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Original Research Article

Management of Displaced Mid Shaft Clavicle Fractures at Tertiary Health Care Centre: A Comparative Study

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Abstract

Aim: The aim of the present study was to compare Conservative versus Surgical Management with Locking Compression Plate (LCP) of Displaced Mid Shaft Clavicle Fractures.

Methods: This was a cross-sectional study carried out at department of Orthopedics in the patients with clavicle fracture during the two years period. During the one-year period there were 140 patients with clavicle fracture were enrolled to study out of the 140 with the written and explained consent 70 patients were managed conservatively (group A) and 70 managed surgically by Compression Plate (group B).

Results: The average age was comparable in both the groups i.e. 46.14±3.14 and 43.17±3.27 and there was male predominance in both the groups. The average healing was significantly more in conservative management group i.e. 6±4.36 months versus 3.77± 2.78. The complications were Mal-union, Union with symptoms, Delayed union, Infection etc. The complications were comparable in both the groups.

Conclusion: It can be concluded from our study that both the methods were comparable with respect to the complications but healing was significantly faster in the surgical method of management hence surgical management should be preferred but the manage should individualized as per the patient.

Keywords: Locking Compression Plate, Conservative Management, Surgical Management, Displaced Mid Shaft Clavicle Fractures

Introduction

The clavicle is the only long bone which lies horizontally and is subcutaneous in its whole extent. Clavicle is present at the root of the neck and it helps to transfer the weight of upper limb to the axial skeleton. Clavicle also contributes to movements of shoulder girdle. [1] Clavicle fractures are common injuries in young, active individuals, especially those who participate in activities or sports where high-speed falls (bicycling, motorcycles) or violent collisions (football, hockey) are frequent, and they account for approximately 2.6% of all fractures. [2] These fractures are often associated with shoulder girdle injuries in approximately 44% of cases. [3] Attributed to its S shape and thinner bone at the middle curvature, clavicle most commonly gets fractured at its middle third and hence is the most common site of fracture in approximately 70% to 80% of cases; while approximately 12% to 15% of fractures occur at lateral 1/3 rd and 5% to 8% occur at medial third 1/3rd of clavicle. [3]

Mid-clavicular fracture accounts for 45% of shoulder injuries, mostly in the third decade of life, with male to female ratio is 2:1. The incidence of open clavicular fracture is only 0.1% to 1% of cases. The peak incidence occurs in the third decade of life. [4] In middle third clavicle fractures, the rate of nonunion is generally estimated as from 0.1 to 0.8%, however current data shows that the rate of non-union among adults is 10 to 15 percent, in displaced middle third clavicular fractures with comminution. [5] This shows that nonunion or malunion is relatively higher when treated conservatively than it was presumed earlier. Patients treated conservatively have varying degrees of pain and disability during the first three to six weeks, and this factor is underestimated. After conservative treatment, pressure from displaced fragments on the brachial plexus can cause symptoms. Patients treated conservatively have varying degrees of pain and disability during the first three to six weeks, and this factor is underestimated.

Surgical treatment by open reduction and internal fixation of displaced comminuted mid-shaft clavicular fractures helps in early return to function. [6] Intramedullary K-wires or Steinmann pins fixation and plate fixation are a few of many

methods for surgical treatment of mid-shaft clavicle fractures. Plates when used for fixation can attain the firm anatomical reduction in severe displaced or comminuted fracture. There are many types of plates, including the Sherman plate, dynamic compression plate, locking clavicle plate, and semi-tubular plate. Precontoured clavicle locking compression plate (LCP), which is S-shaped resembling the curvature of the clavicle, is the most ideal. Among the conservatives, various braces were introduced to immobilize the fracture middle third clavicle, especially Parham support, Bohler's brace, Taylor's support, Velpeau wrap, Billington yoke, and commercial figure of eight brace. The commercial figure of eight brace is the one commonly used among various braces.

The aim of the present study was to compare Conservative versus Surgical Management with Locking Compression Plate (LCP) of Displaced Mid Shaft Clavicle Fractures.

Materials and Methods

This was a cross-sectional study carried out at department of Orthopedics, Maulana Azad Medical College, New Delhi, India in the patients with clavicle fracture during the two years period. During the one year period there were 140 patients with clavicle fracture were enrolled to study out of the 140 with the written and explained consent 70 patients were managed conservatively (group A) and 70 managed surgically by Compression Plate (group B).

