ORIGINAL ARTICLE

COMPARISON OF OUTCOME OF CONSERVATIVE VERSUS OPERATIVE MANAGEMENT OF DISPLACED MIDSHAFT CLAVICLE FRACTURES

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ABSTRACT

Background: The universal treatment for fractures of midshaft of clavicle is a polysling for 4-6 weeks when it is un-displaced/minimally displaced. However, if displacement and shortening is more than 2 cm, it is better to surgically operate it to minimize the rate of non-union. The aim of our study was to compare the rate of non-union in optratried and conservative treatment of clavicle fractures.

Material & Methods: This was a cross sectional study conducted in Bahawal victoria hospital Bahawalpur & Gomal Medical College DI Khan from January 2014 to December 2015. In our study we had 150 patients,who were admitted through emergency department. 75 were included into operative (group A) and 75 included into conservative(group B). Open fractures and fractures older than one month were excluded.Outcome was measured in term of non-union rate in both genders.

Results: Out of 75 patients of operative group (A), 59(78.7%) were males and 16(21.3%) were females. Out of 75 patients of conservative group (B), males were 59(78.7%) and females 16(21.3%). Mean age of patients in operative group (A) was 31.77±11.03 and in conservative group (B) 35.53±12.49 years. Non-union were found in 19(12.66%) out of 150 patients. In which 5(6.66%) patients belonged to group A (operative group) and 14(18.66%) belonged to group B (conservative group).

Conclusion: Platting of displaced midshaft clavicle fractures has better outcome as compared to conservative treatment.

KEY WORDS: Clavicle fractures; Conservative; Platting.

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INTRODUCTION

Clavicle is one of the bones in human body that is more prone to fractures and in adults it accounts for 2.6% to 4% of all fractures, and in young population the ratio increases up to 15%.[1] In US, per year incidence of these injuries is between 29 to 64 per 100,000 [2,3]. Clavicle fractures are classified into three types based on anatomical location. The majority of these fractures occur in the midshaft region (69 to 82 %) [3,4] and about 50% of them are displaced. The most common mechanism of injury is trauma due to fall or direct blow. Clavicle fractures both displaced and undisplaced have been treated conservatively in the past. This treatment was based on the old literature that considered that clavicle is an accessory bone in the body and complications like nonunion and malunions have no adverse effects and are of radiographic interest only. However, in recent literatures various studies have shown that in displaced mid shaft fractures of clavicle, the prevalence of non-union or malunion is higher after conservative treatment in contrast to previous studies[5]. That is why interest developed in surgical fixation methods[6,7,8]. There are many methods of clavicle surgical treatment like plate and screw, intramedullary nails and external fixators. We conducted our study on displaced mid shaft clavicle fractures treated with plate and screws. The aim of our study was to compare the rate of non-union in optratried and conservative treatment of clavicle fractures.

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MATERIAL AND METHODS

Randomized controlled trial was conducted at Department of Orthopaedics Bahawal Victoria

Hospital Bahawalpur and Department of Orthopedics Gomal Medical College D I khan from January 2014 to December 2015. A total of 150 patients, 16 to 60 years of age, were treated with conservative method with just application of polysling (n = 75) or open reduction and internal fixation with small dynamic compression Plate (DCP) (n = 75). Non-union between the two groups for 4-6 months after injury was compared. Non probability purposive sampling was done.

We included patients of both genders from 16 to 60 years of age with displaced clavicle fractures more than 2 cm on AP view. Those with pathological fractures, non-displaced, open fractures, neurovascular injury and more than one month old fractures were excluded.

Eligible patients were taken from emergency department. Patients were explained the study procedure and its purpose in brief and the informed consent was taken and the permission from the ethical committee was sought. Patient history, physical examination and necessary investigation were done.

In operative management, open reduction of fracture was done followed by internal fixation with plate. Soft dressing and sling was applied after skin closure. Each patient was seen after 10 days postoperatively, at which time skin sutures were removed. Afterwards patients were followed up every 4 weeks for any complaints and gradual increase in range of motion of shoulder joint was advances. Final decision of non-union was taken at the end of 4^{th} to 6^{th} month.

