

ORIGINAL RESEARCH

Assessment of outcome of titanium elastic nailing system versus non-operative treatment of midshaft clavicle fractures

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ABSTRACT

Background: Of all clavicle fractures, midshaft fractures account for between 69% and 81% of cases. The present study was conducted to compare outcome of titanium elastic nailing system (TENS) versus non-operative treatment of midshaft clavicle fractures. **Materials & Methods:** 70 patients with midshaft clavicle fractures of both genders were divided into 2 groups of 35 each. Group I patients were treated with 2 mm titanium elastic nail. Group II patients were treated by conservative management by means of figure of eight bandage with cuff and collar. Parameters such as time to bony union, shortening of clavicular length, constant shoulder score, the disabilities of the arm, shoulder and hand (DASH) score were recorded. **Results:** In group I, males were 25 and females were 10 and in group II, males were 21 and females were 14. The mean time to bony union was 13.4 weeks and 17.2 weeks in group I and II respectively. The mean shortening of clavicular length was 4.3 mm and 9.6 mm in group I and II respectively. The mean DASH score was 92.6 and 74.2 in group I and II respectively. The mean constant shoulder score was 70.4 and 55.6 in group I and II respectively. The common complications were non-union seen in 2 in group II, hardware prominence in 3 in group I and infection in 2 in group I and 6 patients in group II. The difference was significant ($P < 0.05$). **Conclusion:** For the fixation of misplaced midshaft clavicular fractures, titanium elastic nailing system offers an appropriate substitute technique that produces satisfactory outcomes for middle third fractures of the clavicle.

Keywords: Clavicle, fractures, DASH

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INTRODUCTION

One of the most common fractures seen in the emergency room setting, clavicle fractures are upper extremity fractures that account for 35% to 44% of shoulder girdle fractures and 2% to 5% of all adult fractures.^{1,2} The most common cause of fractures is direct trauma to the clavicle, such as in contact sports or motorcycle and bicycle accidents; males are more likely than females to be affected, and patients younger than 30 years of age are most likely to have a clavicle fracture; while 88.2% of all clavicle fractures occur in younger adults, a bimodal peak is seen in elderly patients who have simple falls from moderate height or falls from bed.³

Of all clavicle fractures, midshaft fractures account for between 69% and 81% of cases. This is in line with the functional anatomy of the clavicle as the center region of the clavicle is relatively weak and the distal and proximal ends are firmly supported by

strong ligaments and muscles linked to them.⁴ Nonoperative treatment of most clavicular fractures results in uneventful healing without major complications. In the past, the resulting bony prominences were thought to be better than an unattractive scar from internal fixation and open reduction (ORIF).⁵ The recommendations for treatment were derived from two sizable series that demonstrated nonunion rates of less than 1% in fractures treated conservatively as opposed to over 4% in fractures treated surgically.⁶ These findings proved that conservative management of clavicular fractures led to excellent union rates and function. Titanium elastic nailing of clavicular fracture is a relatively new technique with good results reported in a number of studies.⁷ The present study was conducted to compare outcome of titanium elastic nailing system (TENS) versus non-operative treatment of midshaft clavicle fractures.

MATERIALS & METHODS

The present study was conducted on 70 patients with midshaft 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. Patients were divided into 2 groups of 35 each. Group I patients were treated with 2 mm titanium elastic nail.

Group II patients were treated by conservative management by means of figure of eight bandage with cuff and collar. Parameters such as time to bony union, shortening of clavicular length, constant shoulder score, the disabilities of the arm, shoulder and hand (DASH) score were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Gender	Group I	Group II
Method	Titanium elastic nail	Conservative
M:F	25:10	21:14

Table I shows that in group I, males were 25 and females were 10 and in group II, males were 21 and females were 14.

Table II Assessment of parameters

Parameters	Group I	Group II	P value
time to bony union (weeks)	13.4	17.2	0.02
shortening of clavicular length(mm)	4.3	9.6	0.01
DASH score	92.6	74.2	0.04
constant shoulder score	70.4	55.6	0.05

Table II shows that in group I and group II, the mean time to bony union was 13.4 weeks and 17.2 weeks in group I and II respectively. The mean shortening of clavicular length was 4.3 mm and 9.6 mm in group I and II respectively. The mean DASH score was 92.6 and 74.2 in group I and II respectively. The mean constant shoulder score was 70.4 and 55.6 in group I and II respectively. The difference was significant (P < 0.05).

