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RESEARCH ARTICLE
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FUNCTIONAL OUTCOMES & COMPLICATIONS OF CLAVICLE FRACTURE TREATED WITH LOCKING PLATES IN ADULTS

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ABSTRACT:
Introduction: The clavicle is a bone that links the thorax to the shoulder and enables movement at the shoulder joints. Clavicle fractures are the most common fractures in the upper extremity. The purpose of the study was to prospectively analyse the functional outcome of mid third displaced clavicular fractures treated by open reduction and internal fixation with anatomical clavicular plate.
Materials And Methods: A Quasi experimental study was done in the Department of Orthopaedics at a tertiary care hospital. 25 patients with midshaft clavicle fractures with age between 18 to 60 years were included in the study after the inclusion & exclusion criteria were fulfilled. The functional outcome was assessed by Constant and Murley score. Data was collected and compiled using Microsoft Excel. Statistical analysis was done using descriptive statistics.
Results: Mean age was 36.64 ± 10.74 years. 20 (80 %) patients were male and 5 (20%) patients were male. 15 (60%) patients had RTA injury and 10 (40%) patients had fall from height injury. Left side clavicle was affected in 16 (64%) patients, right side clavicle was affected in 8 (32%)patients and bilateral clavicle was affected in 1 (4%) patient. At 1year follow-up, excellent outcome was noted in 20 (80 %) patients. 2 (8%) patients developed Hypertrophic skin scar, 2 (8%) patients developed Hypertrophic skin scar & 1 (4%)patient developed Superficial infection
Conclusion: Treating mid-third clavicle fractures with a locking plate results in dependable bone union and a more rigid stable fixation that does not require immobility for extended periods of time. It leads to early enhanced patient and surgeon orientation, functional outcomes, and lower incidence of non-union and malunion.

Keywords: clavicle fractures, functional outcome, Plating

INTRODUCTION:

A clavicular fracture constitutes around 5% to 10% of all fractures and up to 44% of shoulder girdle injuries [1,2]. Approximately 70% to 80% of these fractures occur in the middle third of the bone,

followed by the lateral third (12% to 15%) and the medial third (5% to 8%) [3,4]. The increased occurrence is attributed to the midshaft clavicle possessing the weakest portion of bone, which lacks ligamentous stabilization [5].

Displaced mid-shaft clavicle fractures are prevalent and often managed non-operatively. The non-operative management of these fractures with axial shortening is linked to non-union, delayed union, and malunion. Additional problems include intense pain, neurological issues, loss of shoulder functionality, and the formation of prominent callus resulting in swelling and skin distension, which is aesthetically unappealing [6].

The importance of precise reduction and rigid fixation in providing prompt pain relief and encouraging early functional recovery is emphasized by proponents of early fixation of new clavicular fractures in order to avoid problems like malunion and nonunion. High-activity individuals may need more intensive treatment for middle third clavicle fractures because they are reluctant to tolerate a longer healing period and compromised shoulder function. Increased patient comfort and early shoulder movement are made possible by the prompt repair of these clavicle fractures. Early plate fixation may be beneficial for individuals who have high physiological demands soon after surgery, high pain ratings, or a strong desire for surgery [7].

The purpose of the study was to prospectively analyse the functional outcome of mid third displaced clavicular fractures treated by open reduction and internal fixation with anatomical clavicular plate.

MATERIALS AND METHODS:

A Quasi experimental study was carried out at in the department of Orthopaedics, Viswabharathi Medical College & Hospital, Kurnool from November 2023 to October 2024. A total 25 patients operated for clavicle Plating were identified to be included in study. The study was approved by the Institutional Ethics committee and informed consent was taken from all the patients.

Inclusion criteria: Patients aged 18 to 60 years of either sex with closed comminuted fractures of the middle part of the clavicle and without medical contraindications for surgery.

Exclusion criteria: Patients who are skeletally immature, those with open or pathological fractures. Exhibiting indications of infection at presentation. Exceeding 4 weeks in age at the time of presentation. In a cognitively impaired patient with deficient communication abilities.

