased locking screw density in the lateral column affords a strong fixation of the distal fragment. An attempt has been made in this dissertation to evaluate the results of surgical management of fractures of distal one third humerus using Extra articular Distal Humerus Locking Compression Plates. Patients selected for this operation were of the age group 18 years and above and with fractures of lower one third humerus shaft who got admitted in Mamata General and Super speciality Hospital.

### II. MATERIALS AND METHODS :

The present study was done in Mamata general and superspeciality Hospital, Khammam



from october 2015 to september 2017. 20 cases of lower one third humerus shaft fractures were treated with open reduction and internal fixation with Extra Articular Distal Humerus Locking Compression Plates (EADHP).

**INCLUSION CRITERIA:**

1.All patients 18 years of age and older, with completely deviated lower 1/3rd humeral shaft fractures. 2.All fractures without intra articular extension. 3.Patients who are willing to be part of the study. 4.Open fractures with Gustilo Anderson classification type 1 and 2 .

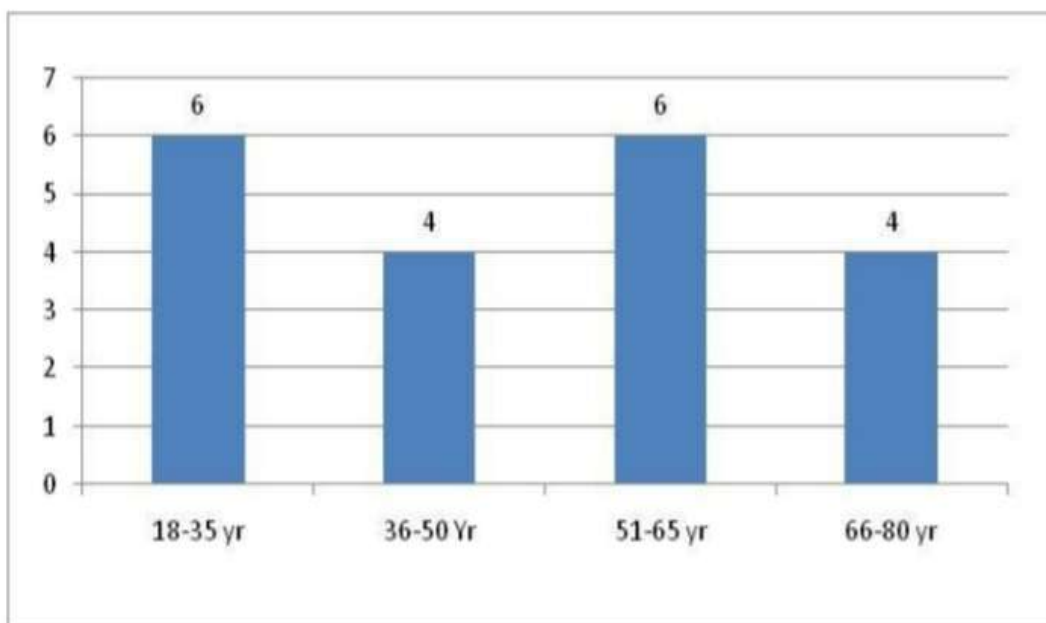
**EXCLUSION CRITERIA:**

1.All Patients less than 18 years of age. 2.Those whose fracture occurred more than 21 days ago and those with neurovascular-associated injury will be excluded 3.Patients who are not willing to be part of the study. 20 cases of distal humerus fractures were admitted and treated by open reduction and internal fixation with distal humerus extraarticular plate. Preoperatively all patients were immobilized in U slab.

**III. RESULTS:**

6 patients were (30%) in the age group of 18-35 yrs & 51-65 yrs each .

**GRAPHS-1:**



4 patients were (20%) in the age group of 36-50 &66-80 yrs each. 14(70%) were Male patients and 6(30%) were females. 13(65%) Left side involved patients and 7(35%) Right side involved patients.

16(80%) patients sustained injury due to road traffic accident and 4(20%) patients by fall. 12 B1 Type was most common pattern.

