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RESEARCH ARTICLE

Treatment of Neer's type 2 distal end clavicle fracture: a systemic review of treatment modalities in 35 fractures

Dr Rushi M Shah, Dr Harshadkumar A Patel

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*Corresponding Author

Dr Rushi M Shah.

Abstract

Introduction:-

For Neer's type 2 distal clavicle fracture, ideal treatment is still unclear. The purpose of this study was to review the outcomes of 35 such cases.

Materials and methods: Amongst 35 patients, 10 were treated non-surgically and 25 surgically. Among which 10 were managed with locked plate fixation, 5 hook plates, 10 by K-wire plus tension band. At a mean follow-up of 16 months, data were assessed by DASH questionnaires, Constant-Murley score.

Results:-

Non-surgical treatment resulted in 30% nonunion and 20% other complications while surgical treatment resulted in 8% nonunion and 24% other complication, lowest complication (1%) found in patient receiving locked plate fixation. The complication rate other than non union was significantly higher in cases of the hook plates (40%) and the K-wire plus tension band wiring (30%).

Conclusion:-

Surgical treatment of these fractures is more appropriate to prevent non-union and functional disability. Locked plates being the most preferable implants.

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Introduction:-

A fracture of the clavicle has been greatly underrated in respect to pain and disability. The "usual or routine treatment" is perhaps far short of satisfying, relieving therapy. - CARTER R. ROWE, 1968. The fractures of the clavicle reportedly represent **2.6%** of all fractures. (1) Specifically, the distal clavicle fractures account for approximately **10–15%** of all clavicle fractures. (2) Although fractures of the distal end clavicle typically do not pose a significant diagnostic dilemma, there have been few injuries with as much controversy in regard to treatment as this fracture.

Neer in 1968 suggested a new classification and proposed general treatment guidelines.

Type I: coracoclavicular ligaments intact.

Type II: coracoclavicular ligaments detached from the medial segment but trapezoid intact to distal segment.

Type III: intra-articular extension into the acromioclavicular joint

Type I and type III fractures are generally treated non-operatively. For type II fractures, although surgical management is the treatment of choice, some authors suggest conservative treatment owing to the high rate of complications in particular circumstances.

Need for study-

- Identify the **nonunion** and **other complication rate** according to the treatment methods
- Observe the **functional outcome**
- Determine which treatment modality is most **suitable**

Material and Methods:-

35 Neer's type II fractures, between 2009 and 2012, amongst which

10 – Non surgically

25 - Surgically, amongst which- 10- Lock plate fixation, 10- tension band wiring, 5 - Hook plate fixation

Study design:-

Prospective and Retrospective study

Inclusion Criteria:-

Age between 20-65 years Neer type II fractures and normal shoulder function before injury.

Exclusion Criteria:-

Open fractures and patients having polytrauma and Bilateral fractures.

Operative Techniques:-

Through standard anterosuperior surgical Approach

Data:-

Collected by the analysis of questionnaires (DASH), clinical examination (Constant–Murley score), and radiological evaluation (antero-posterior view, Zanca view)

Observations:-

- There were 26 male and 9 female with **average age of 43.2 years**.
- *Average duration of follow-up was 16 months (10–30).*
- *Average union time was 10.75 weeks.*

Comparison between different treatment modalities

Criteria	Non surgical treatment	Surgical treatment		
		Lock plate	Hook plate	TBW
No. of patients	10	10	5	10
Follow up (months)	14 (10-30)	16(10-28)	16(10-24)	16(10-30)
Nonunion	3(30%)	0	1 (20%)	1(10%)
Constant score	88	99	94	97
Complications	2(20%)	1(10%)	2(40%)	4(40%)
Cosmetic deformity	6(60%)	0	1(20%)	2(20%)

Overall, there were 5 (14.28%) nonunions, 9 (25.71%) complications other than nonunion. In 10 nonsurgical cases, there were 3(30%) nonunions and 2 (20%) other complications. In 25 surgical cases, there were 2(8%) nonunions and 7 (28%) other complications. **The nonunion rate was significantly higher in the nonsurgical group, and the other complication rate was higher in the surgical group.**

In our study, nonsurgical group, 2 (20%) patients developed stiffness of shoulder while 2(20%) patients in TBW group with pin migration and skin erosion. Pin removal was performed as early as 4 weeks postoperatively in one case of TBW group in consideration of the patient's discomfort and the risk of infection. However, another one in the TBW group who suffered from infection with persistent pain without signs of clinical union had removed pin and had partial loss of reduction. One patient developed acromioclavicular arthrosis at later stage.

In hook plate group one patient had impingement only while another patient having upward migration of the hook in the subacromial space and tear of the rotator cuff which was cause for impingement and developed acromioclavicular arthrosis at later stage. But only one patient (10%) among locked plate group had impingement on motion which is relieved after implant removal.

Thus, the hook plate and the K-wire plus TBW had a higher complication rate than the lock plate fixation among surgical treatment.

In our study, **constant shoulder score** of 28(80%) of cases had excellent outcome, 6(17%) of cases had good to satisfactory, one (3%) case had adequate and no case had poor outcome. Mean constant shoulder score was 94.5.

Only three cases of operative managed type II fractures associated with good outcome due to infection and non-union, while all other had excellent outcome.

In our study, all cases with union treated with nonoperative treatment only had mean constant score 95 and nonunion treated with nonoperative treatment only had mean constant score 78.

In our study, among non-operative cases 6(60%) of cases had **cosmetic deformity**.

Only 2 (12%) cases had cosmetic deformity among operatively managed patients which was due to infection and partial loss of reduction.

Discussion:-

In the present systematic review, the nonsurgical treatment of the Neer type II distal clavicle fracture resulted in a high nonunion rate (33.3%), which is similar to that in the Neer's study. (4, 5) However, despite the high nonunion rate, the nonsurgical group had no significant difference in the functional scores compared to the surgically treated group in most of the studies. (6, 7) Moreover, the complication rate in the nonsurgical group was statistically low compared to the surgical group.

Consequently, this systematic review suggests that the distal clavicle fracture could be treated nonsurgically. In that case, there should be sufficient counsel between the clinician and patient about high nonunion rate and cosmetic problem after nonunion, especially in younger population. However, the functional outcome after nonsurgical treatment remains controversial between different studies; therefore a well-organized and randomized clinical trial is needed to resolve this issue.

In the surgical treatment, the nonunion rates were not statistically significant among the methods. However, the complication rates were unacceptably higher in the hook plate fixation and the K-wire plus TBW than locked plate fixation.

Thus, locked plate fixation found superior among all different modalities for distal clavicle fracture treatment in terms of union, union time, functional score and cosmetic deformity.

There are some limitations to the present study. First, we subjectively categorized the surgical treatment into three types: Locked plate fixation, hook plate, TBW group. This was based on the theoretical similarity among the fixation mechanism, however, not everyone may agree with such categorization. Second, less no. of patients involved. Third it is Not a Randomized Control Trial.

Conclusion:-

Surgical treatment of these fractures is **more appropriate** than nonsurgical management to prevent non-union and functional disability in form of reduced range of motion, cosmetic deformity with **locked plating** being the most preferable implant and superior in terms of all aspects.

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