FUCTIONAL OUTCOME OF NON OPERATIVE TREATMENT FOR DISPLACED MIDSHAFT CLAVICLE FRACTURE

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ABSTRACT

Objective: To determine functional outcome of non operative treatment for displaced mid shaft clavicle fracture

Study Design: Descriptive study.

Place and Duration: The Study was conducted in Orthopaedic Unit, Hayatabad Medical Complex, Peshawar, Pakistan from 5th June 2010 to 5th June 2011.

Methodology: Eighty six (86) patients with mid-shaft displaced Clavicle fracture meeting the inclusion and exclusion criteria were managed non-operatively via cuff and collar sling, and after a fixed follow up duration, assessed for functional outcome by a questionnaire based on Constant Murely Score.

Results: Mean age of patient was 30.71 years (+/- 10.07 SD) with mean Constant Murely Scores of 78.14. Out of 86 patients who had mid-shaft displaced clavicle fractures Sixty Eight patients (79.07%) were satisfied (good functional outcome) with non-operative treatment. These patients had Constant Murely Scores above the threshold of 60. Eighteen patients (20%) were not satisfied (poor functional outcome) with the non-operative treatment for displaced mid-shaft Clavicle fracture, with complaints of pain, decrease range of motion and decreased strength as compared to opposite shoulder. The difference proved to be statistically significant (P value <0.001)

Conclusion: Our study demonstrated that majority of patients were satisfied with good functional outcome treated non-operatively for displaced mid-shaft Clavicle fractures. Their individual parameters were also satisfactory with no pain, slight reduction in range of motion and acceptable power.

Keywords: Mid-shaft clavicle fracture, Conservative treatment, cuff and collar sling.

INTRODUCTION

Clavicle fracture is a common fracture and accounts for about 4% of all fractures[1], second to radius[2]. It is commonly at middle third of clavicular shaft with incidence of about 69-81%[3]. It's a fracture mostly involving young males and old females[4]. Most of the patients (87%) described their injury as fall onto the shoulder, 7% described it as a direct blow and only 6% described in as fall onto an outstretched hand.[5]

literature shows non-union rate of less than one percent with non operative treatment for mid-shaft displaced clavicle fractures, non-union rate of 2.2% with operative treatment. This is the most important reason, for which orthopaedic interventionist are favouring non-operative treatment instead of primary operative treatment. However Metaanalysis of Zlowodzki[6] and studies of Sahal A Altamimi[7] have confirmed better results with operative intervention.

A study of Nowak J. proposed that displacement of more than one bone width was the strongest radiographic risk factor for symptoms and sequalae[8,9]. Moreover the long term sequalae cannot be predicted with initial assessment of radiograph[10]. McKee also confirmed strength deficit between 10-35% effecting mostly young patients treated non-operatively for mid-shaft clavicle fractures[11]. The final clavicle shortening of 14.4 mm in males and 11.2 mm in females is significantly associating with disability and poor patient's satisfaction[12]. Hill et al[13] reported 31% not satisfied, and Lazarides and Zafiropoulos confirmed it to be 25.8%[12] following non-operative treatment for mid-shaft clavicle fractures.

This study has been conducted to evaluvate functional outcome of non operative treatment using cuff and collar sling for displaced midshaft clavicle fracture and will rectify if current treatment is acceptable, or change in trend to primary operative fixation is required.

MATERIAL AND METHODS:

This descriptive study was conducted in the department of orthopaedic surgery, Hayatabad Medical Complex, Peshawar from 5th June 2010 to 5th June 2011. Pain, activities of daily living and range of movements in involved shoulder were the main outcome measures. Displaced midshaft clavicle fracture with

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age more than 18 years were included in the study. Patients with pathological fracture, open fracture and with neurological deficit were excluded. Ethical approval was taken from the institutional review and ethics board.

