



Outcome Analysis of Plating in Shaft of Humerus Fracture

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ABSTRACT

Prospective study of thirty cases of shaft of humerus fractures treated by open reduction and internal fixation using Dynamic Compression plate are taken. 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 females patient. Age of these patients ranged from 20 to 60 years. The right side is affected in 19 patients and left side in 11 patients. AO classification is used to classify the fractures. 12 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 Roman al series grading are used. We have 93.3% excellent/good result and 6.7% poor results. In our series we have one non union, one delayed union and one case of deep infection. Proper preoperative planning, minimal soft tissue dissection, strict asepsis, proper postoperative rehabilitation and patient education are more important to obtain excellent results. Early 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.

INTRODUCTION

Humeral shaft fractures represents between 3% and 5% of all fractures^{1,2}. Most will heal with appropriate conservative care, although a small but consistent number will require surgery for optimal outcome^{1,3,4}. Current research in this area focuses 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. With this background, this study is to determine the efficacy of Dynamic Compression Plate in the treatment of humeral shaft fractures.

MATERIALS AND METHOD

It is a prospective study of thirty cases of shaft of humerus fractures treated by open reduction and internal fixation using Dynamic Compression plate. 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 seven are females patient. Age of these patients ranged 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. 12 patients had B type fractures while remaining had C type fractures. One patient had associated 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 used and a minimum of six cortices are engaged with screw fixation in each fragment. All the patients are followed up at monthly intervals for the first 3 months, later at three-month intervals till fracture union and once in six months till the completion of study. The aver-

age follow up is two years. The American Shoulder and Elbow Surgeons (ASES) shoulder score and Roman al series grading are used. The fracture is considered to be radiologically united, when there is no visible fracture line and evidence of callus bridging at the fracture site. Clinical healing of the fracture is defined by the absence of functional pain and local tenderness at the fracture site.

RESULTS

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

TABLE – 1 RESULTS

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

DISCUSSION

28 of our 30 fractures united with one fracture going 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 al⁶ 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 range of motion of shoulder and elbow joint while 3(10%) Patient had good range of motion while 2(7%) patients had poor 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 RV⁷, Tomasin J. The higher percentage of stiffness in this series, as compared to studies done by Bell MJ et al⁶ and Gongal T et al⁷ is an indication of the importance of patient education and physiotherapy during postoperative management.

The American Shoulder and Elbow Surgeons (ASES) shoulder score is for 13 activities of daily living requiring full shoulder and elbow movement. The maximum 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 MJ⁶ et al who had 92% good results, Rodriguez et al⁹ who had 95% good results and Tingstad EM et al¹⁰ who had 94% good/excellent results. The results obtained by various authors using various modalities of treatment have varied from 75% good or excellent results to 100% good or excellent results. Our study had an 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 excessive retraction of soft tissues with the nerve . Radial nerve palsy recovered in this case after 3 months. Two patients developed stiffness of the shoulder and elbow joints. One patient had an 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 preventable complications. Strict adherence to the AO principles during fixation, meticulous attention to maintenance of asepsis during surgery, patient education and a well-planned rehabilitation programme 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.

CONCLUSIONS

Dynamic compression plating of the humerus produces excellent results in case of both comminuted and segmental humerus fracture. Proper preoperative planning, minimal soft tissue dissection, strict asepsis, proper postoperative rehabilitation and patient education are more important to obtain excellent results. Injury to the radial nerve is rare, 3.3% in our series. Yet, it is necessary to look for neurovascular injury and rule out the same. Early Post-Operative mobilization following rigid fixation of the fracture of humerus, with DCP lowers 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.

REFERENCES:

- [1] Schemitsch EH, Bhandari M. Fractures of the diaphyseal humerus. In: Browner BD, Jupiter JB, Levine AM, Trafton PG, eds. Skeletal trauma, 3rd ed. Toronto: WB Saunders; 2001:1481-1511.
- [2] Brinker MR, O'Connor DP. The incidence of fractures and dislocations referred for Orthopaedic services in a capitated population. J Bone Joint Surg Am 2004; 86:290-297.
- [3] Gregory PR. Fractures of the humeral shaft. In : Bucholz RW, Heckman JD, eds. Rockwood and green's fractures in adults, 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2001: 973-996.
- [4] Fears RL, Gleis GE, Selingson D. Diagnosis and treatment of complications: Fractures of the diaphyseal humerus. In: Browner BD, Jupiter JB, Levine AM, Trafton PG, eds. Skeletal trauma, 2nd ed. Toronto: WB Saunders; 1998: 567-578.
- [5] Michener LA1, McClure PW, Sennett BJ. American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form, patient self-report section: reliability, validity, and responsiveness. J Shoulder Elbow Surg. 2002 Nov-Dec;11(6):587-94.
- [6] Bell MJ, Beauchamp CG, Kellam JK, and McMurtry RY. The results of plating humeral shaft fractures in patients with multiple injuries. J Bone Joint Surg Br.1985; 67(2): 293-296.
- [7] Gongol T, Mráček D. Functional therapy of diaphyseal fractures of the humeral

bone. Acta Chir Orthop Traumatol Cech. 2002; 69(4): 248-53.

- [8] Vander Griend R, Tomasin J, Ward EF. Open reduction and internal fixation of humeral shaft fractures. Results using AO plating techniques. J Bone Joint Surg Am. 1986 Mar; 68(3): 430-3.
- [9] Rodriguez - Merchan EC. Compression Plating Versus Hackethal Nailing in Closed Humeral Shaft Fractures Failing Nonoperative Reduction. J of Orthop Trauma. 1995; 9(3):194-7
- [10] Tingstad EM, Wolinsky PR, Shyr Y, Johnson KD. Effect of immediate weight bearing on plated fractures of the humeral shaft. J Trauma. 2000 Aug; 49(2): 278-80.