

A Prospective Study to Evaluate the Effectiveness of Precontoured Plate & Screw Fixation in Fracture Midshaft Clavicle

Surender Kumar

MBBS DNB (Orthopaedics), Junior Specialist, Government Medical College, Barmer, Rajasthan, India.

ABSTRACT

Background: The clavicle is a S shaped bone that acts as a strut between the sternum and the glenohumeral joint. It also has a suspensory function to the shoulder girdle. The present study was conducted to evaluate the effectiveness of precontoured plate & screw fixation in fracture midshaft clavicle.

Materials & Methods: The present study was conducted to evaluate the effectiveness of precontoured plate & screw fixation in fracture midshaft clavicle. In the present study 80 patients with displaced clavicle fractures were treated surgically by pre contoured LCP & screws with additional inter fragmentary screws. They were followed up for a minimum period of 1 year and evaluated for clinic-functional outcome using DASH score and CONSTANT MORELEY score.

Results: In the present study 62.5% were males and 37.5% were females. 81.25% of the fractures were sustained following Road Traffic Accident and 5 cases 18.75% following fall from height. Right clavicle was fractured in 57.5% cases and left in 31.25% cases and bilateral clavicle fracture in 11.25% cases. All fractures were Allman type 1. The mean operative time was 45 min. Bony union was achieved at an average of 11 weeks. These Patients returned to their daily routine activities from the time of injury on an average of 15 weeks. Postoperative complications were noted in the follow up. The complications were dysesthesia in the area of the incision in 5.0% cases,

painful shoulder in 7.5%. Patients were specifically questioned about their satisfaction or dissatisfaction regarding the appearance of the healed surgical scar, appearance of shoulder. 95% cases had satisfaction regarding the healed surgical scar.

Conclusion: The present study was concluded that displaced clavicle fractures, were effectively treated surgically with pre contoured locking compression plate & screws gave excellent result.

Keywords: Clavicle Fractures, Screws, Pre Contoured Locking Compression Plate.

*Correspondence to:

Dr. Surender Kumar,
MBBS DNB (Orthopaedics),
Junior Specialist,
Government Medical College, Barmer, Rajasthan, India.

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INTRODUCTION

The clavicle is a S shaped bone that acts as a strut between the sternum and the glenohumeral joint. It also has a suspensory function to the shoulder girdle. The shoulder hangs from the clavicle by the coracoacromial ligament. Clavicle is the bony link from thorax to shoulder girdle and contributes to movements at shoulder girdle.¹ Fracture of clavicle is a common skeletal injury around shoulder region due to its subcutaneous location. It accounts for almost 5% of all fractures in adult population.²⁻⁴ Displacement occurs in about 73 % of all midshaft clavicle fractures.⁵ The average age of patients sustaining a midshaft clavicular fracture is 33 years; 70 % of the patients are male.⁶ A fall or a direct blow to the shoulder, giving an axial compressive force on the clavicle, is the most common trauma mechanism of injury for any clavicular fracture.^{7,8} The most commonly used system of classification of clavicular fractures is that of Allman. It

is divided into 3 groups: Group I: Middle-third fractures, Group II: Lateral-third fractures, Group III: Medial- third fractures. Fractures of the clavicle have been traditionally treated non-operatively.⁹ Although many methods of closed reduction have been described, it is recognized that reduction is practically impossible to maintain, and a certain amount of deformity and disability is expected in adults.¹⁰ The present study was conducted to evaluate the effectiveness of precontoured plate & screw fixation in fracture midshaft clavicle.

