ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PROSPECTIVE COMPARATIVE ANALYSIS OF FUNCTIONAL OUTCOME OF OPERATIVE VS NONOPERATIVE TREATMENT OF MIDSHAFT CLAVICLE FRACTURES.

Orthopaedics

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ABSTRACT

clavicle fracture accounts for 2.6%.mid shaft clavicle fracture accounts for 80% followed by distal third fractures 20%.functional outcome of clavicle fracture is not only related to its union ,but also to its length. The aim of the study is prospective comparative analysis of functional outcome of operative (TENS) VS nonoperative treatment on mid shaft clavicle fractures in terms of union,complications and functional outcome. Study is conducted in the department of orthopaedics and traumatology,Madurai medical college and Government rajaji hospital on 30 patients with displaced /comminuted clavicle fracture. Both Anteroposterior and 10 to 20 cephalad tilted radiographs were made for each patient fracture union, non-union ,malunion, infection, functional parameters.using constant score and dash score objective and subjective shoulder function were measured. This study shows that early primary fixation of fractures of clavicle with TENS result in earlier return to function.Operative treatment reduces the non-union,malunion and neurological complication rates of clavicle fracture ,but does not affect the delayed union rate .For clinical application ,we should make decision in accordance with specific conditions.In order to avoid the risk of adverse events ,operative treatment is a better therapeutic method if it is matched to the individual patients.To conclude ,TENS nailing for clavicle middle third fracture provides an acceptable alternative method for the fixation of displaced distal clavicular fractures and delivers good results.

KEYWORDS

Fracture, Clavicular Fracture , Outcomes , Nailing.

1. INTRODUCTION:

Of all fractures ,clavicle fracture accounts for 2.6%.mid shaft clavicle fracture accounts for 80% followed by distal third fractures 20%.functional outcome of clavicle fracture is not only related to its union ,but also to its length.[1]Traditionally clavicle fracture is treated nonoperatively with figure of eight bandage or broad arm sling.However outcome of non operative treatment are not always excellent.some patients are reported to be at a high risk for non-union,shoulder dysfunction or residual pain after nonsurgical management.[2]Therfore operative treatment is playing an increasingly important role in the clinical setting,mainly using locking compression plate or intramedullary nail fixation.Although plating accepted as a standard techniques,it has some disadvantage like large scars ,non-union,and difficult application and removal of plate.[3]The second method intramedullary nailing of clavicle fracture done by many techniques.[4]Nowadays rigid pins are not used due to breakage and migration,relatively new technique with titanium elastic nails are used.so we decided to evaluate functional and radiological outcome in patients treated operatively using intramedullary fixation by titanium elastic nail and nonoperative treatment on mid shaft clavicle fractures.

2. AIM OF STUDY:

The aim of the study is prospective comparative analysis of functional outcome of operative (TENS) VS nonoperative treatment on mid shaft clavicle fractures in terms of union,complications and functional outcome.

3. MATERIALS AND METHODS:

Study is conducted in the department of orthopaedics and traumatology,Madurai medical college and Government rajaji hospital on 30 patients with displaced /comminuted clavicle fractures All the patients were treated with 2mm titanium elastic nail.

CRITERIA FOR INCLUSION:

Patients were included in the study if they had simple mid shaft clavicle fracture with >2cm displacement, comminuted fracture mid shaft clavicle, Fractures associated with neurovascular injury, age 20-50 years.

CRITERIA FOR EXCLUSION:

Patients were excluded from study if they had undisplaced fractures,compound fractures of clavicle,pathological fractures,hemiparesis on the affected side,patients not willing for surgery.

ANESTHESIA: General anesthesia /Regional nerve block

PATIENT POSITIONING:

Patient positioned in supine ,a small bag is placed behing the ipsilateral scapula,the head is placed on a round support and rotated to opposite side of surgery,the upper limb is drapped free to aid in closed reduction of fragments.

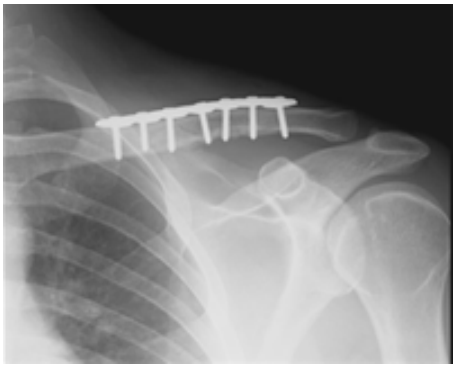
OPERATIVE TECHNIQUE: Under C-Arm Guidance,at the sternal end of clavicle a skin incision of 2cm is made parallel to the clavicle,the anterior cortex is opened with an awl about 1.5 cm lateral to the sternoclavicular joint,a TENS nail of appropriate size is inserted and advanced to the fracture site,subsequently the fracture is reduced in a closed manner,reduction is maintained provisionally with a small reduction forceps,the nail advanced across the fracture into the lateral fragment with gentle rotational movements .care must be taken that the implant is not advanced too laterally in order to avoid penetration into the acromioclavicular joint.

