ORIGINAL ARTICLE

Compare Outcome of Conservative Method Versus Internal Fixation of Mid Clavicle Fractures

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ABSTRACT

To compare the outcome of conservative method versus internal fixation of mid clavicle fractures in terms of frequency of union. This study was the randomized controlled trial conducted at Orthopedic Department in Mayo Hospital Lahore from September 2017 to March 2018**.** Total 216 fulfilling inclusion criteria were included in study. Patients were randomly divided into 02 equal groups. Group A managed conservatively with polysling while group B with internal fixation. The mean age patients were 32.81 ± 7.41 years. In Group A 95(88%) patients achieved union while in Group B 105(97.2%) patients had union. The frequency of union was significantly higher in internal fixation group as compare to conservative group, p-value < 0.05. So we conclude that high rate of union can be achieved using internal fixation as compared to conservative methods.

Keywords: Clavicle fracture, internal fixation, locking plate, Rockwood pin.

INTRODUCTION

Fractures of clavicle elucidate approximately 44% of fractures occurring around shoulder girdle and 04% fractures of the whole body. [1] Different treatment methods were used to manage the clavicle fractures, including conservative management and operative treatment. Yet it is difficult to declare the results of conservative management or surgical management are better[2,3].

Conservative treatment of displaced fracture clavicle leads to shortening of clavicle, pain, loss of strength, rapid fatigue, hyperaesthesia of the hand and arm, difficulty sleeping on the affected side and aesthetic complications.[4] High rate of malunion and nonunion in displaced fracture clavicle treated conservatively lead to use of different types of internal fixation methods which also were found to be associated with various complications[4]. However, operative treatment has also got its own disadvantages such as surgical site infection, hypertrophic scar, hardware prominence and a repeat surgery for implant removal at times. Since mid-shaft clavicular fractures generally unite with most of the treatment modalities, clinical trials performed to compare these therapeutic options are rare. In addition, there is no uniform consensus yet on the definite choice of treatment for displaced mid-shaft clavicular fractures[5,6].

The rationale of this study is to compare outcome of conservative management with internal fixation of mid clavicle fracture in terms of union rate. As no local study is available and international data favors internal fixation with 100%[5,7] union rate but it gives 76%[7] to 93%[5] union rate in conservative group. In our local population most of surgeons as well as patients choose or request for conservative treatment than internal fixation that can further add in non-union or malunion.

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MATERIAL AND METHODS

This randomized controlled trial was done at Orthopedic surgery department in Mayo Hospital Lahore using non-probability consecutive sampling technique from September 2017 to March 2018. A total of 216 cases were estimated by taking union rate of 93% in both groups and 80% power of study, 95% confidence level and 5% of margin of error.[5] The inclusion criteria was that patients with either genders with fresh (within 12 hours of injury) fracture of mid shaft of clavicle and age ranged from 18 to 45 years were included while the patient with old and pathological fractures were excluded from the study.

All the patients fulfilling the inclusion criteria were selected and after taking informed consent the demographic information including name, age and address were noted. Both the procedures were explained to the patients along with the risks and benefits of the procedures and consent was taken to use their data for research purpose. Patients were randomly and equally divided into two groups, Group A and Group B. Patients in group A received conservative management while in group B were treated surgically. Patients in group A were give polysling at 100^0 –125^0 of internal rotation of arm. Patients were advised to do elbow work and to remove sling for short time to perform different activities like bathing, washing, washing and dressing up. In group B the patients underwent surgery under general anesthesia in operation theatre. Pre contoured plating was done for mid shaft fracture by a single orthopedic surgeon. All the patients were followed up on monthly basis and a final follow-up was done at 12^{th} week.

RESULTS

Overall, the mean age of cases was 32.81±7.41 years, while mean age in conservative and internal fixation group was 32.81±7.86 years and 32.82± 6.95 years respectively. In conservative group there were 53(49.1%) male and

55(50.9%) female cases while in internal fixation group there were 57(52.8%) male and 51(47.2%) female cases. The mean BMI in conservative and internal fixation group was 26.70 ± 4.82 and 27.83 ± 4.72 respectively. In conservative group there were 40(37%) obese and 68(63%) non-obese cases while in internal fixation group there were 49(45.4%) obese and 59(54.6%) non-obese cases.

