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A study on displaced mid-clavicular fractures treated by titanium elastic nailing system (Tens)

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Abstract

Introduction: The mid shaft clavicle fractures account for 70-80% of all clavicular fractures. Intramedullary devices behave as internal splints that maintain alignment without rigid fixation. TENS provide a three point fixation within S-shaped clavicle and effectively control rotation, angulation and shortening.

Materials and Methods: study included 21 patients aged between 18 to 60 years who underwent CRIF/ORIF with TENS for mid clavicular fractures in Department of Orthopedics, SMCH. Percutaneous nails are placed from medial to lateral direction. Entry point is 1 cm lateral to sternoclavicular joint. 5 to 10 mm longitudinal skin incision made 2mm medial to entry point in clavicle. In open approach a small vertical incision made at level of fracture. Post operative follow up done at postoperative day 10, 3 weeks, 6 weeks, 4 months, 6 months.

Results: Timing of operation was 2 to 15 days from date of injury. Close reduction was done in 6 cases and open reduction required in 15 cases. DASH score was 5 -10 at 24 weeks and constant shoulder score was 95-100 at 24 weeks. Time for clinical union was 6 to 12 weeks and for radiological union was 12 to 14 weeks.

Discussion: TENS are only indicated for OTA type A and B mid clavicular fractures. Diameter of nail should not be less than half of that of medullary cavity.

Conclusion: Fixation of displaced mid clavicular fracture with TENS is technically demanding and minimal invasive, early functional recovery and 100% rate of fracture union. Study gives sufficient evidence of excellence of this procedure in OTA type A midclavicular fractures, preferably transverse or short oblique fracture.

Keywords: Clavicle, shoulder, nail

Introduction

The mid shaft clavicle fractures account for 70-80% of all clavicular fractures ^[1, 2]. More common with direct blow on shoulder than fall on outstretched hand. Indications for surgery in acute clavicular fractures are completely displaced fractures, potential skin perforation, shortening of clavicle by more than 20 mm, neurovascular injury and floating shoulder ^[3]. Intramedullary devices behave as internal splints that maintain alignment without rigid fixation. Advantage of TENS over other intramedullary devices is that it block itself in the bone and provide a three point fixation within S-shaped clavicle and effectively control rotation, angulation and shortening of fragments ^[3, 4].

Materials and Methods

Study design; Randomised prospective study

No. of cases: study included 21 patients aged between 18 to 60 years

Place of study: Department of Orthopaedic Surgery, Silchar Medical College and Hospital, Silchar, Assam, India.

Procedures and follow ups conducted at the same centre and outcome were assessed and recorded

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Inclusion criteria

1. Patient who gives consent for surgery.
2. Patients with clinically and radiologically diagnosed displaced fracture of midshaft of clavicle with displacement or shortening/over riding more than 2 cm.
3. Age between 18 to 60 years Irrespective of sex.

Exclusion criteria

1. Patients who do not give consent for surgery
2. Compound fracture clavicle
3. Comminuted fracture clavicle
4. Fractures in any part of clavicle other than midshaft.
5. Distal neurovascular deficit associated with clavicle fracture
6. Patients with pathological fracture
7. Patients with associated head injuries
8. Age <18 years, > 60 years

Surgical Technique

Position: supine position

Percutaneous nails are placed from a medial to lateral direction so that they are driven across the fracture site to prevent medial migration of the nail.

Entry point: 1 cm lateral to the sternoclavicular joint on the anterior surface of the bone

Incision: 5 to 10 mm Longitudinal skin incision is made 2mm medial to the entry point in the clavicle.

Anterior cortex is drilled at a 30 to 45 degree angle from the horizon. Nail is advanced through drill hole into medullary canal of the clavicle. Nail is advanced to the level of fracture. The fracture can often be reduced by: manipulation of Arm Percutaneous towel clips.

In open approach, A small vertical incision is made at level of fracture parallel to langer’s line to avoid damage to the supraclavicular nerve. The Nail comes to rest in the posterior aspect of the lateral clavicle just medial to acromioclavicular joint.



Fig 1: a) Incision b) minimal exposure of fracture site c) fluoroscopic view of nail in the proximal fragment

Post operative follow up: done at postop day10, 3 weeks, 6 weeks, 4 months, 6 months.

