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ORIGINAL ARTICLE

Functional outcome of clavicle fractures treated with locking plates

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ABSTRACT:
Background: Many treatment modalities have been used for the management of such fractures. The present study was conducted to assess outcome of clavicle fractures managed with locking plates. **Materials & Methods:** 110 patients of clavicle fractures of both genders underwent open reduction and internal fixation was done using a 3.5 mm locking plate with lateral extension. Pain was assessed using visual analogue scale (VAS). The functional outcome was assessed using disabilities of the arm, shoulder and hand (DASH) scoring. **Results:** Out of 110, males were 60 and females were 50. The mean VAS on day1st was 5.8, on day 3rd was 3.2 and on day 10th was 0. DASH at 2 months was 12.6 and at 6 months was 4.2. Functional outcome was excellent in 50, good in 30 and moderate in 30 cases. The difference was significant (P< 0.05). **Conclusion:** Compression plating resulted in better patient outcome in clavicle fractures.
Key words: Compression plating, clavicle fractures, Visual Analogue Scale

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INTRODUCTION

The clavicle is the first bone in the human body to begin intramembranous ossification directly from mesenchyme during the fifth week of fetal life. Similar to all long bones, the clavicle has both a medial and lateral epiphysis. The growth plates of the medial and lateral clavicular epiphyses do not fuse until the age of 25 years. Peculiar among long bones is the clavicle's S-shaped double curve, which is convex medially and concave laterally.[1] This contouring allows the clavicle to serve as a strut for the upper extremity, while also protecting and allowing the passage of the axillary vessels and brachial plexus medially. The cross-sectional geometry also changes along its course. It progresses from more tubular medially to flat laterally. This change of contour, which is most acute at the junction of the middle and outer thirds, may explain the frequency of fractures seen in this area.[2]

Many treatment modalities have been used for the management of such fractures. Nonoperative methods are associated with high rates of non-union (22%–50%), out of which 14% cases were symptomatic.[3] Many operative treatment modalities have been tried for the management of lateral clavicle fracture including coracoclavicular screws, Kirschner wires, tension bands, hook plates, nonlocked and locked plates.[4] The present study was conducted to assess outcome of clavicle fractures managed with locking plates.

MATERIALS & METHODS

The present study comprised of 110 patients of clavicle fractures of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. An all cases, open reduction and internal fixation was done using a 3.5 mm locking plate with lateral extension. Pain was assessed using Visual Analogue Scale (VAS). The functional outcome was assessed using disabilities of the arm, shoulder and hand (DASH) scoring. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 110		
Gender	**Males**	**Females**
Number	60	50

Table I shows that out of 110, males were 60 and females were 50.

Table II Assessment of outcome

Score	Variables	Number	P value
VAS (days)	1st	5.6	0.02

	3rd	3.2	
	10th	0	
DASH	2 months	12.6	0.01
	6 months	4.2	
Functional outcome	Excellent	50	0.05
	Good	30	
	Moderate	30	

Table II shows that mean VAS on day1st was 5.8, on day 3rd was 3.2 and on day 10th was 0. DASH at 2 months was 12.6 and at 6 months was 4.2. Functional outcome was excellent in 50, good in 30 and moderate in 30 cases. The difference was significant (P< 0.05).

DISCUSSION

Fractures of the lateral third of the clavicle were further sub classified by Neer recognizing the importance of the coraco-clavicular (CC) ligaments for the stability of the medial fracture segment.[5] A type I lateral clavicle fracture occurs distal to the CC ligaments, resulting in a minimally displaced fracture that is typically stable. Type II injuries are characterized by a medial fragment that is discontinuous with the CC ligaments. In these cases, the medial fragment often exhibits vertical instability after loss of the ligamentous stability provided by the CC ligaments.[6] Type III injuries are characterized by an intra-articular fracture of the acromio-clavicular joint with intact CC ligaments. Although these fractures are typically stable injuries, they may ultimately result in traumatic arthrosis of the acromio-clavicular joint. A more subtle fracture may require special radiographic views for identification and may be mistaken for a first-degree acromio-clavicular joint injury.[7] The present study was conducted to assess outcome of clavicle fractures managed with locking plates.

We found that out of 110, males were 60 and females were 50. Different surgical treatments are reported in literature liked by different type of fractures and injury. Surgical treatment of medial-end clavicle fractures is indicated if mediastinal structures are placed at risk because of fracture displacement, in case of soft-tissue compromise, or when multiple trauma and/or "floating shoulder" injuries are present.[8] Closed or open reduction should be performed to reduce the displaced fragment in an emergent fashion. When open reduction is necessary, several techniques have been described for internal fixation of fracture fragments. These include wire or plate fixation and interosseous sutures.[9] In general, Kirschner wire fixation has proven unsafe because of breakage and migration.

We found that mean VAS on day1st was 5.8, on day 3rd was 3.2 and on day 10th was 0. DASH at 2 months was 12.6 and at 6 months was 4.2. Functional outcome was excellent in 50, good in 30 and moderate in 30 cases. Fridberg et al[10] identified all locking plate osteosynthesis of mid-shaft clavicle fractures operated upon in our department from January 2008 to November 2010 (n = 114). Nine patients did not attend the follow-up at our institution. The study group of 105 fractures (104 patients, 86 males) had a median age of 36 years (14–75 years). Follow-up ranged from 0.5 to 3.5 years. No patients were allowed to load the upper extremity for six weeks. Overall, there were 31 cases (30 %) of plate removals for discomfort. There were five cases (5 %) of failure of osteosynthesis: two occurred early after approximately six weeks and three late after ten to 13 months postoperatively.

Wu K et al[11] compared hook plates and Kirschner tension band wiring for unstable lateral clavicle fractures, they found that there is an equivalent rate of complications in the two groups, however, hook plate fixation was associated with statistically better shoulder function than K-wire tension band fixation. In addition, Kiefer H et al[12] compared the mechanical strengths between K-wires with tension bands and clavicular hook plates, they drew a conclusion that hook plates provided more stability than K-wires.

CONCLUSION

Authors found that compression plating resulted in better patient outcome in clavicle fractures.

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