Original Article

Clavicular # & Complications

Surgical Fixation of Clavicular Fractures Outcome and Complications

1. Syed Qasim Mehmood 2. Asad Mehmood 3. Rifat Latif 4. Samson Griffin

1. Asstt. Prof. of Surgery, BBS Teaching Hospital/Women Medical College Abbottabad 2. Asstt. Prof. of Orthopedics, DHQ Hospital Mansehra 3. Anesthetist, Ayub Hospital Complex, Abbottabad 4. Prof. of Surgery, BBS Teaching Hospital/Women Medical College Abbottabad

ABSTRACT

Objective: To determine the outcome of K-wire fixation of Clavicular fracture in terms of union rates and complication profile.

Study Design: Retrospective case series study.

Place and Duration of Study: This study was carried out at DHQ teaching hospital Abbottabad and Mansehra from March 2009 to Feb 2011.

Materials and Methods: Forty five adult patients with displaced mid clavicular fractures treated with K-wire fixation in a standard Supine position were included in this study.

Results: Out of 45 patients, non union occurred in only two, Implant failure occurred in the same two cases. Most of the complications were of minor nature consisting of superficial wound infection 2, delayed union 4 and pin prominence at insertion site 10. No major nerve or vascular injuries occurred.

Conclusion: Intra medullary K-wire fixation of displaced mid clavicular fracture with protection in early post operative period is a safe and simple procedure, achieving good union rates without major complications.

Key Words: Clavicle fractures, Operative Vs conservative treatment, K- wire fixation.

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INTRODUCTION

Clavicular fractures may consist of 2.6% to 10% of all adult fractures. Most clavicular fractures are situated in the middle part (81%) whereas lateral (17%) and medial (2%) are much less common.[1,2]. Most of these fractures are still treated non surgically as many early studies reported a low non union rate (less than 1 %) with conservative treatment.[3,4] But this is not true in many cases as suggested in some recent studies that a number of patients with displaced mid shaft clavicular fractures may end up with non union, shoulder dysfunction, residual pain, neurological symptoms etc after non surgical management [5]. Some of these studies focusing on the non operative treatment of displaced midshaft clavicular fractures in the adult population described non union rates of 15% to 20%, objective shoulder muscle strength loss of 18% to 33 %, poor early functioning of the injured shoulder and up to 42% of patients with residual sequelae at six months after injury . [6,7,8]

Owing to the finding of these and many others studies, there has been increasing interest in the operative treatment of clavicle fractures. [9,10.]

Correspondence: Dr. Syed Qasim Mehmmod Shah
Assistant Prof. of Surgery, BBS Teaching Hospital/ Women Medical College Abbottabad
Contact No: 0333-5062690
Email: sqmehmood@hotmail.com

MATERIALS AND METHODS

Study included 45 patients with mid clavicular displaced fractures with age range of 14y to 60y (Table I). All of the patients chose their treatment option after getting the required information.

We used the same surgical technique in all 45 patients. Under general anesthesia; patients were placed in supine position with a pillow or sand bag adjusted between scapulae. A small incision was given over fracture site after close reduction. Fracture ends were secured with small clamps and a proper sized K-wire passed in retrograde fashion. Then reduction was done and fixed with antegrade K-wire fixation. K-wire was then bent and cut laterally and the wound closed. Arm rested in a polysling shoulder immobilizer for two weeks. Patient was discharged the next day, stiches were removed on the 10th day. Gradual movements were started after three weeks and incrementally increased with almost full range after six weeks. K-wire was removed any time after eight weeks. All patients were followed for up to 06 months. Radiographs were taken after ever two weeks for assessing radiological union.

RESULTS

Out of 45 patients, 20 received supporting and road traffic injuries, 10 received road traffic injuries and 15 received road traffic injuries due to falls in the age

range of 14yr to 24yr, 25-50yr and 51-60yr respectively (Table 1).

