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Functional Outcome of Displaced Middle Third Clavicle Fractures Treated By PRECONTOURED Locking Plate

Medical Science

KEYWORDS : clavicle fractures, precontoured ,locking plate, Constant Murley score.

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ABSTRACT

A prospective study from October 2014 to October 2015 was conducted in which twenty patients with mean age 32.65years.(range 19-60yrs) and Robinson type 2B1 in 16 patients (80%) and type-2B2 in 4 patients (20%) underwent plating with precontoured locking plate. Mean time to radiographic union was 8.60±1.96 weeks.None developed nonunion,neurovascular complications,infections. Functional outcome using Constant Murley score was excellent in 85%, good in 10% and fair in 5%. In conclusion, bony union could be achieved with precontoured locking plate by reducing the complication rates like malunion and nonunion in midshaft comminuted displaced clavicle fractures with good to excellent functional outcome.

INTRODUCTION

Clavicular fracture is one of the most common bony injuries. They account for 2.6% to 4% of adult fractures and 35% of injuries to the shoulder girdle.

The clavicle is an S-shaped bone that acts as a strut between the sternum and the glenohumeral joint. It also has a suspensory function to the shoulder girdle .The shoulder hangs from the clavicle by the coracoclavicular ligament.[1]

A weak spot in the clavicle is present at the midclavicular region, which accounts for most fractures occurring in this region

The present consensus that great majority of clavicular fractures heal with non operative treatment is no longer valid. The amount of pain and disability during the first three weeks of conservative treatment has been underrated and the common view that nonunion does not occur is wrong. Pressure from a displaced fragment on the retroclavicular part of the brachial plexus may cause symptoms after conservative treatment. Recent studies have shown that higher rate of non union and specific deficits of shoulder function in subgroups of patients with these injuries. Hence they can be treated as a spectrum of injuries requiring careful assessment and individualized treatment. Nonunion after a clavicular fracture is an uncommon occurrence, although the prevalence is higher than previously reported. There are subgroups of individuals who appear to be predisposed to the development of this complication either from intrinsic factors such as age or gender, or from the type of injury sustained.

Also persistent wide separation of fragments with interposition of soft tissue may lead to failure of closed reduction. There is 15% nonunion rate in widely displaced fractures of middle-third of the clavicle treated without surgery. And all fractures with initial shortening of more than 2cm resulted in nonunion.[2]

MATERIAL & METHODS

This is a prospective study from October 2014 to October 2015 consist of at least 20 patients visiting outpatient department/ emergency department of the hospital.Relevant history followed by patient or patient's attender consent for the operative procedure and all cases were treated by Open reduction and internal fixation with precontoured locking plate.inclusion criteria are patients of either gender aged 18-60 years with closed displaced clavicular fracture who have given their consent for the procedure.Exclusion criteria are open fractures of the clavicle,undisplaced fractures,patients with neurovascular deficits.All patients underwent surgery under general aneasthesia. in beach chair position,about 7-9 cms, incision was made in the anterior aspect centering of clavicle over the fracture site,skin subcutaneous tissue and platysma ,overlying fascia and periosteum were divided. Minimal soft tissue and periosteum dissection was done,Fracture fragments were reduced and precontoured locking compression plate was applied over the superior aspect of the clavicle.During drilling care taken to prevent injury to neurovascular structure, at least three screws in medial and lateral fragment were fixed.Wound was closed in layers after ensuring meticulous hemostasis and sterile dressing was applied.

OPERATIVE PHOTOS

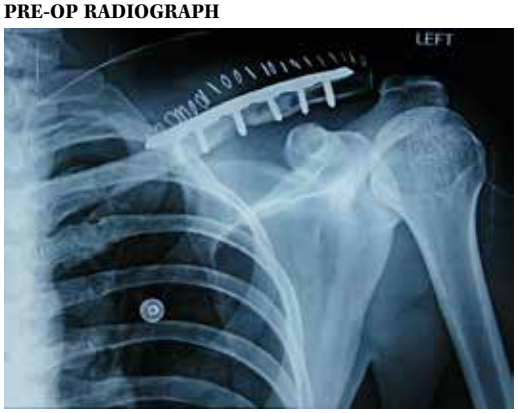
POSITIONING OF PATIENT

PRECONTOURED LOCKING PLATE

INTRA OPERATIVE -PLATE FIXATION

Post operative care-The operated upper limb was immobilized in an arm pouch for 2-3 weeks.Check x-rays were taken to study the alignment of fracture fragments.Rehabilitation started at the end of 2 weeks. Gentle pendulum exercises to the shoulder in the arm pouch were allowed. At 4 to 6 weeks gentle active range of motion of the shoulder was allowed but abduction in limited to 80 degrees. At 6 to 8 weeks active range of motion in all planes were allowed.Patients were followed up till radiological union.The functional outcome were assessed by Constant and Murley score.[3,4]