Patients were diagnosed as a case of clavicle fracture clinically by history of trauma, pain, tenderness and deformity over the clavicle. Radiologically confirmed by anteroposterior radiograph of the clavicle. Fracture was labelled displaced when there was displacement of more than one bone width between the main fracture fragments at fracture site on anteroposterior radiograph.

After written and informed consent patients were advised cuff and collar sling sling and no attempt at reduction was done. The patient were reviewed at follow-up, up till 4 months (0, 1, 2 and 4th month). At the end of follow-up the patients were evaluated by a Questionnaire based on Constant Murley score devised by Boehm in 2004 for self-evaluation of shoulder function by patient[14] The questionnaire consisted of patients being questioned for pain, daily activities (occupational activity, leisure limitation, working height and disturbance at sleep) and range of movements in the form of pain free forward, lateral, internal and external rotation possible at affected shoulder without pain. The power was measured by patient ability to lift a paper bag having 1 litre tetra-packs for 5 seconds in position of abduction of the arm. Constant Murley score of more than 60 was taken as satisfied patient with good functional outcome. All the patients were examined by same examiner, and a strict adherence to the inclusion criteria was always kept in mind.

DATA ANALYSIS PROCEDURE:

All the data was accessed with SPSS version 16.0 software and manipulated, as and when required. There are 5 variables mentioned in the study, including the background variables. They are Pain, Activity of daily living, Power, Age and Gender. The first three variables (Pain, activity of daily living and power) are categorical: Ordinal type and are made operational by Constant Murley Score. The Age is numerical: continuous and measured in years and Gender is Nominal variable in the study.

Mean and standard deviation was calculated for quantitative variable like age. Frequency and percentages were presented for all quantitative variables like gender. Chai square test was used to determine whether statistically significant difference exists in terms of overall satisfaction and dissatisfaction with non operative treatment, based on Constant Murley score. P value of d" 0.05 was considered significant.

RESULTS

A total number of 10756 trauma patients were received during the study period, out of which there were 377 clavicle fractures. 271 of which were mid-shaft fractures of the clavicle and 102 were displaced.

Five cases were excluded in the study, out of which four were open fractures and one had already amputated upper limb. 11 patients were lost during the follow up.

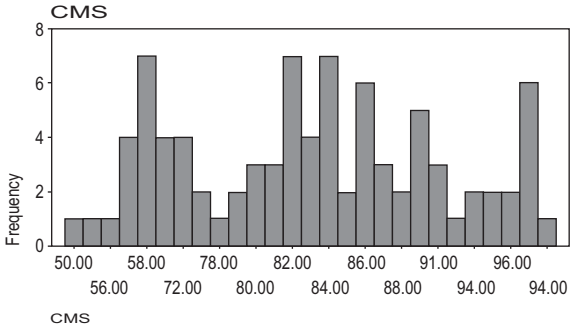
A total of 86 patients with mid-shaft displaced Clavicle fracture were selected. Male patients were 72 (83.7%) whereas female patients were 14 (16.7 %). Majority of our patients (69.77%) had road traffic accident, as their mechanism of injury and 4.6% patients had associated injuries remote for the area. Most of the patients were from younger age group, with a mean age of the patients was 30.71 years +/-10.07 SD (19-55 years). Constant Murely scores measured ranged from 50 to 99 with mean of 78.14.

In this study, we found that a statistically significant number of patients were satisfied with good functional outcome treated non operatively (P value <0.001). Out of 86 patients who had mid-shaft displaced clavicle fractures 68 patients (79.07%) were satisfied and had good fuctional out come. On the

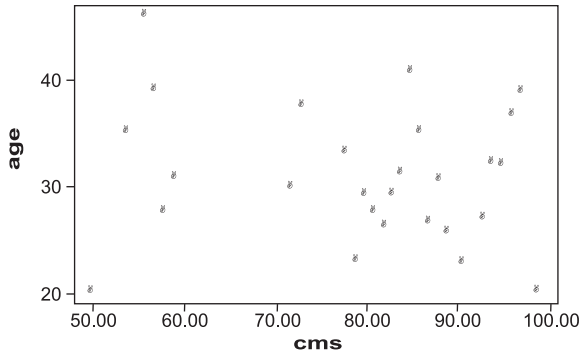
Table: Age distribution of patients and dissatisfied patients

