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ORIGINAL ARTICLE

Assessment of outcome of clavicle fractures managed with locking plates

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ABSTRACT:

Background: Clavicle fractures comprise five to ten percent of all fractures. Approximately 75 % of these fractures are located in the middle third of the clavicle, with the majority of fractures being displaced. The present study was conducted to assess outcome of clavicle fractures managed with locking plates. **Materials & Methods:** 110 patients (males- 60, females- 50) with clavicle fractures were managed with open reduction and internal fixation was done using a 3.5 mm locking plate with lateral extension. The postoperative pain was assessed using Visual Analogue Scale (VAS) on postoperative days 1, 3 and 10. The functional outcome was assessed at the end of 2nd and 6th months with the help of Disabilities of the Arm, Shoulder and Hand (DASH) scoring. **Results:** Mode of injury was RTA in 65, fall in 30 and violence in 15. Side involved was right in 48, left in 52 and both in 10. The mean operative time was 54.2 minutes. The mean VAS on day1st was 5.3, on day 3rd was 3.1 and on day 10th was 0. DASH at 2 months was 12.4 and at 6 months was 4.6. Functional outcome was excellent in 40, good in 50 and moderate in 20 cases. The difference was significant (P< 0.05). **Conclusion:** Distal end clavicle fractures were well managed with compression plating.

Key words: clavicle fractures, compression plating, Arm, Shoulder and Hand scoring

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INTRODUCTION

Clavicle fractures comprise five to ten percent of all fractures. Approximately 75 % of these fractures are located in the middle third of the clavicle, with the majority of fractures being displaced. Despite the relative high prevalence of clavicle fractures, the optimal treatment of displaced mid-shaft clavicle fractures remains a matter for debate.[1]

The commonest site of fracture in clavicle is the midshaft followed by the lateral end, which accounts for about 25% of all the clavicle fractures. Twenty-five percent of these fractures are unstable due to the displacing forces acting on the fracture fragments: an inferior force on the lateral clavicle fracture fragment and an anterosuperior force on the medial clavicle fragment. These fractures can be classified using the Neer's Classification.[2] The lateral fractured fragment is small and hence, it is difficult to get an anatomical reduction and also poses problems in its fixation, which results in instability of the lateral clavicle fractures.[3] 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. 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 was conducted among 110 patients (males- 60, females- 50) with clavicle fractures. All were convinced for the study and their consent was taken.

Data of each patient was recorded. In all, preoperative investigation was performed. Open reduction and internal fixation was done using a 3.5 mm locking plate with lateral extension. Postoperative X-rays were done on day 1 and every 6 weeks after operation, until radiological union was achieved. The postoperative pain was assessed using Visual Analogue Scale (VAS) on postoperative days 1, 3 and 10. The functional outcome was assessed at the end of 2nd and 6th months with the help of Disabilities of the Arm, Shoulder and Hand (DASH) scoring. Data was collected and analysed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Assessment of parameters

Parameters	Variables	Number	P value
Mode of injury	RTA	65	0.02
	Fall	30	
	Violence	15	
Side	Right	48	0.09
	Left	52	
	Both	10	
Operative time (mins)		54.2	-

Table I, graph I shows that mode of injury was RTA in 65, fall in 30 and violence in 15. Side involved was right in 48, left in 52 and both in 10. The mean operative time was 54.2 minutes. The difference was significant (P< 0.05).