Patients in the surgical group were posted for surgery when fit for surgery. Patients' demographic profile was noted and short history and clinical examination were performed to find out the location of pain and swelling over the affected clavicle. Plain Antero-posteriorroentenogram shoulder with clavicle was taken to evaluate the site and type of fracture. The fractures were then classified by Robinson's classification. Patients aged < 18 years and >60 years, patients with open fractures, fracture in medial or lateral third of the clavicle, pathological fractures, undisplaced fractures, patients with established nonunion from a previous fracture, polytrauma patient, patients with any medical contraindication to surgery or general anesthesia (heart diseases, renal failure or active chemotherapy) and patients refusing surgery (lack of consent) were excluded from the study.

The details of the patients like age, sex, average duration of the wound healing, and various complications were noted. The statistical analysis was done by chi-square test and unpaired t-test and analyzed by SPSS 19 version software

Results

Table 1: Distribution of the patients as per age and gender

Parameters	Group A	Group B	P Value
Age	46.14 ±3.14	43.17±3.27	>0.005
Gender			
Male	45	42	>0.005
Female	25	28	

The average age was comparable in both the groups i.e. 46.14 ±3.14 and 43.17±3.27 and there was male predominance in both the groups.

Table 2: Distribution of the patients as per the healing time (months) on x-ray

Parameters	Group A	Group B	P Value
Healing (Months)	6 ± 4.36	3.77± 2.78	<0.005

The average healing was significantly more in conservative management group i.e. 6 ± 4.36 months versus 3.77± 2.78.

Table 3: Complications

	Group A	Group B
No any complications	35	60
Mal union	12	4
Union with symptoms	8	3
Delayed union	7	3
Infection	4	0
Non-union	4	0

The complications were Mal-union, Union with symptoms, Delayed union, Infection etc. The complications were comparable in both the groups.

Discussion

Clavicle fractures are one of the most common adult injuries, accounting for 5% to 12% of all fractures and representing up to 44% of injuries to the shoulder girdle. [7-10] About 80% to 85% of these fractures occur in the midshaft of the bone due to its narrow cross section and high compressive force resulting in bone failure. [11,12] Neer [13] reported low nonunion rates after nonoperative treatment of mid-shaft clavicle fracture of 0.1%. Although nonoperative treatment was the major treatment strategy used for a long time, recent studies have identified higher rates of nonunion. In addition, patients treated nonoperatively are at high risk of clinical symptoms such as pain, loss of strength, and rapid fatigability associated with nonunion and malunion of clavicle fractures. [17]

The average age was comparable in both the groups i.e. 46.14 ±3.14 and 43.17±3.27 and there was male predominance in both the groups. In Bostman et al [14] study 76 Patients (73.79%) were males compared to 27 females Patients (26.21%).In Cesare Faldini et al [15] study, out of 100 patients 78 were males and 22 were females. All these studies show a female predominance in fracture mid-third clavicle occurrence which was dissimilar to the present study. Considering the excellent remodeling of clavicle, irrespective of displacement, amount of comminution, in the past, every fracture clavicle was treated non-operatively. The surgical treatment was only reserved for cases with neurological deficits, open fractures, clavicle fractures causing skin tenting. Many recent studies have showed increased incidence of nonunion, residual pain, malunion, decreased shoulder endurance, shoulder weakness, inferior patient and surgeon-oriented outcome scores, and lower overall patient satisfaction rate following conservative treatment. [16]

The average healing was significantly more in conservative management group i.e. 6 ± 4.36 months versus 3.77± 2.78. The complications were Mal-union, Union with symptoms, Delayed union, Infection etc. The complications were comparable in both the groups. A meta-analysis by Zlowodzki et al [17] in 2005 of recent studies revealed that the rate of nonunion for displaced midshaft clavicular fractures was 2.2% after plate fixation compared with 15.1% after nonoperative care, a relative risk reduction for nonunion of 86%. That meta-analysis also showed that primary plate fixation was contrary to prevailing opinion, a safe and reliable procedure.

In a randomized control study [18] by the Canadian orthopaedic trauma society, it was found that Constant score and DASH Scores are significantly better in the surgical group at 6 weeks, 12, and 24 weeks than the conservative group. The main advantage of surgical treatment of displaced mid-third fractured clavicle with plate is that it gives immediate pain relief, early shoulder movements less chance of non-union, and early return to work compared to conservative treatment.

Conclusion

It can be concluded from our study that both the methods were comparable with respect to the complications but healing was significantly faster in the surgical method of management hence surgical management should be preferred but the manage should individualized as per the patient.

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