PRE-OP RADIOGRAPH



IMMEDIATE POST OP

6 WEEKS POST OP

12 WEEKS POST OP

RANGE OF MOTION

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RESULTS

In this study 17 patients (85%) had excellent functional outcome, 2 patients (10%) had good functional outcome and fair in 1 patient (5%).In 14 patients (70%) 7 hole locking compression plates were used. In 5 patients (25%) 6 hole locking compression plate were used and in another 1 patients (5%) 8 hole locking compression plates were used.Average operation time was 59.50 minutes.Average blood loss during surgery was 90 ml.

1 patient (5%) had plate loosening,2 patients (10%) had plate prominence,1 patient(5%) had delayed union,18 patients (90%) united by 12 weeks. In 2 patients (10%) union occurred at the end of 14 weeks .

TABLE-1 OUTCOME MEASURES

OUTCOMES	Mean ± SD
Union time(wks)	8.60±1.96
Blood loss(ml)	90.00±8.58
surgical time(mins)	59.50±8.26
Constant Murley Score	91.50±4.15

DISCUSSION

Most of the middle third clavicle fractures were treated conservatively in past. The results of conservative treatment by Hill et al10. in 1997, Nordqvist et al.[5] in1998 and Robinson et al.[6] in 2004 found poor results following conservative treatment of displaced middle third clavicle fracture. So operative treatment is needed for displaced middle third clavicle fractures.

Our study is compared with Bostman et al.[7] study, Cho et al.[8] study and VanBeek et al[9] study, where they compared outcomes after precontoured and non contoured superior plating of acute displaced midshaft clavicle fractures.

Average age was 32.65years.Majority of patients studies were male ,18 patients(90%).Direct injury occurred in 12 patients(60%),among which 5 patients (25%) were due to road traffic accident and 7 patients (35%) were due to fall from bike. Six patients (30%) due to simple fall on shoulder and 2 patients (10%) due to indirect injury by fall on outstretched hand.

Robinson[10] Type- 2B1 (displaced with simple or butterfly fragment) were common and there were 16 patients (80%) , Type-2B2 (displaced with comminution) occurred in 4 patients (20%).1 patient (5%) had plate loosening,2 patients (10%) had plate prominence,1 patient(5%) had delayed union

The functional outcome according to Constant Murley Scoring in this study 17 patients (85%) had excellent functional outcome, 2 patients (10%) had good functional outcome and fair in 1 patient (5%).

CONCLUSION

In conclusion, bony union could be achieved with precontoured locking clavicle plate by reducing the complication rates like malunion and nonunion in midshaft comminuted displaced clavicle fractures with good to excellent functional outcome.

REFERENCES

1. Robert Bucholez, James D Heckman, Charles Court- Brown, rockwood green's fractures in adults(1)VII: 1213-1216.
2. Schiffer G, Faymonville C, Skouras E, Andermahr J, Jubel A : Midclavicular fracture: Not just a trivial injury – *current treatment options* .Dtsch Arztebl Int 2010;107(41);711-7.
3. Constant CR, Murley AHG. A clinical method of functional assessment of the shoulder. Clinical Orthopaedics and Related Research. 1987; 214: 160-164.
4. Labler L, Platz A, Weishaupt D, Trentz. O. Clinical and functional results after floating shoulder injuries J Trauma. 2004; 57 : 595- 602.
5. Nordgvist A, Petersson CJ, Redlund-Johnell I. Mid clavicular fractures in adults : end result study after conservative treatment . J Orthop Trauma, 1998 ; 12 : 572-576.
6. Robinson CM, Court Brown CM, McQueen MM, Walkefield AE. Estimating the risk of non union following non operative treatment of a clavicular fracture. J Bone Joint Surgery (Am), 2004; 86 : 1359-1365.
7. Bostman O, Manninen M, Pihlajamaki H. Complications of plate fixation in fresh displaced mid clavicular fractures. J Trauma, 1997; 43:778-783.
8. Chul-Hyun Cho, MD, Kwang Soon Song, MD, Byung-Woo Min, MD, Ki-Cheor Bae,MD, Kyung-Jae Lee, MD, Reconstruction Plate versus Reconstruction Locking Compression Plate for Clavicle Fractures, Clinics in Orthopaedic Surgery 2010; 2:154-159.
9. Corinne VanBeek MD, Karen J. Boselli MD, Edwin R. Cadet MD, Christopher S. Ahmad MD, William N. Levine MD, (2011) Precontoured plating of clavicle fractures: decreased hardware-related complications? Clin Orthop Relat Res 469(12):3337–3343.