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Management of lateral end clavicle fractures using hook plate -A prospective study

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Abstract

Background: The study was conducted to assess the functional outcome of hook plate for displaced lateral end clavicle fractures using Constant Murley score.

Materials and Methods: This study include total of 15 cases with displaced lateral end clavicle fractures satisfying the inclusion criteria treated with hook plate. Patients were followed up at 1st month, 2nd month and 6th month, the functional outcome was assessed using Constant Murley score and the radiological outcome was also assessed

Results: In our study, 15 cases treated with hook plate 26.7% of patients had excellent outcome and 73.3% had good outcome and postoperative shoulder impingement seen in 13% of patients

Conclusion: Hook plate has a good functional outcome for lateral end clavicle fractures. Hook plate is an absolute indication for comminuted lateral end clavicle fractures. Hook plate has implant-related complications, hence implant removal should be advised.

Keywords: Lateral end clavicle fracture, clavicle hook plate, subacromial osteolysis, clavicle fracture

Introduction

Fractures of the clavicle are one of common injuries with an incidence of 29 per 100,000 population per year ^[1]. It is around 2.6–4% of the total adult fractures. Lateral end clavicle fracture form 21– 28% of all clavicle fractures. Of these 10–52% are displaced fractures. ² Minimally displaced fractures of the lateral end of the clavicle can be managed non-operatively with good clinical outcome, displaced and comminuted fractures of the lateral end of clavicle have a higher rate of non-union. ³Hence operative treatment is needed.

There are numerous surgical techniques for the treatment for these fractures. Among them are Kirschner wires, coracoclavicular screw fixation, hook plate fixation, locking plate fixation. Although there are many types of operative procedures, no procedures are considered to be the gold standard treatment ^[1]. High rate of union (95% or higher) and good shoulder function have been reported with use of hook plates, but patient discomfort and acromial osteolysis generally require plate removal as soon as union occurs ^[44].

Materials and Methods: 15 cases with lateral end clavicle fractures admitted in JSS Hospital in a period of September 2016 to April 2018 satisfying the inclusion criteria were treated with clavicle hook plate.

Inclusion criteria

1. Displaced lateral end clavicle fracture.
2. Age > 18 years.

Exclusion criteria

1. Pathological fractures.
2. Medial and midshaft clavicle fractures.
3. Ipsilateral -humerus head/neck fracture.

Results: There were total of 15 patients, among them 12(80%) were male and 3(20%) were female. Right sided lateral end clavicle fracture was seen in 9(60%) and left in 6(40%) patients.

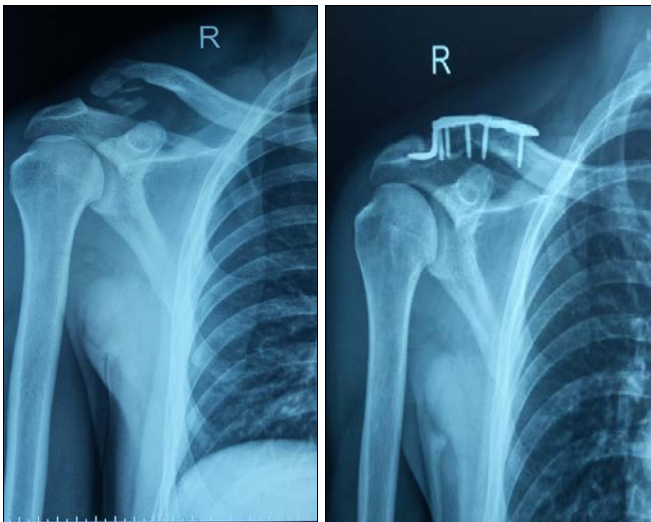
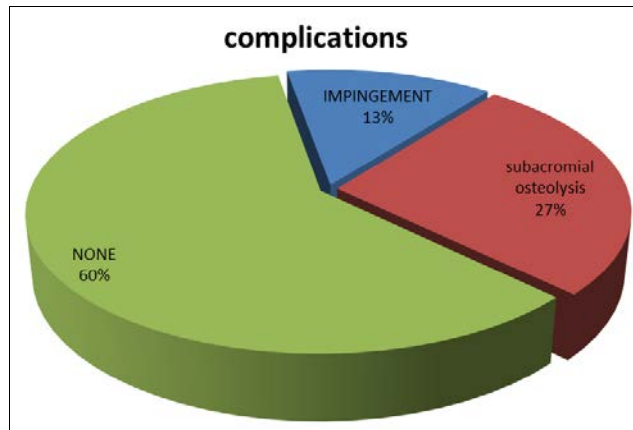
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Road traffic accidents was the cause of trauma in 9(60%) and fall in 6(40%). 10(66.6%) patients were type 2 Neer's fracture and 5(33.3%) were type 3 Neer's fractures. 9(60%) patients were less than 40 years of age, 3(20%) patients were of 40-50 years and 3(20%) patients were more than 50 years.