Age Range	N	Satisfied Patients CMS Score of more than 60
	TOTAL	
19-25	38(44.19%)	33(38.3%)
26-30	14(16.27%)	8(9.3%)
31-35	7(8.13%)	3(3.4%)
36-40	9(10.46%)	9(10.4%)
41-45	5(5.81%)	4(4.6%)
46-55	13(15.12%)	11(12.7%)
TOTAL	86(100%)	68(79.07%)

(MEAN AGE= 30.71 Years+/-10.07 S.D.)



Graph: Distribution of CMS and its Frequency



Graph: Age Wise Distribution of CMS

other hand18 patients (20.93%) were not satisfied with with poor functional outcome. Satisfied patients with good functional outcome had Constant Murely Scores above the threshold of 60 and their individual parameters were also satisfactory with no pain, slight reduction in range of motion and acceptable power.

DISCUSSION

Clavicle fractures in general, and mid shaft clavicle fracture especially have been managed Non-operatively with different modalities in literature. Any reduction of fracture fragments results in undue success, and is mostly not practiced.

Our study is important because there is no previous study ever from Pakistan regarding conservative treatment of mid-shaft clavicle fractures. It is different from most of previous international study because it is based purely on patients functional outcome instead of radiological or surgeons criterion. Due to the soul fact, we feel that we were in a better situation to measure the shortcomings regarding the conservative management.

Our study showed 68(79.07%) patient were satisfied with good functional outcome following non-operative treatment for mid shaft displaced clavicle in a sample of 86 patients. These patients had constant-Murley scores of more than 60 and their individual parameters were also satisfactory with no pain, slight reduction in range of motion and acceptable power.

The renowned study of Hill et al had 69 % of patients satisfied which is close to our study[13]. The study of Robinson et al [15] and Lazarides had 21 % and 25.8%[12] patients not satisfied with conservative treatment for displaced mid-shaft clavicle fractures. Recently, Postacchini has quoted that 20% patients were not satisfied of their outcome after fracture clavicle treated non operativly[16].

The Constant Murely Score in our study was variable in distribution with respect to age, ranging from 50 to 99, with a mean of 78.14. Lazarides[12] and McKee [17] in their study found Mean Constant Murely Scores of 84 and 71 respectively. A study in 2011, by Rasmussen et al[18] has shown that mean difference between Constant Murely score achieved at the injured shoulder and contralateral normal shoulder was 7.3. Similarly, Chalidis[4] noted constant Murely scores of 88 with a range of 72 to 100. We are of the opinion that the slightly lower mean Constant Murely Scores achieved in our study may be due to the relatively displaced fractures of the clavicle when compared to studies conducted by Chalidis[4] and Lazarides[12]. Another reason which we could infer is, relatively short duration of follow up which also can be a reason for different Means achieved.

Our study shows that 79.07% of the mid-shaft clavicle fractures managed non-operatively were satisfied with good functional outcome when accessed via constant Murely Scores (p value<0.001).

CONCLUSION:

At the compendium, the study was able to achieve its goals, and found that majority of patient with displaced mid clavicle fracture treated non operatively using cuff and collar sling were satisfied with good functional outcome. However regarding the treatment protocol for mid-shaft displaced clavicle fractures a randomized and a poly centre study with a long follow-up is required to support of refute non operative treatment.

REFERENCES

1. Lenza M, Belloti JC, Andriolo RB, Santos GJB, Fallopa F. Conservative intervention for treating middle third clavicle fracture in adolescents and adults. Cochrane database syst 2009.15;(2):CD007121.

