



## TO STUDY POST OPERATIVE COMPLICATIONS OF MID SHAFT CLAVICLE FRACTURE

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### ABSTRACT

Clavicle is a S shaped bone which is connected to sternum and scapula. Clavicular fractures are the most common fractures that optimally treated. Clavicle fractures accounts for approximately 2.6% of all fractures in adults 10% to 15% in children and comprise about 30 - 40% of all shoulder girdle injuries and 5% fractures occurs in medial end. The main aim of clavicle fracture is to reunite the bone by minimizing dysfunction, morbidity, and cosmetic deformity. Definitive indications for acute surgical intervention include skin tenting, open fractures, the presence of neurovascular compromise, multiple trauma, or floating shoulder are the indications for intervention of surgery. 30 patients with mid shaft clavicle fractures were included in the study in the department of orthopaedics and these cases are divided into following two groups of 15 patients each. Operational Treatment leads to improve short term functional outcome, increased satisfaction of patients, and early recovery from clavicular fracture. MIPPO technique with the application of LCP offered an ideal combination in terms of bone fixation and soft-tissue sparing.

**Key words:** Clavicle fracture, operative, mid shaft treatment.

### INTRODUCTION

Clavicle is a bone connected to the sternum from inside and outside to the scapula. It is a membranous strong bone with no marrow canal. with the help of scapula, arms and sternum, clavicle forms the shoulder girdle [1]. In children, clavicle fracture accounts for 10-15% (2-6) whereas in adults, 2-5% of the fractures are seen (7,8). Clavicle fractures are more common in people aged less than 30 and more than 70 years. 2/3rd of the fractures is diaphyseal type with higher risk of displacement. The main cause of clavicle fracture is severe trauma due to traffic collision or intense exercise due to falling on outstretched arm. Sometimes, these fractures are healed without the treatment or by using an arm sling or figure of eight strap bandaging. These are the most used method in the treatment of fracture [9-12]

The treatment used for the displacements of more than two centimeters, fractures of more than three pieces, open fractures, and scapular malposition is the plate fixation. Clavicle hook plate fixation is the most common treatment in the fractures of distal clavicle fractures, acromioclavicular joint fractures. Plate fixation is used for the displacements of more than two centimeters, shortness of more than two centimeters, fractures of more than three pieces, open fractures, and scapular malposition. Moreover, fixation by a clavicle hook plate is one of the common treatment methods for the fractures of the distal clavicle. In general, hook plates are applied for the displacement of distal clavicle fractures, fractures extending to the acromioclavicular (AC) joint or fractures in the proximity of the AC joint (13).

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Risk of complications and reoperations increased with long term shoulder functional outcomes with the treatment of clavicle. Main aim of clavicular fracture is the union of bones and reducing the deformities and dysfunction. Surgical intervention is due to skin tenting, open fractures, neurovascular complications and multiple trauma. Besides this, management of displaced fractures remains controversial. Some studies say that mid shaft clavicle fracture heals without functional deficit.

Over the past 2 decades, mid shaft clavicular fracture becomes more favorable whereas data on non-displaced fractures says a relative risk reduction in 72% and 57% for non-union when compared to non-operative treatment. With these evidences, we carried out this study by x-ray finding, duration of surgery and post-operative complications.

## MATERIALS AND METHODS

This is prospective comparative study done in orthopedics at Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry, and Sree Balaji Medical College and Hospital, Chrompet, Chennai. This study conducted in 30 patients with mid shaft clavicular fracture during the period of 7 months i.e; January 2020 to September 2020. All the patients are in the age group of above 18 years.

Cases are included under the classification of Robinson's type 2 B1 (Mid shaft simple displaced and single butterfly fragment fracture), type 2 B2 (Mid shaft segmental fracture).

### Exclusion criteria

People less than 18 years of age, Fracture of medial third clavicle and lateral third clavicle fracture were excluded from the study.

Informed consent was obtained from all the patients. They are asked for follow-up after operation for every 1 month, 2 month, 4 month and 6 months. During the visit to hospital, they are asked for X-ray of clavicle with shoulder Antero-posterior view, Chest X-ray- Postero-anterior view and specific investigations whichever needed. Abnormal swelling of middle third clavicle fracture and in the lateral third for lateral third clavicle fracture is seen. Skin examined for any abrasion, laceration and contusion

Patients exhibited restricted movement in the affected side of the shoulder due to pain. Neurovascular status of the affected upper limb also examined. During the checkup, palpitations are seen on the affected clavicle.

30 patients were selected into two groups randomly and in each group 15 patients were present. Each group is treated with different treatments like group A treated with anatomical locking compression plate

(LCP) by open technique and Group B patients treated by minimal invasive percutaneous osteosynthesis (MIPO) technique.

## RESULTS

Our study is a type of prospective cohort study comprising of about 30 patients divided into two groups and treated with different treatments. Most of the patients are in the age group of around 23-37 years. Most of our cases were males with very less number of females. Male patients constitute around 80% whereas females around 20%.

According to the classification of Robinson's, Type 2B1 and Type 2B2 was seen around 92.3% and 7.3% patients respectively in Group A while Type 2B1 and Type 2B2 was seen in 70.2% and 20.8% patients respectively in Group B. By this result, we can say there is no significant association between the groups.