We achieved good union rate of 95.5 % with only two cases developing non-union. This high success rate could be the result of good surgical technique involving less soft tissue disturbance and protected fixation particularly in early post operative period. Two cases of implant failure also occurred which were the same cases who developed non-union. Both of them had a severe fall in early post operative period. In one of the case the K-wire was found broken and in the other it was markedly bent. There was no nerve or vascular injury. Most of the complications were of minor nature. (Table 2).

Table No.I: Demographic Data of Study Population

No of patents	Age	Sex	Mode of injury
20	14-24	15 M 4 F	Sporting injury/ RTA
10	25-50	4 M 6 F	RTA
15	51-60	6 M 9 F	Falls and RTA Minor Falls

Table No.2: Complication Profile for Intramedullry K-Wire Fixation of Clavicular Fractures

Type of Complication	No
Major	
Nonunion	2
Major nerve injury	0
Major artery injury	0
Implant failure	2
Deep infection	0
Minor	
Superficial infection	2
Pin exposure	10
Delayed union	4
Temporary nerve injury	0

DISCUSSION

Most of the earlier studies reported very good results for conservative or non- operative treatment methods for clavicular fractures, showing non-union rates of just 0.4%. [11,12] However many recent studies contradicted this traditional view and reported higher non-union rates and functional deficits, when non- operative treatments were compared with operative fixation of clavicular fractures. [13 , 14].

Open reduction and internal fixation of clavicular fractures can be done using either plates or intramedullary pins. Plate fixation can provide immediate rigid fixation allowing early mobilization.[15] However plate fixation may involve a greater risk to underlying neurovascular bundle. It may also give rise to cosmetic concerns by implant prominence and wound breakdown.[16]

Whereas intramedullary fixation has some potential benefits when compared to plate fixation. Intramedullary pins involve a relatively smaller incision, less periosteal stripping, better load sharing and obligatory removal after useful union, eliminating the long term concern for hardware presence.[17]

Owing to the close proximity of brachial plexus and major vessels, clavicle fixation was always considered as a hazardous undertaking. But fortunately no major nerve or vascular injury occurred in our series of patients. In contrast many of these neurological complications from either irritation or compression were more common in non surgically treated patients.[18] Those developing the so called thoracic outlet syndrome may consist up to 29 % of patients treated conservatively and can be reduced significantly by opting for primary clavicle fracture fixation.[19]

Intramedullary K-wire fixation has not been widely recommended owing to studies showing a high percentage of complications, particularly high migration rates. But most of these complications were of a minor nature and included delayed union, skin erosion, pin exposure and prominence etc. No major nerve injury or even transient brachial plexopathy was reported which however seemed relatively more common with plate fixation.[17,20]

The non union rate in our study was 4.4% (2 of 45) and is slightly better than that of plate fixation i.e 5%.[13] P.J. Millett etal [21] reported a non union rate of 8.6% (5 of 58) for intramedullary pin fixation. They tried to implicate limited rotational stiffness, fracture site violation and operative technique for that high non union rates. We in our patients ensured a post operative shoulder immobilization sling so as to gain some rotational stability for at least two weeks. Some studies reported a union rate of 3% which is slightly better than ours.[22] While others using Rockwood pin, Plates and Knowle's pin showed even 100% union rates. [23,24]

Two cases of implant failure also occurred in our study. Both had a significant fall within three weeks post operatively. In one of the patients, the K-wire was found broken and in second case there was extreme bending of the K-wire at fracture site. The most common minor complication was pin prominence at the site of insertion, most probably because of absence of any locking mechanism. Although some of the studies have shown migration rates and failure of K-wire of up to 50 %, we did not find the same, rather migration and prominence at insertion site after few weeks made its removal much easier. [25, 26].

CONCLUSION

Intra medullary K-wire fixation of displaced mid clavicular fracture with protection in early post operative period is a safe and simple procedure, achieving good union rates without major complications.

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