While in conservative management patient fracture was managed non operatively by immobilizing his/her arm in sling/ figure of 8-brace/polysling for 6-8 weeks to look for desired results. Just analgesics with polysling given to these patients.

Non-union was assessed at 4^{th} to 6^{th} month post operatively clinically by absence of pain, tenderness & radiographically by the absence of Trabecular continuation across fracture line in AP and cephalic view at 45^{0} .

The data collected was entered in computer software SPSS version 10. Mean and standard deviation was calculated for age, and duration of injury. Frequencies and percentages were calculated for qualitative variables (non-union and gender). Chi-square test was used for study variable i.e. non-union. The level of significance was 0.05.

RESULTS

Out of 150 patients 75 were in operative group (A)[male were 59 (78.7%) and female were 16 (21.3%)] and 75 patients were in conservative group (B),[male were 59 (78.7%) and female were 16 (21.3%)].There were total of 118(78.66%) male patients and 32(21.33%) female patients. Mean age of the patients in operative group (A) was 31.77 ± 11.03 and mean age in conservative group (B) patients was 35.53 ± 12.49 years while minimum age was 16 and maximum was 60 years in both groups. . The mean and standard deviation of the patients for age and duration of injury (in days) was 33.65±11.90 and 4.09±1.76 respectively.

As shown in table 1, nonunion were found in 19 (12.66%) out of 150 patients. In which 5 (6.66%) patients out of 75 belongs to group A (operative group) and 14 (18.66%) patients out 75 belonged to group B (conservative group).

DISCUSSION

Clavicle fractures are increasing in frequency due to motor bike accidents and are one of the most common skeletal injuries in adolescents. The midshaft region of clavicle is weakest and is at increased risk of fracture.[9-12] Fractures of the clavicle account for 35 percent of all injuries to the shoulder girdle.[2] Fractures of the middle third (midshaft) account for 69 to 82.4% of all clavicular fractures.[13,14] Conservative management was the usual mode of treatment for midshaft fractures even when displaced, due to the false belief that non-unions are very rare and if present is without clinical importance.[15] Moreover, surgical fixation of acute midshaft fractures was

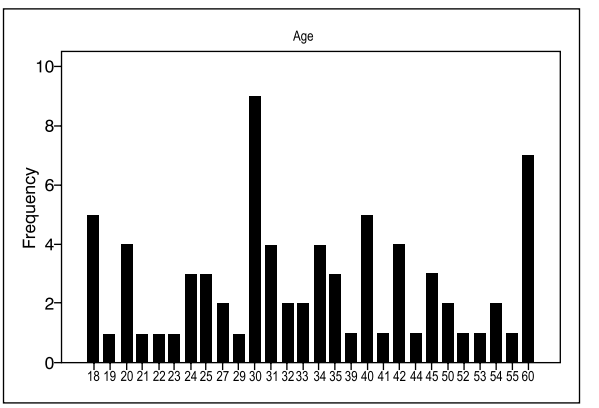

Figure 1: Group A (operative management) age distribution.

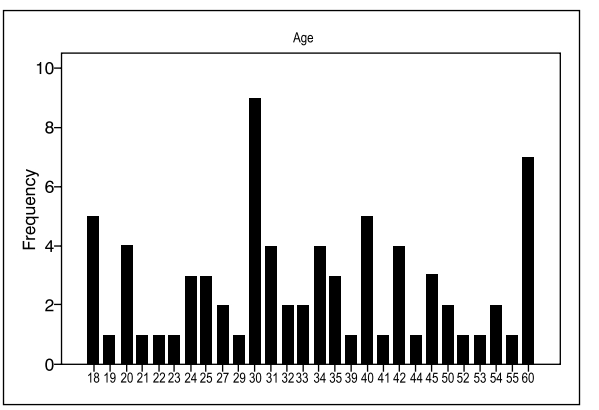

Figure 2: Group B (conservative management) age distribution.