Functional outcome was assessed by DASH score and Constant shoulder score at 6weeks, 4months and 6 months.



Fig 2: a) Pre-operative X-ray b) X-ray immediately after fixation c) Union at 5th month



Fig 3: Range of movements of shoulder after 6 weeks:

Results

21 patients with displaced midclavicular fracture underwent CRIF/ORIF with TENS.

Table 1: Sex distribution

Sex	No. of patients	Percentage
Male	17	81%
Female	03	19%
Total	21	100%

Table 2: Complications

Complications	No. of patients
Superficial infection and formation of hypertrophic scar	1
Medial prominence of nail	3
Extrusion of nail at fracture site	1
Medial skin perforation	1
Total	6

Table 3: Functional outcome based on DASH (Disability of Arm Shoulder and Hand) Score:

Completed weeks	DASH Score range
6 weeks	20-30
16 weeks	14-25
24 weeks	5-10

Table 4: Mean Constant Shoulder Score:

Completed weeks	Constant score
6	50-60
16	80-90
24	95-100

Discussion

In study of Kadakia *et al.* [5] (Study on 38 patients) mean age was 27.6 years, close reduction was possible in 28% cases, clinical and radiological union was achieved at 6 to 24 weeks, complications was observed in 7 cases, DASH score was 6.7 at the last follow up visit.

In study of Mishra *et al.*, [6] (Study on 73 patients) mean age was 32.6 years, close reduction was possible in 75% cases, clinical and radiological union was achieved at 6 to 11 weeks, complications was observed in 7 cases.

In study of Mueller *et al.*, [7] (Study on 32 patients) median age was 40 years, close reduction was possible in 50% cases, clinical and radiological union was achieved at 6 to 18 weeks, complications was observed in 8 cases.

TENS are only indicated in OTA type A and B midclavicular fractures.

They are not suited for osteoporotic and comminuted fractures in which fixation will not obtain 3 point support.

As the middle third of clavicle is subjected to considerable tension and bending forces, the diameter of nail should not be less than half of that of medullary cavity.

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Conclusion

Fixation of displaced midclavicular fractures with TENS is technically demanding and minimal invasive, early functional recovery and 100% rate of fracture union.

Post operative complications are less.

This study gives sufficient evidence of excellence of this procedure in OTA Type A midclavicular fractures, preferably

Timing of operation: 2 to 15 days from date of injury.

Type of reduction

Close reduction: 6 cases

Open reduction: 15 cases

Clinical and radiological union

Time for clinical union- 6 to 12 week

Time for radiological union-12 to 14 weeks

transverse or short oblique fracture.

References

1. Duan X, Zhong G, Cen S, Huang F, Xiang Z. Plating versus intramedullary pin or conservative treatment for midshaft fracture of clavicle: a meta-analysis of randomized controlled trials. *J Shoulder Elbow Surg.* 2011;20:1008-15.
2. Schiffer G, Faymonville C, Skouras E, Andermahs J, Jubel A. Midclavicular fracture: not just a trivial injury; Current treatment options. *Dtsch Arztebl Int.* 2010;107:711-7.
3. Frigg A, Rillmann P, Perren T, Gerber M, Ryf C. Intramedullary nailing of clavicular midshaft fractures with the titanium elastic nail: problems and complications. *The American Journal of Sports Medicine.* 2009;37(2):352-359.
4. Mueller M, Rangger C, Striepens N, Burger C. Minimally invasive intramedullary nailing of midshaft clavicular fractures using titanium elastic nails. *Journal of Trauma and Acute Care Surgery.* 2008;64(6):1528-1534.
5. Kadakia AP, Rambani R, Qamar F, McCoy S, Koch L, Venkateswaran B. Titanium elastic stable intramedullary nailing of displaced midshaft clavicle fractures: A review of 38 cases. *International Journal of Shoulder Surgery.* 2012;6(3):82.
6. Mishra PK, Gupta A, Gaur SC. Midshaft clavicular fracture and titanium elastic intra-medullary nail. *Journal of Clinical and Diagnostic Research: JCDR.* 2014;8(1):129.
7. Mueller M, Burger C, Florczyk A, Striepens N, Rangger C. Elastic stable intramedullary nailing of midclavicular fractures in adults: 32 patients followed for 1–5 years. *Acta Orthopaedica.* 2007;78(3):421-423.