Graph I Assessment of parameters

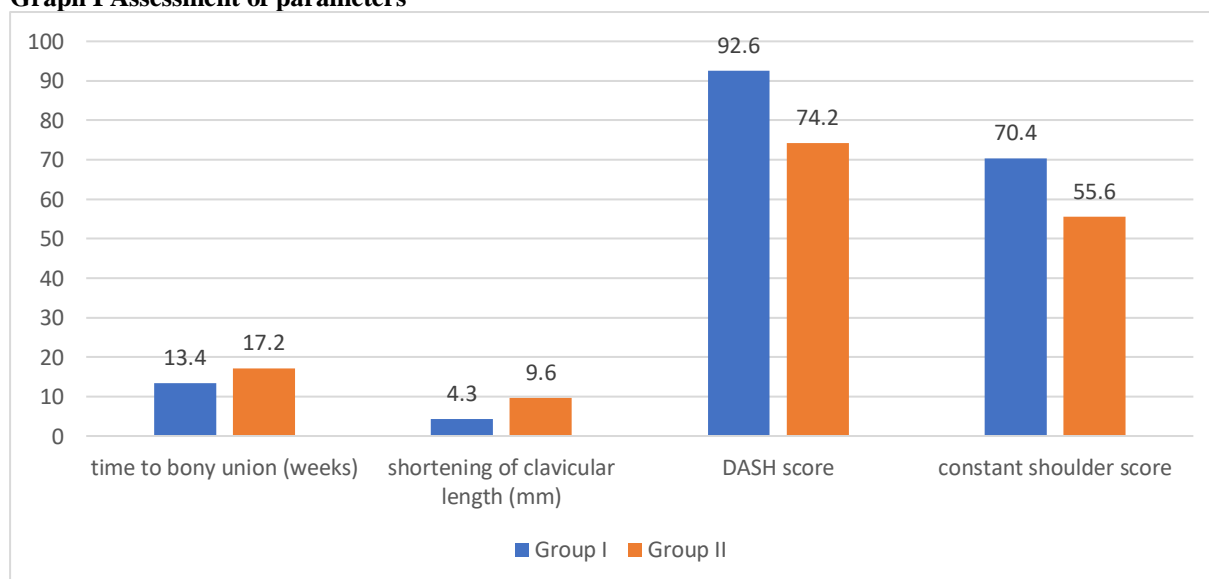


Table III Assessment of complications

Complications	Group I	Group II	P value
Non- union	0	2	0.05
hardware prominence	3	0	
Infection	2	6	

Table III shows that common complications was non- union seen in 2 in group II, hardware prominence in 3 in group I and infection in 2 in group I and 6 patients in group II. The difference was significant (P < 0.05).

DISCUSSION

Clavicle functions as a "strut" that keeps the upper limb away from the torso for efficient shoulder and

upper limb function, as well as transmitting forces from the upper limb to the trunk.⁸ Clavicle fractures account for 2.6% of all fractures.⁹ The most common

type of clavicle fractures is mid shaft fractures (80%). The functional outcome of a mid- shaft clavicle fracture is related to both its union and its length.¹⁰The present study was conducted to compare outcome of titanium elastic nailing system (TENS) versus non- operative treatment of midshaft clavicle fractures.

We found that in group I, males were 25 and females were 10 and in group II, males were 21 and females were 14. Gadegone WM and Lokhande V¹¹ performed a study in which 36 patients of midshaft clavicular fractures were taken up, there were 28 males and 8 females. mean age was 36.6 years. Twenty- one patients were managed by close reduction and fixation with screw intramedullary nail. Fifteen patients required mini-open reduction. Union was achieved at average of 11.6 weeks in 31 cases and five patients went to delayed union. The average follow-up was 6 months. The average constant score was 90%. Three patients had medial nail protrusion which required early removal after union. intramedullary nail is a safe, minimally invasive surgical technique with a lower complication rate, faster return to daily activities, excellent cosmetic and good functional results, and can be used as an equally effective alternative to plate fixation in displaced midshaft clavicle fractures.

We observed that in group I and group II, the mean time to bony union was 13.4 weeks and 17.2 weeks in group I and II respectively. The mean shortening of clavicular length was 4.3 mm and 9.6 mm in group I and II respectively. The mean DASH score was 92.6 and 74.2 in group I and II respectively. The mean constant shoulder score was 70.4 and 55.6 in group I and II respectively. We observed that common complications were non- union seen in 2 in group II, hardware prominence in 3 in group I and infection in 2 in group I and 6 patients in group II. Shukla A et al¹² in their study fifty adult consenting cases of acute midshaft fracture clavicle, displaced >15 mm was included. Twenty- five cases were allotted to conservative (group A) and external fixator (group B) each. In group A treatment was given in form of clavicle brace. In group B schanz pins were inserted obliquely between supero-inferior and anterior-posterior direction and connected with rod. Mean radiographic union time in group A was 23.45 ± 1.40 weeks (with 8% non- union and 80% malunion) and in group B it was 9.36 ± 1.49 weeks. Mean Constant score at 6 months in group A was 78.28 ± 6.45 and in group B 92.72 ± 1.48. Mean shortening at 6 months in group A was 19.36 mm. In group B shortening at 6 months was noticed in three cases (6, 5, 6 mm). Close reduction of acute fracture mid clavicle and application of external fixator is a simple procedure providing the benefits of rigid fixation and undisturbed fracture environment. Pain relief is faster, union time is shorter and there are no hardware related problems.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that for the fixation of misplaced midshaft clavicular fractures, titanium elastic nailing system offers an appropriate substitute technique that produces satisfactory outcomes for middle third fractures of the clavicle.

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