2. Trompetter R, Seekamp A. Clavicle Fractures Unfallchirung 2008 Jan: 111(1):27-38.

3. Zlowodzki M, Zelle BA, Cole PA, Jeray K, Mckee. Treatment of acute mid shaft clavicle fractures: systematic review of 2144 fractures: on behalf of the Evidence-Based Orthopaedic Trauma Working Group. J Orthop Trauma 2005 Aug; 19(7):504-7.

4. Chalidis B, Sachinis N, Samolandas E, Domitriou C, Christodoulou A, Pournaras J. Acute management of clavicle fractures. A long term functional outcome study. Acta Orthop Belg 2008 Jun; 74(3):303-7.

5. Koval JK, Zukerman JD. Handbook of fractures. 2nd ed.Phiadelphia, PA: Lippincott; 2002; 63.

6. Zlowodzki M, Zelle BA, Cole PA, Jeray K, McKee MD. Treatment of acute mid shaft clavicle fractures: systematic review of 2144 fractures: on behalf of the Evidence-Based Orthopaedic Trauma Working Group.J Orthop Trauma 2005(7):504-7.

7. M Altamimi SA.Mckee MD.Nonoperative treatment compared with plate fixation of displaced mid shaft clavicular fractures. The Journal of bone and joint Surgery (American).2008:90:1-8.

8. Wick M, Muller, EJ Kollig, E Muhr G. Mid shaft frac-

tures of the clavicle with a shortening of more than 2 cm predispose to non union. Archives of Orthopaedic and Trauma Surgery.2001.vol121,no4,207-11.

9. Nowak J, Holgersson M , Larsson S,. Sequelae from clavicular fractures are common: A prospective study of 222 patients. Acta Orthopaedica.2005. vol 76 no 4;496-502.

10. Holgersson, M Larsson S. Can we predict long-term sequelae after fractures of the clavicle based on initial findings? A prospective study with nine to ten years of follow-up. Journal of Shoulder and Elbow.2004. vol13, issue 5; 479-86.

11. Mckee MD, Pedersen EM, Jones, C Stephen DJG, Kreder HJ, Schemitsch EH et al. Deficits Following Non operative Treatment of Displaced Mid shaft Clavicular Fractures. JBJS (American) 2006; 88:35-40.

12. Lazarides, S Zafirolpoulos. Conservative treatment of fractures at the middle third of the clavicle: The relevance of shortening and clinical outcome. Journal of shoulder and elbow surgery 2006 Vol15,issue 2,191-4.

13. Hill JM, McGuire, MH Crosby, LA. Closed treatment of displaced middle-third fractures of the clavicle gives poor results. J Bone Joint Surg Br.1997; 79(4):537-39.

14. Boehm D, N Wollmerstedt, Doesch M, Handwerker M, Mehling E, Gohlke F. Development of a questionnaire based on the constant Murely Score for self evaluation of shoulder function by patients. Unfallchirung2004; 107(5):397-402.

15. . Robinson CM, Court-Brown CM, McQueen MM, Wakefield AE. Estimating risk of non-union following non-operative treatment of a Clavicle fracture. JBJS (Am) 2004. 86:1359-65.

16. Postacchini, R Gumina, S Farsett,i P Postacchini F. Long term results of conservative management of mid shaft clavicle fracture. Int Orthop 2010, 34(5):731-6.

17. Mckee MD, Pedersen EM, Jones C, Stephen DJG, Kreder HS, Schemitsch EH,et al. Deficit following non-operative treatment of displaced mid shaft clavicular fractures, JBJS,2006;8:35-40.

18. Rasmussen JV, Jansen SL, Peterson JB, Falstie-Jenson, T,Lausten, G Olsen BS. A retrospective study of the association between shortening of the Clavicle after fracture and the clinical outcome in 136 patients. Injury 2011.http://www.ncbi.nlm.nih.gov/pubmed/21241982.