Graph I Assessment of parameters

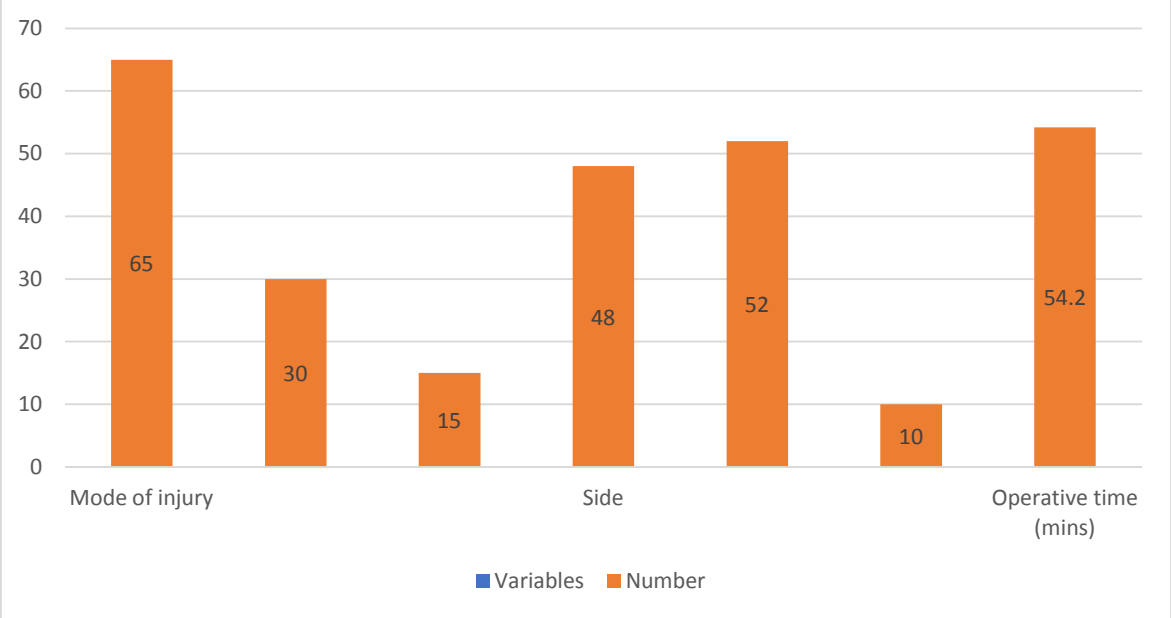
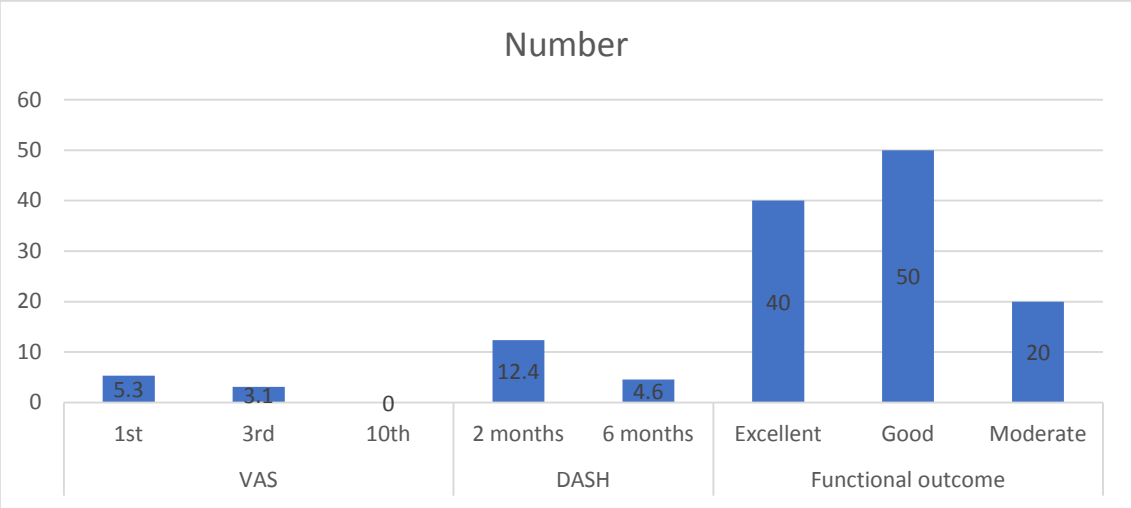


Table II Assessment of score

Score	Variables	Number	P value
VAS	1st	5.3	0.05
	3rd	3.1	
	10th	0	
DASH	2 months	12.4	0.01
	6 months	4.6	
Functional outcome	Excellent	40	0.02
	Good	50	
	Moderate	20	

Table II, graph II shows that mean VAS on day1st was 5.3, on day 3rd was 3.1 and on day 10th was 0. DASH at 2 months was 12.4 and at 6 months was 4.6. Functional outcome was excellent in 40, good in 50 and moderate in 20 cases. The difference was significant (P< 0.05).

Graph II Assessment of score



DISCUSSION

Clavicle fractures are one of the most common injuries in an adult population. It is also commonly associated with injuries to ribs, head and the upper extremities. These fractures are being encountered increasingly due to increase in high-velocity trauma as seen in the young population.[5] Due to more soft tissue injuries associated with these accidental injuries, the fracture fragments are displaced and require adequate reduction and fixation. Moreover, the functional demands in younger patients are high, and hence there has been a recent increase in the operative fixation of these fractures.[6]

The pre-contoured locking plate is now the preferred choice of implant for surgical treatment of clavicle fractures. The locking plate theoretically offers increased stability of fixation, which again should allow for application of greater forces than conventional reconstruction or dynamic compression plates (DCP) plates. Biomechanical studies investigating the impact of torsional and bending load forces on both locking and DCP supports the concept that improved fixation is achieved when using a locking plate.[7] Clinical studies support advantages of locking plates over more conventional plate types. Despite the frequent use of locking plates, little is known about what rates of complications and reoperations to expect following the use of this technique in daily practice.[8] The present study was conducted to assess outcome of clavicle fractures managed with locking plates.

We found that mode of injury was RTA in 65, fall in 30 and violence in 15. Side involved was right in 48, left in 52 and both in 10. The mean operative time was 54.2 minutes. Nordqvist et al[9] in their study 32 patients with lateral end clavicle fracture (Neer's Type II) were included. There were no intraoperative complications in the procedure. The mean VAS score on postoperative day 1 was found to be 5 which decreased to 3 on day 2 and 0 on day 10. The mean DASH score was calculated as 11.63 at the end of postoperative month 2 and then 4.6 at the end of month 6. There was one case of malunion in whom the overhead abduction was restricted but was not painful and was managed conservatively.

In 2007, the Canadian Orthopaedic Trauma Society published a randomised controlled trial comparing conservative treatment and plate osteosynthesis for the treatment of displaced midshaft clavicle fractures. Based on assessment of functional outcome and the rate of non-union, the study suggested superiority of plate osteosynthesis.[10]

We observed that mean VAS on day1st was 5.3, on day 3rd was 3.1 and on day 10th was 0. DASH at 2 months was 12.4 and at 6 months was 4.6. Functional outcome was excellent in 40, good in 50 and moderate in 20 cases. Fridberg et al[11] 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.

Kalamaras et al[12] were the first to report the concept of locking plate in distal clavicle fracture in their study where distal radius locking plate was used and finally concluded that the use of the locking plate gave good results and was promising for the management of the lateral clavicle fracture as it showed to have a better control on the distal fracture fragment.

CONCLUSION

Authors found that distal end clavicle fractures were well managed with compression plating.

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