**TABLE 1 :**

TYPE	NUMBER OF CASES	PERCENTAGE
12-A1	1	5%
12-A2	3	15%
12-B1	7	35%
12-B2	5	25%
12-B3	2	10%
12-C1	2	10%
TOTAL	20	100%



18(90%) were closed fractures and 2(10%) were open fractures  
3(15%) were associated with multiple injuries  
Mean of time for Fracture union in 18 patients

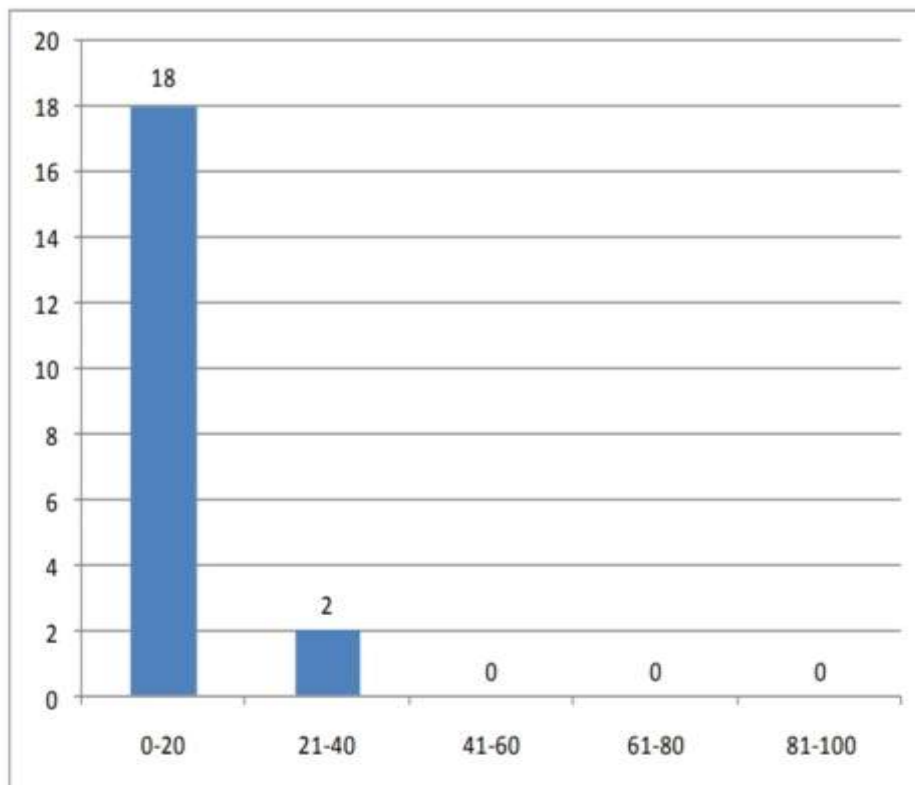
(90%) was 13.9 weeks. 3(15%) patients developed post operative complications. Radial nerve neuropraxia 2(10%) cases and Superficial infection 1(5%) case.

TABLE 2:

COMPLICATIONS	NUMBER OF CASES	PERCENTAGE
INFECTION	1	5%
RADIAL NEUROPRAXIA	2	10%
NO COMPLICATIONS	17	85%
TOTAL	20	100

Average DASH score was 17.6 with range 12.5 to 33.5 points.

GRAPHS-2:



Functional outcome as per Mayo Elbow Performance Score was excellent in 18(90%) cases ; good in 2(10%)cases.

IV. DISCUSSION

Distal third humerus shaft fractures remain one of the most challenging orthopaedic surgeries. They are commonly multi-fragmented, occur in osteopenic bone with peri articular and complex joint anatomy. Even after anatomical and stable reduction of fractures, end results are often associated with elbow stiffness, non union, mal

union and pain. A painless, stable and mobile elbow joint is desirable as it allows the hand to conduct the activities of daily living.

AGE DISTRIBUTION :

In our series the mean of age patients was 48.1 yrs, ranging from 18 yrs to 80 yrs. John T. Capo et.al<sup>4</sup> 2013 (n=21) series reported that the average age of the patients at the time of operation were 39 years (range 19–91 years). Fawi et al.<sup>5</sup>



2014 (n=23) series reported that the mean age of patients was 47.5 years; range 18 years to 89 years. Yashwant Singh Tanwar et al <sup>6</sup> 2016 (n=20) series reported that the average age of the patients was 44 years (range 31–56 years).

In Our study the mean of age group belonged to 4th decade. This is comparable with that of Fawi et al <sup>37</sup> 2014 and Yashwanth Singh Tanwar et al <sup>6</sup> 2016 studies. But the study conducted by John T Capo et al <sup>4</sup> 2013 the average age group was 3 rd decade.

