ORIGINAL RESEARCH PAPER

Orthopaedics

# STUDY OF FUNCTIONAL OUTCOME OF PATIENTS WITH DISPLACED MID SHAFT CLAVICLE FRACTURE FOLLOWING THE TREATMENT USING A LOCKING COMPRESSION PLATE ; A LONGITUDINAL STUDY

KEY WORDS:

**Dr. Razia khan** Junior Resident, Career Institute Of Medical Science, Lucknow

**Dr. Uttam kumar Garg** Professor, Career Institute of Medical Science, Lucknow

**Dr. Susheel kumar pathak** Professor, Career Institute of Medical

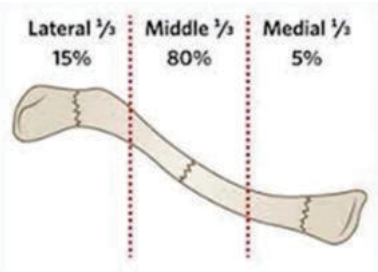
**Dr Aman jyoti** Junior Resident, Career Institute of Medical Science, Lucknow

## INTRODUCTION

- Clavicle fractures are common , accounting for 5-12% of all fractures .
- About 80-85% of these fractures are in the middle third of bone, where the typical compressive forces applied to the shoulder and the narrow cross section of the bone combines and results in bony failure .
- Displaced mid shaft fracture are common and are generally treated non operatively .
- Non operative treatment of these fractures with axial shortening is associated with non union , delayed union and malunion .
- Other complications are severe pain , neurological complications , loss of shoulder and protuberant callus forming swelling and strechng of skin which is cosmetically unacceptable .
- Prompt fixation of these clavicular fracttures permits increased patient comfort and early shoulder mobility .
- Operative treatment of displaced midshaft clavicular fractures can be achieved successfully using plates or intra medullary implant like Rush pins , kirschner's wire or nails.
- Open reuction and internal fixation with plating provides regid fixation , early functional recovery and low rates of non union , malunion .

## Allman Classification According To Site Of Fracture

- Group 1 : Fracture mostly occur in middle one third of clavicle (80%).
- Group 2 : Fracture of outer third is 15%. Fracture involving the acromioclavicular joint 28%
- Group 3 : Fracture of medial third 5 % .




## Aim

- The aim of this study " To assess the patient's functional outcome in displaced midshaft clavicle fractures with surgical management by Locking Compression Plate

## MATERIALS AND METHODS

- In this Institution based longitudinal study , 25 patients of both sexes belonging to adult age group presenting with displaced mid shaft clavicle fracture were admitted from June 2022 to January 2023 .
- All patients were surgically treated using the Locking Compression Plate .

## Inclusion Criteria

(a) Fracture Specific Criteria displacement > 2 cm , shortening > 2 cm comminuted > 3 segmental fracture open fractures impending compund fracture with soft tissue compromise

(b) Fracture with or without associated injuries vascular injuries progressive neurological deficits ipsilateral upper extremity injuries floating shoulder , bilateral clavicular fracture

## Exclusion Criteria

Undisplaced or minimally displaced fracture

## Sample Size

$$n = \frac{Z^2 * [p(1-p)]}{e^2}$$

Z= value of the standard normal distribution corresponding to the significance level of alpha( 1.96 for a 2- sided test at the 0.05 level / 95%.

p= expected proportion in the population

e = absolute precision value of n would be 25

Overall 25 samples will be collected

## Surgical Techniques

- Place the patient in supine position with sand bag between the scapulae. Keeping the sand bag allows the shoulder girdle to falls backward. It restores the length and increases the exposure to clavicle.
- Make an incision along the axis of the clavicle, centering the fracture site.
- Subcutaneous tissue along with platysma incised together and mobilized. Myofascial layer is incised and elevated. Fracture site exposed. Periosteum elevated.
- Fracture ends freshened. Fracture reduced using bone clamps. If there is a comminuted wedge fragment fix it with a lag screw.
- Locking compression plate is used. The Plate is placed over the superior surface of the clavicle.2.7mm drill bit is used.
- Screw size measured with depth gauge.Tapping was done with 3.5mm tap. 3.5 mm cortical screws are used for reconstruction and locking screws in locking plate.
- Minimum of six cortical purchases was attained on either side of the fracture. Myofascial layer followed by skin and sub cuticular tissue sutured.
- Sterile dressing applied and immobilized in a shoulder immobilizer.

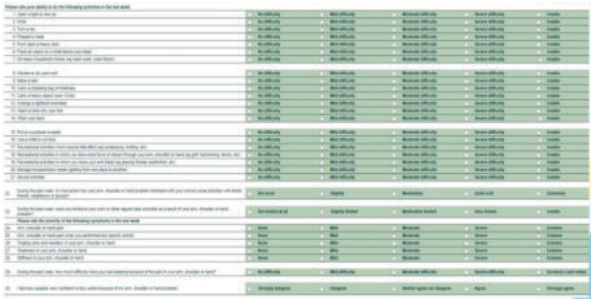
**Complications And Outcomes After Operative Treatment Of Clavicular Fracture**

| Complications | Operative Treatment ( n= 25) |
|---|---|
| Non union | 01 |
| Malunion requiring futher treatment | 0 |
| Wound infection / dehicence | 01 |
| Implant irritation requiring removal | 0 |
| Complex Regional pain Syndrome | 0 |
| | |
| Transient Brachial Plexus Symptoms | 01 |
| Abnormality of AC / SC joint | 0 |
| Early mechanical failure | 01 |
| Other | 02 |
| TOTAL | 06 |

**Statistical Analysis**

- The statistical analysis was done with the help of statistical software SPSS version 28
- Sampling done : Random sampling
- Study type prospective

**DASH Scoring**



**RESULTS**

- **Age Incidence**

| Age in years | No. of patients | Percentage |
|---|---|---|
| 10-20 | 02 | 08 |
| 21-30 | 08 | 32 |
| 31-40 | 06 | 24 |
| 41-50 | 04 | 16 |
| 51-60 | 05 | 20 |

- **Sex Incidence**

| Sex | No. of patients | Percentage |
|---|---|---|
| Male | 16 | 64 |
| Female | 09 | 36 |

**RESULTS**

- Maximum number of patients sustained clavicle fracture due to fall on shoulder (30 cases) followed by RTA (07 cases).
- The mean DASH Score was 7.6 +/- 7.3 points

**DISCUSSION**

- When LCPs are used to treat clavicle mid shaft fractures , the risk of injury to the sub clavicular artery or Brachial plexus can be reduced because fixation can be achieved without the tip of the screw reacing the opposite bone cortex and periosteal stripping can be minimised to promote rapid union.
- It is believed that surgery time can be reduced using LCPs becouse accurate plate contouring is not necesssary and periosteal stripping could be minimised using self tapping screws .

The problem of LCPs that screw fixation can be weakened if breakage of the screw holes occur in the plate thread during plate contouring .

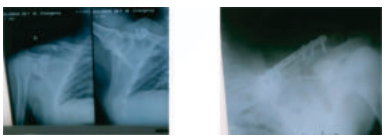
Surgical treatments for clavicle fracture leave distinct scar on the shoulder .

Patient with clavicle mid shaft fracture could suffer from hypertrophic scarring after surgical treatment with plate .

**CONCLUSION**

- LCP Clavicle plate allows for a safe stabilization and good functional outcome with high patient satisfaction in fracture of the clavicle .

**LCP Clavicle Plate**



**Pre op** **Post op**

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