Figure 1: X-ray showing fracture left clavicle

Figure 2:

Figure 3:

Figure 4:

Figure 5:

Figures 2-5 showing different steps of surgical reduction of clavicle

Table 1: Reflecting whole picture of the study containing study variables(non-union)

Group	Nonunion	Union	Total
A (Operative group) N=75	5 (6.66%)	70 (93.33%)	75 (50%)
B (Conservative group) N=75	14 (18.66%)	61 (81.33%)	75 (50%)
Total	19 (12.66%)	131 (87.33%)	150 (100%)
P value	0.047		

feared to be associated with complications like infection, non-union, pin migration, broken plates, and prominence of plates and necessity of removal of hardware. In recent studies of conservative treatments the prevalence of non-union or malunions in displaced mid shaft clavicular fractures is higher compared to older literature. In group A (Operative group), age ranging from (16-39) consisted on 56 (74.66%) patients. Nonunion was found in 2(3.57%) patients in which 1 (50%) male and 1 (50%) female patients. In age ranging from of 40-60 years, there were 19 (25.33%) patients, nonunion were found in 3 (15.79%) patients who were all male patients.

In group B (Conservative group), there were 47(62.66%) in age ranging from of 16-39 and nonunion were found in 3 (3.38%) patients which were

Table 2: Statistics showing gender and age wise distribution of non-union and union

Age Range	Nonunion			Union			Total
	Male	Female	Total	Male	Female	Total	
Group A (Operative)							
16-39	1 (50%)	1 (50%)	2 (3.57%)	41 (75.92%)	13 (24.07%)	54 (96.42%)	56 (74.66%)
40-60	3 (100%)	0	3(15.79%)	14 (87.5%)	2 (12.5%)	16 (84.21%)	19 (25.33%
Group Total	4 (80%)	1 (20%)	5 (6.67%)	55 (78.57%)	15 (21.42%)	70 (93.33%)	75 (100)
Group B (Conservative)							
16-39	3 (100%)	0	3(6.38%)	33 (75%)	11 (25%)	44 (58.66%)	47 (62.66%)
40-60	10 (90.90%)	1 (9.09%)	11 (39.28%)	13 (76.74%)	4 (23.52%)	17 (60.71%)	28 (37.33%)
Group Total	13 (92.85%)	1 (7.14)	14 (18.66)	46 (75.40%)	15 (24.59%)	61 (81.33%)	75 (100%)

all male patients. In age ranging from of 40-60, there were 28 (37.33%) patients. Nonunion was found in 11 (39.28%) patients, in which 10 (90.90%) were male and 1 (9.09%) were female.

In contrast, midshaft clavicle fractures treated surgically showed superior results, with lower rates of complications.[16-20] In our study, we proved the benefits of the surgical fixation versus universal polysling in case of nonunion. Our findings are favoring the results of other studies that also showed the better outcome of operative treatment with DCP for displaced midshaft fracture clavicle treatment.[21-31]

In our study the nonunion ratio in operative group is less as compared with the conservative group. It is due to proper anatomical reduction and stable fixation. Such less nonunion rates also shown by Wick et al.[32]

There were few complications in operative group but at the end of 4 months it was better than conservative group like infection, hardware prominence, and nonunion supported by Poigenfurst et al.[33--36]

Our study had certain limitations. We did not study the pain scoring, range of motion at shoulder and time to fracture union in either group. We did come across few cases of non-union, infection and hardware prominence of our patients at the end of 4 months compared with conservative group.

CONCLUSION

We strongly recommend early surgical fixation of displaced mid shaft clavicle fractures due to better results and less complications as compared to conservative management, especially in young people for early return to their work.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	AHM, MS, MJ
Data collection, analysis & interpretation:	AHM, MS, MJ
Manuscript writing:	AHMS, MS, MJ, AA