



Original Research Article

Prospective study of clavicle fractures treated with precontoured locking compression plate

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ABSTRACT

Background and Objectives: Clavicle fracture is one of the most common fracture in human body. From past many years its been treated conservatively with good results. This study is conducted to know role of compression locking plate plate in unstable comminuted clavicle fracture.

Materials and Methods: We included 20 patients in our study. All were subjected for surgical treatment with LCP and followed up for 1 year. Study is conducted in period between January 2018 and January 2019.

Result: 17 patients out of 20 who were treated with Anatomic locking compression plate shows union at average duration of 3 months (12 weeks). Delayed union was seen in 3 patients, plate loosening in one patient and 3 patients had plate prominence.

According to Constant and Murley score after fracture union, 15 patients show excellent functional outcome, 4 patients shown good outcome and fair outcome was seen in 1 patient.

Conclusion: Our study concluded that precontoured locking compression plates in unstable displaced comminuted fractures in middle third of clavicle give fracture stability, allows early mobility and there by prevents shoulder stiffness.

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1. Introduction

Clavicle is the only long bone placed horizontally in our body. It connects upper limb and thorax at shoulder girdle.

Clavicle is one of the most common bone to get fractured due to its superficial position. Clavicle fracture accounts to 6-10% of all fractures.

1.1. ALLMAN classification¹

Group I: Middle third, Group II: Lateral third and Group III: Medial third.

Among 3 most common is MIDDLE THIRD accounting upto 75% of all clavicle fractures.

Almost all clavicle fractures are closed with only 1% cases accounting for open injuries. Fractures are twice more common in male and peak incidence in 3rd decade.²

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As rate of non union is as less as 1% most clavicle fractures were treated conservatively. However recent research and studies have revealed a larger occurrence of non union and malunion than presumed in displaced, comminuted fractures treated conservatively.

There is higher chance of nonunion in more displaced fractures treated without surgery.³

Primary internal fixation of displaced midshaft clavicle fractures leads to predictable and early return to function.⁴

In surgical treatment, many options are available. Most common being 1) TENS under c-arm guidance. 2) open reduction and internal fixation (ORIF) using anatomical LCP, DCP, reconstruction plate and semitubular plates.

In this series we have studied in detail the various pros and cons in surgical treatment of displaced unstable comminuted midshaft clavicle fractures using LCP.

2. Aims and Objectives

1. To know role of the surgery in clavicle fractures.
2. To know complications of clavicle fractures.
3. To know the functional outcome of surgical management of displaced clavicle fractures.

3. Materials and Methods

We included 20 patients of clavicle fracture treated surgically in the study done in GIMS Gulbarga in duration between January 2018 and January 2019.

Young patients, closed fractures, displaced clavicle fractures are included in the study.

Open, undisplaced, medial and lateral clavicle # and those associated with head injury are excluded from study.

In emergency department all the patients are assessed clinically and are immobilised with clavicle brace and arm pouch.

3.1. Surgical technique

Open reduction and internal fixation (ORIF) with anatomical locking plate under brachial block and short GA.

POST OP: patient is put on antibiotics and analgesic for 3-5 days. Pendulum shoulder exercises are started by end of 2nd week. After 1 month active shoulder range of movements are started but abduction is limited to 90°. Patient is followed up every 4-6 weeks and assessed clinically and radiologically for progressive callus formation. The functional outcome were assessed by Constant and Murley score.^{5,6}

4. Results

Study included 20 patients of clavicle fracture treated surgically in the study done in GIMS Gulbarga in duration between January 2018 and January 2019.

Out of 20, 18 patients(90%) were male and only 2 patient (10%) were female.

Among the 20 patients, 7 patients (35%) were aged between 19-29 years. Youngest was 19 and oldest being 60 yrs. Average age being 36 yrs.

Direct injury was most common mode of injury was road traffic accident, 80% (16 patients) reported with fall on shoulder, whereas indirect injury due to fall on outstretched hand in 4 patients (20%).

Left sided fractures were common (70%) than right (30%).

All patients are treated with anatomical LCP with minimum of 3 screws on either side.

Fracture is believed united after assessing clinically when there was no tenderness, and radiologically when fracture line is not seen.

In our study 17 patients (85%) fracture united by the end of 3 months and in 3 patients (15%) fracture united by end of 4 months.

In this study 3 patients (15%) had hypertrophic scar and in 3 patients (15%) had plate prominence and in another 3 patients (15%) delayed nonunion occurred. In 1 patient (5%) plate loosening occurred.

The functional outcome is assessed by Constant and Murley score. In our study excellent outcome was seen in 15 patients (75%), 4 patient (20%) have shown good functional outcome and fair outcome in 1 patient (5%).

5. Discussion

Most clavicle fractures can be treated conservatively. Hill et al.⁷ in 1997, Nordqvist et al.⁸ in 1998 and Robinson et al.⁹ in 2004 did a study to know this which showed poor results in middle third fractures with conservative treatment. Hence specific fractures like displaced with or without comminution require surgical stabilisation.

In our study Direct injury was most common mode of injury due RTA, direct injury due to fall on shoulder in 16 patients (80%) and indirect mode of injury like those due to fall on outstretched hand in 4 patients (20%). In Bostman et al.¹⁰ study the mode of injury from direct injury was 78.55% and indirect injury in 21.36% which is comparable to our study.

In our study 35% patients belonged to age group 19-29 years with average being 36 years. Youngest was 18 yrs and oldest 60 yrs.

In a study done by VanBeek et al.,¹¹ average age of patients in plating group was 36 years (range 13-68 years).

Male predominance was clearly seen in our study with male constituting 90% cases which was comparable to study done by Cho et al.¹² where male predominance was 78%.

Fracture united in our study at 3 months (12 weeks) when compared to study done by Cho et al.¹² where fractured united with locking plate at 13.2 weeks.

Plate prominence was seen in 15% cases which was the main reason for implant removal in our study. In Van Beek et al.¹¹ study shows 32% cases had plate prominence in precontoured plate and 64% in non contoured plate group.

The functional outcome as assessed by Constant and Murley score shows excellent functional outcome in 85% patients, good functional outcome in 10% and fair in 5% patient which was comparable to studies of Bostman et al.¹⁰ and VanBeek et al.¹¹ which showed similar results.

6. Conclusion

Precontoured locking compression plate is a very good option of implant for displaced comminuted middle third clavicle fracture as it offers advantages like immediate pain relief, fracture stability and early mobilisation of shoulder.

7. Sources of Funding

None.

8. Conflict of Interest

None.

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