**SEX DISTRIBUTION :**

Males are predominantly prone to fracture shaft of humerus due to high incidence of motor vehicular accidents.our study, there were 14(70%) male patients and 6(30%) female patients. John T.Capo et .al <sup>4</sup> 2013 (n=21) series reported that there were 12(57.2%) male patients and 9 (42.8% ) female patients. Yashwant Singh Tanwar et al <sup>6</sup> 2016 (n=20) series reported that there were 13 (65%) males and 7 (35%) females. Vinit Vimal Karn et al.<sup>7</sup> 2017 (n=20) series reported that there were 13 (65%) males and 7 (35%) females

**TYPE OF INJURY DISTRIBUTION:**

In our study (n=20) there were only 2(10%) patients with open injuries, remaining were 18(90%) closed fractures.John A. Scolaro, MD et al.<sup>8</sup> 2014 (n=40) series reported that there were 13(32.5%) open injuries, remaining 27 (68.5%) were closed fractures. **Jain et al <sup>9</sup> 2017 (n=26)** series reported that there were only 2(7.6%) patients with open injuries ,remaining 24 (92.4%) were closed fractures

**FRACTURE CLASSIFICATION TYPES ACCORDING TO AO CLASSIFICATION AMONG STUDY GROUPS:**

In our study the majority of fractures according to AO Classification were spiral wedge fractures and they were graded as 12 B1. Fawi et al <sup>5</sup> 2014 series reported that there were majority of oblique fractures( 12 A2) type in their series . But where as Yashwanth Singh Tanwar et al <sup>6</sup> 2016 series and Jain et al <sup>9</sup> 2017 series reported that spiral wedge fractures(12 B1) were their major fractures in their respective study

**POST-OPERATIVE COMPLICATIONS DISTRIBUTION AMONG STUDY SUBJECTS**

TABLE:3

SERIES	INFEC-TION	EL-BOW STIFF NESS	HETE-ROTOPIC OSSIFI-	ULNAR NEURO-PRAXIA	RADIAL NEURO-PRAXIA
OUR STUDY N=20	1(5%)	NIL	NIL	NIL	2(10%)
JOHN T. CAPO ET.AL 2013 (N=21)	1(4.7%)	1(4.7%)	1(4.7%)	1(4.7%)	NIL
FAWI ET AL. 2014 (N=23)	NIL	NIL	NIL	NIL	1(4.3%)
SUSHANT UDAY CHAVAN ET AL. IN 2017 (N=47)	NIL	NIL	NIL	NIL	1(2.1%)

In our study there were 15% cases who had complications during post operative period. John T. Capo et al <sup>4</sup> 2013 series reported that there were 14.1% cases who had complications. Whereas

Fawi et al <sup>5</sup> 2014 series and Sushant Uday Chavan et al <sup>10</sup> 2017 series reported their complication rates as 4.3% and 2.1% respectively



**FUNCTIONAL RESULTS BY DASH SCORE AMONG STUDY GROUPS:**

**TABLE :4**

SERIES	DASH SCORE
OUR STUDY (N=20)	17.6
JOHN A. SCOLARO ET AL 2014 (N=40)	17.5
YASHWANT SINGH TANWAR ET AL 2016(N=20)	17.6
SUSHANT UDAY CHAVAN ET AL 2017 (N=47)	18.5

In our study the mean DASH score was 17.6 points .Our results were comparable with Yaswant Singh Tanwar et al <sup>6</sup> 2016 whose DASH score was 17.6. whereas John A. Scolaro et al <sup>8</sup> 2014 series quick dash score and Sushant Uday Chavan et al <sup>10</sup> 2017series reported mean DASH scores were 17.5 and 18.5 points respectively

**FUNCTIONAL RESULTS BY MAYO ELBOW PERFORMANCE SCORE**

In our study the mean MEPS was 94.75 (ranges from 80-100) with excellent results 90% cases and 10% cases had good results. Whereas Jain et al <sup>9</sup> 2017 series reported their mean MEPS as 96.1 (range 80-100) and 81% cases had excellent results and 19% cases had good results and Vinit vimal Karn et al <sup>7</sup> 2017 series reported the mean MEPS was 95.5% (ranges 80-100)and 95% cases with excellent results and 5% cases good results. There were no poor results in our study group

**V. CONCLUSION :**

As per AO principles that early operative intervention with Extrarticular Distal Humerus Locking Compression Plating (EADHP) on posterolateral column of humerus for distal humerus fractures will result in excellent functional outcome.

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