A plain radiograph of the clavicle and shoulder in anteroposterior view was obtained to evaluate the location and kind of fracture. Standard evaluations were conducted, and surgical clearance was secured. All patients had surgery in the supine position under general anesthesia, utilizing an anterior approach to stabilize the fractured middle part of the clavicle with a suitably sized locking compression plate. Postoperatively, analgesics and antibiotics were administered, with dressing applied on the second day and suture removal performed after two weeks. The affected limb was stabilized using an arm bag. Intermittent workouts, including modest pendulum movements, commenced on the third day. Full active range of motion in all planes was progressively attained within 4 to 6 weeks. Follow-up occurred biweekly for three months, then monthly until six months, then bimonthly until one year. Sports activities and heavy lifting are prohibited until 12 weeks. The functional result was evaluated using the Constant and Murley score. The functional result was evaluated using the Constant and Murley score [8].

Data was gathered and organized via Microsoft Excel. Statistical analysis was done using descriptive statistics

RESULTS:

During study period 25 patients with midshaft clavicle fractures with age between 18 to 60 years were included in the study. Mean age was 32.64 ± 10.74 years. 20 (80 %) patients were male and 5 (20%)

patients were male. 15 (60%) patients had RTA injury and 10 (40%) patients had fall from height injury. Left side clavicle was affected in 16 (64%) patients, right side clavicle was affected in 8 (32%)patients and bilateral clavicle was affected in 1 (4%) patient as shown in Table 1

Table 1: General Characteristics

Particular	**Mean/ No. of patients**	**Percentage (%)**
Age (years)	32.64 ± 10.74	
Gender		
Male	20	80
Female	5	20
Mode of Injury		
RTA	15	60
Fall from Height	10	40
Laterality		
Left	16	64
Right	8	32
Bilateral	1	4

15 (60%) fractures were healed at 12 weeks, 7 (28%) fractures were healed at 10 weeks & only 3 (12 %) fractures required 14 weeks for healing as shown in Table 2

Table 2: Radiological union

Union in weeks	**Number of weeks**	**Percentage (%)**
10	7	28
12	15	60
14	3	12

At 1year follow-up, excellent outcome was noted in 20 (80 %) patients as shown in Table 3

Table 3: Functional outcome

Outcome	**Number of cases**	**Percentage (%)**
Excellent	20	80
good	4	16
fair	1	4
poor	0	0.00

2 (8%) patients developed Hypertrophic skin scar, 2 (8%) patients developed Hypertrophic skin scar & 1 (4%)patient developed Superficial infection as shown in Table 4

Table 4: Complications

Complications	**Number of cases**	**Percentage (%)**
Hypertrophic skin scar	2	8
Plate prominence	2	8
Superficial infection	1	4

DISCUSSION:

Clavicle fractures have traditionally been treated without surgery. Until recently, the literature indicated a high incidence of positive results and a low risk of nonunions after nonoperative therapy. Many writers have lately proposed surgery therapy for clavicle fractures, particularly in cases of severe displacement or comminution, and have found decreased rates of nonunion and improved functional results. The sling or figure of 8 bandage is a popular conservative therapeutic option. The

primary issues with conservative therapy include nonunion, poor functional result, and lengthy recovery time. Zlowodki's study of displaced, midshaft clavicle fractures indicated nonunion rates ranging from 15% to 20% [9]. Hill found unsatisfactory patient-oriented functional results in 16 of 52 adult patients (31%) who had conservative therapy for displaced mid-shaft clavicle fractures [10]. This study examined the functional result of mid-third displaced clavicular fractures treated with open reduction and internal fixation using an anatomical clavicular plate.

The average age of the patients in this research was 32.64 ± 10.74 years, which is consistent with the earlier study by Dhoju et al [11]. The average age of the patients in the Lee JK et al. [12] study was 30 years. In the current study, mid shaft clavicle fractures occurred in 80% of males and 20% of females. In the Panse JB et al. [13] study, (90%) were men and 3 (10%) were females. In Patel YC et al. [14] study, 90% are men and 10% are girls.

In our investigation, all fractures were united, with more than 96% of patients having excellent to good outcomes and none having a bad outcome, which was consistent with previous studies such as Bostman and Pearson et al [15].

In the current study, one instance (4%) showed superficial infection of the operated site. In the Mckee MD et al.[16] trial, 4.8% experienced wound infection at the operated location. In the Lee JK et al. [12] study, four patients (11.8%) experienced infection in the operated site. In the Karthi MN, Premkumar TC, and Kailash K [17] study, 10% of patients had post-operative wound infection.

CONCLUSION:

Treating mid-third clavicle fractures with a locking plate results in dependable bone union and a more rigid stable fixation that does not require immobility for extended periods of time. It leads to early enhanced patient and surgeon orientation, functional outcomes, and lower incidence of non-union and malunion.

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