Constant murley score 26.7% of patients had excellent outcome and 73.3% had good outcome The mean duration of fracture union was 12.6 weeks .2(13%) patient had impingement and 4(26.7%) patients had subacromial osteolysis.



Discussion

The use of a hook plate in the treatment of fractures of the lateral end of the clavicle is one of the better treatment option.^{5,6} In our study also, we found that hook plate had 100% union and 26.7% had excellent outcome 73.3% had a good outcome which was comparable to the above study. Time of Implant removal has been the biggest question. In regards to the use of a hook plate, as late removal leads to implant related complications^[7]. In our study, we found that 40% of patients had implant-related complications, but the functional outcome was good to excellent outcome in 100% patients. Most of the patients in this study had an excellent or good outcome which is similar to the findings of various other studies^[8, 9, 10]. Most of the studies have not clearly defined whether there is need for either simultaneous reconstruction or repair of the ligaments along with hook plate method of fixation^[11]. In our study, we did not reconstruct the ligaments, 4 patients had an excellent outcome as assessed by Constant score. These results are comparable to other studies using a hook plate^[12]. We have noted the following complications: impingement occurred in 2 patients and osteolysis at the tip of the hook in 4 patients. These results are

comparable with other studies^[13]. The origin of impingement pain may be as a result of decrease in subacromial space or the irritation of the subacromial bursa. The cause of osteolysis between the plate and the acromion is said to be due to the rotational movement (micro motion) which occurs with shoulder movements resulting in rotation of clavicle and the hook plate in respect to the acromion^[14]. Senthil Loganathan came to a conclusion that anatomy of acromion varies with different ethnic group and hence same kind of hook plate cannot be used in all patients. A smaller hook depth is needed in South Asian population to prevent impingement and Intraoperatively distance between the acromion and supraspinatus tendon should be measured using depth gauge^[15].

Conclusion

From our study we conclude that the hook plate provides sufficient stabilization and good functional outcome. Hook plate fixation is an absolute indication for the comminuted lateral clavicle fracture. It facilitates early mobilization of the shoulder postoperatively and results in a high percentage of union with a good objective and subjective shoulder function. Depth of hook determines the complications related to hook plate, more the depth leads to rotator cuff attrition and lesser the depth causes subacromial osteolysis. Hook plate removal is advisable but the decision depends on the presence or absence of osteolysis and impingement. Using hook plate may cause impingement and subacromial osteolysis, without leading to functional impairment. These complications can be minimized by meticulously adjusting the plate to the individual anatomy with verification under fluoroscopy or measuring the depth of acromion and supraspinatus tendon intraoperatively and using hook plate with appropriate depth. Stability to the AC joint can be attained without the need of CC ligament repair or reconstruction using hook plate. However, large sample size, longer follow up and comparative study with other modalities is worthwhile pursuing.

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