

## A Prospective Analysis of Plating in Shaft of Humerus Fracture

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### ABSTRACT

Cohort study of thirty cases of shaft of humerus fractures treated by open reduction and internal fixation using Dynamic Compression plate are taken at orthopedics ward of S. K. Hospital, Sikar. Inclusion criteria are both comminuted and segmental closed shaft of humerus fractures and exclusion criteria are open fractures and ipsilateral forearm and clavicle fractures. Twenty three are males and only seven are female's patient. Age of these patients ranged from 20 to 60 years. The right side was involved in 19 patients and left side in 11 patients. AO classification is used to classify the fractures. Patients had B type fractures while remaining had C type fractures. The average follow up is two years. The American Shoulder and Elbow Surgeons (ASES) shoulder score and Romen al series grading are used. We have 93.3% excellent/good result and 6.7% poor results. In our patients series we have one non-union, one delayed union and one case of deep infection. Suitable preoperative planning, minimal soft tissue dissection, strict asepsis, proper post-operative

rehabilitation and patient education are more significant to obtain excellent results. Timely Post-Operative mobilization following rigid fixation of the fracture of humerus, with DCP lowers the incidence of stiffness and sudecks dystrophy.

**Keywords:** Humerus Shaft, DCP, ASES Score, Fracture.

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### INTRODUCTION

Humeral shaft fractures represent between 3% and 5% of all fractures.<sup>1,2</sup> Most will heal with proper conservative care, although a small but consistent number will require surgery for optimal outcome.<sup>1,3,4</sup>

Existing research in this area focus on defining the incidence and health care resource required to treat this injury, refining the indications for surgical intervention, decreasing the surgical failure rate through newer implants and techniques, and minimizing the duration and magnitude of disability post injury. This study is to conclude the efficacy of Dynamic Compression Plate in the treatment of humeral shaft fractures.

### MATERIALS AND METHODS

It's a prospective study of thirty cases of shaft of humerus fractures treated by open reduction and internal fixation using Dynamic Compression plate at orthopedics ward of S. K. Hospital, Sikar.

**Inclusion Criteria:** Both comminuted and segmental closed shaft of humerus fractures.

**Exclusion Criteria:** Open fractures and ipsilateral forearm and clavicle fractures.

Twenty three are males and seven are female patient. Age of these patients range from 20 to 60 years. The right side is affected in 19 patients and left side in 11 patients. Mode of injury is RTA in 20 cases, due to slip and fall in 8 cases, due to fall from height in 2 cases. AO classification is used to classify the fractures. Patients had B type fractures while remaining had C type fractures. One patient had connected contralateral radius fracture, two had metacarpal fractures remaining patients didn't have any other associated injuries. Posterior approach is the surgical approach. A Broad 4.5 mm DCP made of 316L stainless steel is use and a minimum of six cortices are engaged with screw fixation in each fragment. All the patients are followed up at monthly interval for the first 3months, later at three-month intervals till fracture union and once in six months till the completion of study. The standard follow up is two years. The American Shoulder and Elbow Surgeons (ASES) shoulder score and Romen al series grading are used. The fracture is considered to be radiological united, when there is no noticeable fracture line and evidence of callus bridging at the fracture site. Clinical healing of the fracture is distinct by the absence of functional pain and local tenderness at the fracture site.

Table 1: Present study

ASES score	Number of Patients	Percentage
Excellent	25	83.3
Good	3	10
Bad	2	6.7

## RESULTS

The results were tabulate in table 1. We had 83% excellent and 10% good results.

## DISCUSSION

28 of our 30 fractures united with one fracture departing for non-union. There is one case of delayed union. In our study we had 93% union rate, 3% non-union and 3% delayed union. Our study is comparable to that of Bell MJ et al<sup>6</sup> who had 97% union rate with 34 patients and Tomasin J and Ward et al whose study had 97% union and 3% delayed union. 28 (93%) patients had sound union in less than six months, 1 (3%) Patient had delayed union and 1(3%) patient developed non-union-one due to deep infection. 25(83%) patients had full variety of motion of shoulder and elbow joint while 3(10%) Patient had good range of motion while 2(7%) patients had reduced range of movement. Of these, 1 (3%) patient had radial nerve palsy, 1(3%) patient had delayed union. Out of 30 patients in our study two patients had poor mobility of elbow and shoulder joints. We have 93% good range of mobility. Our results are comparable with those of Griend RV<sup>7</sup>, Tomasin J.<sup>8</sup> The higher percentage of stiffness in this series, as compared to studies done by Bell MJ et al<sup>6</sup> and Gongal T et al<sup>7</sup> is an indication of the importance of patient education and physiotherapy during postoperative supervision.

The American Shoulder and Elbow Surgeons (ASES) shoulder score is for 13 behavior of daily living require full shoulder and elbow movement. The utmost possible score is 52 points. The average ASES score obtained was 48 in our series. We had 28(93%) patients with excellent or good results out of 30 patients in our series. Our results are comparable to that of Bell MJ et al who had 92% good results, Rodriguez et al<sup>9</sup> who had 95% good results and Tingstad EM et al<sup>10</sup> who had 94% good/excellent results. The results obtain by various authors using various modalities of treatment have diverse from 75% good or excellent results to 100% good or excellent results. Our study had a 93% overall good or excellent results. The causes for poor results are non-union in one case (deep infection caused it) and delayed union with stiffness in the other. There is one case of radial nerve palsy, developed post-operatively, it could have been due to extreme retraction of soft tissues with the nerve. Radial nerve palsy recovered in this case after 3 months. Two patients developed inflexibility of the shoulder and elbow joints. One patient had radial nerve palsy. The other patient had a delayed union. There are no cases of superficial infection. There is one case of deep infection which went for non-union and required implant removal. All are avoidable complications. Strict adherence to the AO principles during fixation, meticulous attention to preservation of asepsis during surgery, patient education and a well-planned rehabilitation programmer are required to obtain good results. If these principles are adhered to DCP fixation of humeral shaft fractures, this results in fewer complications and greater patient satisfaction.

## CONCLUSION

Dynamic compression plating of the humerus produce outstanding results in case of both comminuted and segmental humerus fracture. Appropriate preoperative planning, minimal soft tissue dissection, strict asepsis, proper postoperative rehabilitation and patient education are more vital to obtain excellent results. Injury to the radial nerve is rare, 3.3% in our series. Yet, it is essential to look for neurovascular injury and rule out the same. Timely Post-Operative mobilization following rigid fixation of the fracture of humerus, with DCP lower the incidence of stiffness and sudecks dystrophy. Prolonged immobilization goes against the principle of obtaining early, active, pain free mobilization. Internal fixation of the humerus with DCP avoids these complications and achieves higher union rates as compared to conservative management.

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