



Orthopaedics

FUNCTIONAL OUTCOME OF SURGICALLY TREATED DISPLACED CLAVICLE FRACTURES

Dr Dema Rajaiah	Associate professor, Dept of Orthopaedics, Kurnool Medical College
Dr Bandam Srinivas*	Orthopaedics Resident, Kurnool Medical College *Corresponding Author
Dr Indla Ashok Kumar	Orthopaedics Resident, Kurnool Medical College

ABSTRACT Clavicle fracture is one of the most common injuries in the body occurring either due to a fall on an outstretched hand or due to direct trauma. They include 2.6% to 10% of all the fractures and nearly 44% of shoulder injuries. Most of the clavicle fractures heal without any complications with conservative management which has been showing acceptable results. But recent research is showing that surgical treatment has the potential to reduce the fracture complication rates and increase functional outcomes. In this study, 26 adult patients with displaced middle third clavicle fractures were treated with open reduction and internal fixation with precontoured clavicle locking plates in Government General Hospital, Kurnool from a period of September 2018 to February 2020. The functional outcome was assessed by Constant Murley Scoring. Results showed that 81% had excellent outcome, 15% had good functional outcome and only 4% showed fair result. Major complications like implant related complications, nonunion and neurovascular injuries were not seen. **Surgical treatment of displaced clavicle fractures** in the form of primary open reduction and internal fixation with precontoured clavicle locking plates gives rapid pain relief, early shoulder mobilization and less occurrence of nonunion and shoulder stiffness.

KEYWORDS : Clavicle Fracture, Displaced, Open Reduction And Internal Fixation, Precontoured Clavicle Locking Plates, Constant Murley Scoring, Functional Outcome.

INTRODUCTION

Clavicle fracture is common during trauma because of it is a subcutaneous bone.

According to Allman classification¹ of clavicular fracture, group I is middle third fracture, group II is lateral third fracture and group III is medial third clavicular fracture. Middle third fractures are most common due to a weak spot of clavicle at this location.

Numerous muscular and ligamentous forces acting on clavicle are responsible for displacement of clavicular fractures.

Open clavicular fractures are very rare. Clavicular fractures are more common in men. Majority of cases occur in the third decade of life².

Older data shows that incidence of nonunion in midclavicular fractures with conservative treatment is between 0.1 and 0.8%.

Recent data with adequate classification of fractures shows that incidence of nonunion in comminuted displaced midclavicular fractures is 10 to 15%.³

Surgery is being considered as primary treatment option due to its clinical and functional superiority over conservative management.

Displaced mid clavicular fractures treated with plate fixation have better functional outcome than those that are treated conservatively.⁴

Further, nonunion rate is high with closed reduction in widely separated fractures with interposition of soft tissue and in fractures with initial shortening of more than 2 centimeters.⁵ Complications associated with non union were limited mobility of shoulder, neurovascular symptoms and thoracic outlet syndrome.⁶

Surgical treatment proved to give high union rate and low complication rate.⁷

Open reduction and internal fixation is the preferred method of treating severely displaced middle clavicle fractures in adults.⁸

After one year of surgery, the operated patients were more likely to be satisfied with the appearance shoulder and shoulder in general than those treated conservatively.

Also, primary internal fixation of displaced comminuted mid shaft clavicular fractures leads to predictable and early return to function

and therefore preventing the unacceptably high complication rates of non-operative treatment.

Methods include k-wire, Steinman pin, more effective plate fixation.

Among plate fixation, Sherman plates dynamic compression plates, semitubular plates can be used.

Of all these, a precontoured locking compression plate or reconstruction plate is the most preferred.

AIMS AND OBJECTIVES OF THE STUDY

To study the role of surgical management of displaced clavicle fractures with precontoured clavicle locking plates.

MATERIALS AND METHODS

In this study, 26 adults with displaced middle third fractures of clavicle were treated with primary open reduction and internal fixation with precontoured clavicle locking plates at Government General Hospital, Kurnool from a period of September 2018 to February 2020.

INCLUSION CRITERIA

- Adult patients with age >18 years
- Closed fractures
- No contraindications to general anaesthesia
- Robinson classification 2B1 and 2B2 that is displaced fractures⁷

EXCLUSION CRITERIA

- Patients unfit for surgery
- Age <18 years
- A fracture involving medial or lateral one third of clavicle
- Open fractures
- Undisplaced fractures
- Pathological fractures

As the patients were brought to casualty, initial ATLS protocol was followed. Primary and routine investigations were done. The affected upper limb was immobilized in an arm pouch.