In Group A, out of 15 patients, 4 patients (26.6%) had operative time of around 80-100 minutes whereas 9 patients (60%) had operative time around 100-120 and 2 patients (13.3%) had operative time of 120-140 minutes respectively. The mean operative time was  $104.9 \pm 13.52$  mins. In Group B, 5 (33.3%) patients had operative time of 80-100 minutes whereas 7 (46.6%) had operative time of 100-120 minutes and 3 (20%) patients had operative time of 120-140 minutes respectively. The mean operative time was  $106.5 \pm 11.72$  mins. There was no significant association between the groups as per Student t-test ( $p > 0.05$ ).

The mean duration for radiological union in Group A was  $10.7 \pm 4.11$  weeks. Majority of the patients (60%) achieved radiological union in  $< 10$  weeks; 6 (40%) patients achieved union in 12-18 weeks. In Group B, majority of the patients (66.7%) achieved radiological union in  $< 10$  weeks while 5 (33.3%) patients achieved union of about 10 weeks. The mean duration for radiological union in Group B was  $12.1 \pm 6.68$  weeks.

1 (6.7%) patients in Group A had shoulder stiffness whereas 2 patients (13%) had plate prominence and infection. 2 (13.3%) patients each in Group B had shoulder stiffness and plate prominence while 1 (6.7%) patient had infection. During follow up period of 1 month, 10 patients in Group A and Group B has excellent score whereas 2 patients have good score and fair score also observed in some patients. Very poor score was observed in only two patients, and this might be due to some other causes like lack of rest, stress on affected area and also food habits. Increase in the functional outcome is seen in both groups but the increase was not so statistically significant. ( $p > 0.05$ ).

**Table 1: Comparison of Duration of Operative time between groups**

Operative Time (mins)	Group A		Group B		p Value
	N	%	N	%	
80-100 mins	4	26.6	5	33.3	<b>&gt;0.05</b>
100-120 mins	9	60	7	46.6	
120-140 mins	2	13.3	3	20	
Total	15	100	15	100	
Mean±SD	<b>103.6±12.5</b>		<b>105.6±10.52</b>		

**Table2: Distribution of patients according to Complications**

Complications	Group A		Group B		p Value
Shoulder Stiffness	1	6.7	2	13	<b>&gt; 0.05</b>
Plate Prominence	2	13	2	13	
Infection	2	13	1	6.7	

**DISCUSSION**

Clavicle is S shaped with concavity in the medial side whereas concavity is seen laterally. Middle third of the clavicle is very soft and located directly under the skin without the attachment of any muscle. So, it is very sensitive even to small damage. This is the reason of high frequency of clavicular fractures. Clavicular shaft fractures are considered to be non-operative treatments for a long time. This is according to the study of Neer CS and Rowe CR

The main aim of the treatment of clavicular fracture is reconstruction of clavicular length and alignment of the shoulder girdle. Fractures of clavicular shaft is treated by open reduction and internal fixation with plates by a method called plate osteosynthesis. LCP is mainly preferred for plate osteosynthesis of clavicle. LCP is nothing but locking of screw and plate. Displaced mid clavicular fractures are treated surgically with locking compression plate, which gives the shape of the clavicle. It is more effective in the treatment of clavicle mid shaft fractures. However, increased soft tissue stripping, infections, extensive scars, supraclavicular nerve injury are also seen in the treatment.

This is in accordance with the study of Jiang H et al who explained his study as randomized, controlled, clinical trial compared minimally invasive percutaneous plate osteosynthesis (MIPPO) technique and conventional open reduction with LCP for the treatment of clavicle mid shaft fractures in adults found in MIPPO group 20 males and 12 females with a mean age of 40 years (range, 20 to 70 years). In the conventional open reduction group, there were 20 males and 12 females with a mean age of 45 years (range, 18 to 69 years) [14].

It was observed in our study that in Group A, 4 (26.6%) patients had operative time of 80-100 minutes whereas 9 (60%) and 2 (13.3%) patients had operative time of 100-120 and 120-140 minutes respectively. The mean operative time was 103.6 ± 12.52mins. In Group B, 5(33.3%) patients had operative time of 80-100 minutes whereas 7 (46.6%) and 3 (20) patients had operative time of 100- 120 and 120-140 minutes respectively. The mean operative time was 105.6 ± 10.52mins. prospective study reported 3.3% of the patient had hospital stay of 1-3 days. 52% had a stay of 4-6 days, 20% stayed for 7-10 days, 15.7% were admitted for 11-16 days and 9% were hospitalised for 17 or more days. Mean hospital stay was of 7±5 days.

In the present study, 1 (6.7%) patient in Group A had shoulder stiffness while 2 (13%) patient each had plate prominence and 2 (13.3%) patients have infection. In group B, 2 (13%) showed shoulder stiffness, 2 (13%) showed plate prominence whereas 1 (6.7%) showed infection. Al-Sadek TA et al study says that patients treated with minimally invasive plate osteosynthesis (MIPO) in Mid shaft Clavicle Fractures reported All fractures healed within a mean period of 4.9 months (range, 2- 10 months without bending of the plate [15].

**CONCLUSION**

By this study, we can say that MIPOs can be used to preserve the biology at the fracture site with maximizing the healing potential of the bone, and to facilitate early and pain free recovery and MIPPO technique with the application of LCP offered an ideal combination in terms of bone fixation and soft tissue sparing.

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