In conservative group there were 15(13.9%) malnourished and 93(86.1%) well-nourished cases while in internal fixation group there were 8(7.4%) malnourished and 100(92.6%) well-nourished cases. In conservative group there were 95(88%) cases that had union while in internal fixation group there were 105(97.2%) cases that had union. A total of 13(12%) and 3(2.8%) cases in conservative and internal fixation group who could not achieved union within the follow up time. The frequency of union was significantly higher in internal fixation group as compare to conservative group, p-value < 0.05. When data was stratified for age, the frequency of union in age group of 18-29 years was statistically same i.e. 31(86.1%) in conservative group and 35(97.2%) in internal fixation group, p-value > 0.05 while 30-45 years of age the frequency of union was significantly higher in internal fixation group (97.2%) as compared to conservative group (88.9%), p-value < 0.05. In male cases the frequency of union in internal fixation was significantly higher (98.2%) as compared to conservative group (86.8%), p-value < 0.05 while in females the frequency of union was statistically same in conservative (89.1%) as compared to internal fixation (96.1%), p-value >0.05. In obese cases the frequency of union was statistically same in conservative and international fixation group i.e., 90% versus 95.9%, p-value > 0.05. In non-obese cases the frequency of union was significantly higher in internal fixation (98.3%) as compared to conservative group (86.8%), p-value < 0.05. In malnourished group the frequency of union was statistically same in conservative (86.7%) as compared to internal fixation (100%), p-value > 0.05 and in well-nourished cases the frequency of union was significantly higher in internal fixation (97%) as compared to conservative group (88.2%), p-value < 0.05.

Frequency distribution of union in both study groups

Union	Study groups		Total
	Conservative	Internal fixation	
Yes	95(88%)	105(97.2%)	200(92.6%)
No	13(12%)	3(2.8%)	16(7.4%)
Total	108(100%)	108(100%)	216(100%)

Chi-square test = 6.75, *P-value = 0.009*

DISCUSSION

Fractures of clavicle are most frequent fractures presenting in accident and emergency department and accounts almost of 45% to 65% of all the fractures around shoulder joint and 2.5% to 5% of all the fractures of the body. Although having this much high incidence of fracture and presentation in emergency so the management options warrant another review of treatment options for this injury[8].

The incidence of fractures of clavicle accounts in between 30 to 65 per 100 000 persons, and the prevalence is utmost in the young person because it mostly occur post trauma. The mean age of clavicle fracture stated is to be 29.3 years and males and female ratio is 67:32 (male being twice more affected than females). However the frequency in females increase with age and after sixth decade of life it increases with the frequency of fracture in males most probably due to osteoporosis[9].

The fracture of clavicle most commonly occurs due to trauma except for pathological fracture which can occur due to metabolic disorder or tumour. In young people it usually occurs due to moderate to high energy trauma like road traffic accident or sports injuries, while in elders it mostly occurs due to low energy trauma.[10] Conventionally the mid shaft clavicle fractures have been treated conservatively with the hope of patient satisfaction, fracture union and excellent functional outcomes. Owing the unfavorable outcomes with conservative management the trend surgical treatment of clavicle fracture is growing rapidly[11].

The improved outcome with surgery for the clavicle fracture is still debatable, however in 2007 in Canada a multicenter study was conducted by Canadian Orthopedics trauma society in which they compared the non-operative treatment with plating of mid shaft clavicle fracture and concluded better outcome with platting in terms of union and chances of malunion.[7] The operative treatments for clavicle fracture has its own disadvantages like infection, redo surgery, surgical intervention for removal of implants.

In conservative group there were 95(88%) cases that had union while in internal fixation group there were 105(97.2%) cases that had union. A total of 13(12%) and 3(2.8%) cases in conservative and internal fixation group who could not achieved union within the follow up time. The frequency of union was significantly higher in internal fixation group as compare to conservative group, p-value < 0.05. A recent study in 2017 reported the union rate as 93% of the patients in conservative group, whereas 100% in internal fixation group. [5] While another study reported that in conservative group fracture union was documented in 76% cases and 100% in surgical group.[7] These findings are almost similar in current study.

Lenza et. al. in 2013 published a study in which they assessed the effects of surgical treatment with conservative treatment in treating middle third clavicle fractures. They included 08 trials involving 555 participants. He found no statistically difference between both the groups. However, the adverse effects like infection, wound dehiscence skin and problems were seen in surgical group, while shoulder stiffness and limitation of shoulder movements were seen in non-operative ones. So he concluded that the choice of treatment depends upon individual patient considering patient's choice and advantages and risks of both managements[10].

McKee RC et. al. in 2012, published a meta-analysis of randomized clinical trials comparing operative versus non-operative care for displaced mid shaft clavicular fractures. They showed that the rate of non-union were higher in patients conservatively (29 out of 200) as compared to operated patients (03out of 212) (p = 0.001). Similarly the rate of malunion was very low in operated (0of

212) as compared to non-operative patients (17 of 200). So they concluded their study in favour of operative treatment in terms of low rate of symptomatic malunion and non-union comparing with conservative treatment. However, there is little evidence at present to show that the long-term functional outcome of operative intervention is significantly superior to nonoperative care[12].

CONCLUSION

Through the findings of this study we conclude that high rate of union rate can be achieved using operative treatment as compared conservative method.

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