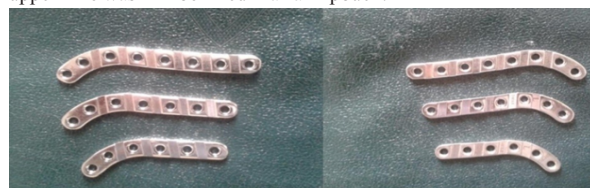


Fig 1: Precontoured Clavicle Locking Plates

OPERATIVE TECHNIQUE

- Patient is supine on ot table with a towel in between the scapula.
- Under strict aseptic precautions, a 7-9 cm incision was made in the anterior aspect of clavicle over the fracture site.
- The skin, subcutaneous tissue, platysma, overlying fascia, periosteum were divided and osseous ends were freed.
- Minimal soft tissue and periosteal dissection was done.
- At the junction of medial and middle third of clavicle, the inferior surface is exposed so that a protective instrument can be inserted during drilling to prevent injury to neurovascular structures underneath it.
- After reduction of fracture fragments, precontoured locking compression plate was applied to the superior aspect of clavicle and fixed to the medial and lateral fragments with at least 3 locking screws.
- Haemostasis was ensured, wound was closed in layers and sterile dressing was applied.

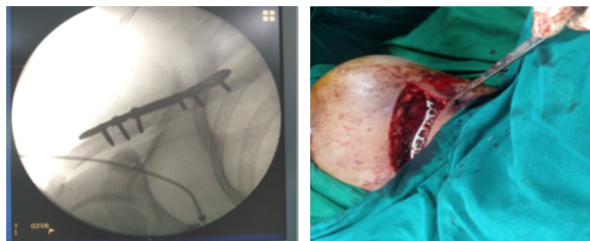


Fig 3: Intra op images. Fracture reduced and plate fixed with screws.

RESULTS

- Regular follow up was done every 4 weeks till radiological union and clinical examination was done and x-rays were taken at each follow up.
- The functional outcomes were assessed by Constant and Murley scoring.

Patients were graded as below with a maximum of 100 points

The present study consists of 26 patients with fresh middle third clavicle fractures who were treated surgically by precontoured locking compression plate and followed up in Government General Hospital, Kurnool, between a period of September 2018 and February 2020. All patients were available for follow up and they were followed every 4 weeks. Results were analyzed both clinically and radiologically.

DURATION OF UNION

In the study, for 23 patients (89%), union occurred within 12 weeks and in 3 patients (11%), union occurred after 12 weeks but within 16 weeks.

COMPLICATIONS

In this study 2 patients (8%) had hypertrophic skin scar, 2 patients (8%) had plate prominence, 3 (11%) had delayed union and 1 (4%) had plate loosening.

FUNCTIONAL OUTCOME

In this study, 21 (81%) had excellent functional outcome, 4 (15%) had good and 1 (4%) had fair functional outcome.

DISCUSSION

Though clavicle fractures are usually treated conservatively, surgical treatment is specifically indicated in certain situations like displacement, with or without comminuted middle third clavicle fractures.

The present study of 26 patients with middle third clavicle fractures is compared with Bostman et al.¹⁰ study which treated only middle third clavicle fractures, in which 103 patients were treated by primary open reduction and internal fixation with plate and screws.

In this study, in 23 patients (89%), fractures united within 12 weeks and in 3 patients (11%) delayed union occurred that is after 12 weeks but within 16 weeks. There were no non-union cases. There were no major complications in this study. Bostman et al.¹⁰ study had no major complications either.

In our study, plate prominence occurred in 2 patients (8%),

hypertrophic skin scar in 2 patients (8%), delayed union in 3 patients (11%) and plate loosening in 1 patient (4%).

In Bostman et al.¹⁰ study, 3 patients (15%) had plate loosening, 1 patient (5%) had skin complications, 2 patients (10%) had delayed union and 7 patients (6.80%) had implant loosening.

The functional outcome according to Constant Murley Scoring in this study of total 26 patients of middle third clavicle fracture fixed with locking compression plate and screws is excellent outcome in 21 patients (81%) and good functional outcome in 4 patients (15%) and fair functional outcome in 1 patient (4%).

CONCLUSION

With surgical treatment of clavicle fractures with precontoured clavicular locking plates, higher union rates can be achieved with much better functional outcomes and the complication rates are significantly low when compared to conservative treatment for displaced, comminuted, middle third clavicle fractures in adults.

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