MATERIALS & METHODS

The present study was conducted to evaluate the effectiveness of precontoured plate & screw fixation in fracture midshaft clavicle. In the present study 80 patients with displaced clavicle fractures were treated surgically by pre contoured LCP & screws with

additional inter fragmentary screws. They were followed up for a minimum period of 1 year and evaluated for clinic-functional outcome using DASH score and CONSTANT MORELEY score. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written informed consent was taken from the patient after explaining the study. Patients of age Age >18 years of both gender, Displaced clavicle fractures (ALLMAN GROUP I, II, III), A fracture that had occurred less than two weeks previously, Bilateral clavicle fractures, Open clavicle fractures, Clavicle fractures associated

with neurovascular injury were included in the study. Patients with Haemopneumothorax, Multiple rib fractures, Flail chest, Patient not fit for surgery, Transverse type of clavicle fracture were excluded from the study. All the cases were operated with precontoured LCP fixed on superior surface with 3.5 mm locking screws with interfragmentary screws. In comminuted type of fractures, if the butterfly fragment is large it is fixed with main fragment by lag screw and converted into two-part fracture then fixed with plate. If fracture pattern is oblique or spiral then lag screw is put through plate itself.

Table 1: Demographic data

Variable	N(%)
Mean Age	33.24yrs
Gender	
Male	50(62.5%)
Female	30(37.5%)
Mode of injury	
RTA	65(81.25%)
Fall from height	15(18.75%)
Laterality	
Right	46(57.5%)
Left	25(31.25%)
Bilateral	9(11.25%)
Allman type 1	80(100%)

Type 2: Data regarding the effectiveness of precontoured plate & screw fixation in fracture midshaft clavicle

Variable	N (%)
Mean Operation time	45 mins
Bone union	11 weeks
Return to activity	15 weeks
Complications	
Dysthesia	4(5%)
Wound dehiscence	1(1.25%)
Hypertrophic scar	0(0%)
Painful shoulder	6(7.5%)
Motion limitation	0(0%)
Satisfaction with Appearance	76(95%)
DASH Score	4.3
Constant Morely score	86.6

RESULTS

In the present study 62.5% were males and 37.5% were females. 81.25% of the fractures were sustained following Road Traffic Accident and 5 cases 18.75% following fall from height. Right clavicle was fractured in 57.5% cases and left in 31.25% cases and bilateral clavicle fracture in 11.25% cases. All fractures were Allman type 1. The mean operative time was 45 min. Bony union was achieved at an average of 11 weeks. These Patients returned

to their daily routine activities from the time of injury on an average of 15 weeks. Postoperative complications were noted in the follow up. The complications were dysesthesia in the area of the incision in 5.0% cases, painful shoulder in 7.5%. Patients were specifically questioned about their satisfaction or dissatisfaction regarding the appearance of the healed surgical scar, appearance of shoulder. 95% cases had satisfaction regarding the healed surgical scar.

DISCUSSION

Mid-third diaphyseal clavicle fractures account for more than 80% of clavicle fractures. It was traditionally treated conservatively. Either an arm sling or a figure of 8 bandages was widely used. Arm sling demonstrated better patient satisfaction. Figure of 8 bandages were associated with more complications such as axillary pressure ulcer, compression of neurovascular structures.¹¹ In the present study 62.5% were males and 37.5% were females. 81.25% of the fractures were sustained following Road Traffic Accident and 5 cases 18.75% following fall from height. Right clavicle was fractured in 57.5% cases and left in 31.25% cases and bilateral clavicle fracture in 11.25% cases. All fractures were Allman type 1. The mean operative time was 45 min. Bony union was achieved at an average of 11 weeks. These Patients returned to their daily routine activities from the time of injury on an average of 15 weeks. Postoperative complications were noted in the follow up. The complications were dysesthesia in the area of the incision in 5.0% cases, painful shoulder in 7.5%. Patients were specifically questioned about their satisfaction or dissatisfaction regarding the appearance of the healed surgical scar, appearance of shoulder. 95% cases had satisfaction regarding the healed surgical scar.] Altamimi et al. in his comparative study between non operative treatment versus primary plate fixation for displaced fractures concluded that plating group had better functional outcomes, lower rates of malunion and non-union and a shorter time to union.¹²

In 2007, the Canadian Orthopaedic Trauma Society reported that internal fixation with plates resulted in more rapid union, excellent clinical outcomes, and lower complication rates in 132 patients with displaced clavicle fractures than non-operative treatments.¹³ Golish et al. in his study summarized, plates to be more biomechanically superior than intramedullary nails in clavicular fracture fixation.¹⁴

CONCLUSION

The present study concluded that displaced clavicle fractures, were effectively treated surgically with pre contoured locking compression plate & screws gave excellent result.