FOLLOW UP:

Postoperatively the limb was immobilesd with sling.Active range of motion exercises-elbow,wrist,and hand under the supervision of a physiotherapist,the affected limb was supported with a shoulder immobiliser for 3 weeks.Patient can be discharged on POD 6.Patient asked to attend for suture removal on POD 12 .The sling prevented the arm from drooping and interfering with bone union while allowing passive exercises.At 4th week the sling was removed and the patient was instructed to exercise the shoulder joint with active range of movements more than 90,Pendulum swing exercise gradually increased >90.At 6th week full range of movements were obtained.All patients were advised to return to light works and day to day activities as long as tolerable and radiologically acceptable.until solid union of fracture ,patients are advised to avoid heavy manual works.

Figure1: Mid Shaft Clavicular Fracture

Figure2: Mid Shaft Clavicular Fracture-locking Compression Plate



ASSESSMENT:

Both Anteroposterior and 10 to 20 cephalad tilted radiographs were made for each patient.All patients were assessed with a standard protocol in which they were assessed by 4th week ,6th week and once in a month with clinical and radiological parameters such as proper alignment of fragments,fracture union,non-union, malunion, infection, functional parameters.using CONSTANT SCORE and DASH SCORE objective and subjective shoulder function was measured.

STATISTICALANALYSIS:

The information collected regarding all selected cases were recorded in a master chart.Data analysis was done with the help of computer by using SPSS software and sigma stat 3.5 version(2012).usin this software percentage,mean,standard deviation,and P value were calculated through one way ANOVA,and CHI Square test and P value of < 0.05 was taken as significant.

4.RESULTS:

Among 30 patents 20 to 30 years-13 patients,31 to 40 years 8 patients,41 to 50 years 9 patients.All 30 patients included in our study had Robinson type 2B Fracture of clavicle.

COMPLICATIONS: Superficial wound infection-1,Implant prominence -2,Hard ware removal 2,without complications -12.

TIME TO BONY UNION: In all patients union of bone was observed ,and mean time required to bony union was 15 weeks (range from 11 to 19 weeks) Range of movements was well maintained in all patients except two patients.

5. DISCUSSION & CONCLUSION :

In this study ,we found that limited open reduction and internal fixation with TENS in the treatment of mid clavicular fractures in adults resulted in a high fracture healing rate ,rapid functional recovery and minimal complications.The procedure is minimally invasive and achieved high patient satisfaction.several options are available for the surgical treatment of clavicle shaft fractures,including plating and nailing.Plating is the most commonly used surgical treatment;however plating requires relatively extensive periosteal stripping,which may increase destruction of the blood supply at the fracture site,thus hindering fracture healing.stress shielding produced by rigid plates can lead to an 8% refracture rate after plate removal.Additionally the relatively long scar can be a cosmetic issue in some patients,and some individuals experience discomfort induced by the plate underneaththe skin.Fixation with TENS though a newe therapeutic method,provides fixation that is more consistent with the physiologic bone structure to permit early functional exercise,leads to faster functional recovery,provides early pain relief and avoids the complications associated with longer operating time and periosteal stripping.Some systematic reviews on clavicle fracture treatment have been reported in previous studies.For example Zlowodzki et al.[5] showed that the non-union rate can reach 4% by operative treatment and 6% by nonoperative treatment.However ,this study only included three RCT containing a cohort study due to the limitation of methodology.Only one of the three RCT studied the effect of different operations on clavicle fracture .Lenza et al[6] investigated three reports of nonoperative treatment of middle third clavicle fractures,but the three reports could not analyse the effect of different operations on clavicle fracture.This metaanalysis included five RCT and three CCT published between 2000 and 2011.This metaanalysis analysed the non-union,malunion,delayed union and neurological complication rate after operative and nonoperative treatment for clavicle fractures.The results showed that there were statistical differences in the non-union,malunion and neurological complication rates between operative and nonoperative treatment ,suggesting operative treatment could decrease the incidence rate of these adverse events. Plating is the standard technique for operation of clavicle fracture when surgery is required,but fixation of clavicle fracture by TENS nail is a new technique and can be used on some occasions.we had favourable results with this technique in cases with midshaft clavicular fracture.This technique is demanding and we do not recommend it in old comminuted clavicular fractures.This study shows that early primary fixation of fractures of clavicle with TENS result in earlier return to function.Operative treatment reduces the non-union,malunion and neurological complication rates of clavicle fracture ,but does not affect the delayed union rate .For clinical application ,we should make decision in accordance with specific conditions.In order to avoid the risk of adverse events ,operative treatment is a better therapeutic method if it is matched to the individual patients.To conclude ,TENS nailing for clavicle middle third fracture provides an acceptable alternative method for the fixation of displaced distal clavicular fractures and delivers good results.

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