REFERENCES

1. KB Ravi, Ravishankar J, Puneet Shetty, Madhusudan H. Operative management of clavicle fractures by LCP. *Int J Orthop Sci* 2017;3(3):519-530. DOI: 10.22271/ortho.2017.v3.i3h.84
2. Schiffer G, Faymonville C, Skouras E, Andermahr J, Jubel A. Midclavicular fracture: not just a trivial injury: current treatment options. *Deutsches Ärzteblatt International*. 2010 Oct;107(41):711.
3. Toogood P, Horst P, Samagh S, Feeley BT. Clavicle fractures: a review of the literature and update on treatment. *The Physician and sports medicine*. 2011 Sep 1;39(3):142-50.
4. Van der Meijden OA, Gaskill TR, Millett PJ. Treatment of clavicle fractures: current concepts review. *Journal of shoulder and elbow surgery*. 2012 Mar 1;21(3):423-9.
5. Khan LA, Bradnock TJ, Scott C, Robinson CM. Fractures of the clavicle. *J Bone Joint Surg (Am)* 2009;91:447-460. doi: 10.2106/JBJS.H.00034.

6. Pearson AM, Tosteson ANA, Koval KJ, McKee MD, Cantu RV, Bell JE, Vicente M. Is surgery for displaced, midshaft clavicle fractures in adults cost-effective? Results based on a multicenter randomized, controlled trial. *J Orthop Trauma*. 2010;24:426-433. doi: 10.1097/BOT.0b013e3181c3e505.
7. Nowak J, Mallmin H, Larsson S. The aetiology and epidemiology of clavicular fractures. A prospective study during a two-year period in Uppsala, Sweden. *Injury*. 2000;31:353-358. doi: 10.1016/S0020-1383(99)00312-5.
8. Stanley D, Trowbridge EA, Norris SH. The mechanism of clavicular fracture. A clinical and biomechanical analysis. *J Bone Joint Surg Br*. 1988;70:461-464.
9. F Postacchini, S Gumina, P Santis, F Albo. Epidemiology of clavicle fractures. *J Shoulder Elbow Surg*. Sep-Oct 2002;11(5):452-6. doi: 10.1067/mse.2002.126613.
10. Dr. M Srikanth, Dr. Laxman S, Dr. M Jaggu Niadu, Dr. G Ganesh, Dr. Manoranjan B. Prospective study of internal fixation of clavicle fractures by various methods. *Int J Orthop Sci* 2019;5(4):160-171. DOI: 10.22271/ortho.2019.v5.i4d.1667
11. Canadian Orthopaedic Trauma Society. Nonoperative treatment compared with plate fixation of displaced midshaft clavicular fractures. A multicenter, randomized clinical trial. *J Bone Joint Surg Am*. 2007 Jan;89(1):1-10.
12. Altamimi SA, McKee MD. Canadian Orthopaedic Trauma Society. Nonoperative treatment compared with plate fixation of displaced midshaft clavicular fractures. Surgical technique. *J Bone Joint Surg Am*. 2008;90(Suppl 2):1-8
13. Canadian Orthopaedic Trauma Society. Nonoperative treatment compared with plate fixation of displaced midshaft clavicular fractures. A multicenter, randomized clinical trial. *J Bone Joint Surg Am* 2007;89:1-10.
14. Golish SR, Oliviero JA, Francke EI, Miller MD. A biomechanical study of plate versus intramedullary devices for midshaft clavicle fixation. *Journal of orthopaedic surgery and research*. 2008 Dec;3(1):28.

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