

Comparison of Functional Shoulder Recovery after Conservative versus Surgical Treatment in Patients with Grade III Acromio-Clavicular Dislocation

SUBHAN SHAHID, MIAN MUHAMMAD HANIF, TANVEER AFZAL, GHULAM FAREED

Department of Orthopedic Surgery, Sir Ganga Ram Hospital, Lahore

Correspondence to: Dr. Subhan Shahid, Assistant Professor, Department of Orthopedic Surgery, Sir Ganga Ram Hospital, Lahore. Email: drsubhanorthsurg@hotmail.com

ABSTRACT

Objective: To compare the functional shoulder recovery after conservative versus surgical treatment in patients with grade III acromio-clavicular dislocation.

Design: It was a randomized controlled trial.

Place and Duration of Study: This study was conducted at the Department of Orthopedic Surgery, Sir Ganga Ram Hospital, Lahore over 2 years period from June 2013 through June 2015.

Patients and Methods: 80 patients of both genders aged between 18-65 years presenting with Rockwood Grade-III AC Dislocation were enrolled. These patients were then divided into following two groups randomly using lottery method. Patients in Group-A underwent Conservative Treatment which involved resting of the arm in a broad arm sling for 3 weeks followed by physiotherapy. While patients in Group-B underwent Surgical Treatment which involved open reduction and stabilization of the joint using a hook plate followed by physiotherapy starting at 2 weeks post-operatively. Outcome was described by using constant score (Appendix-I) in terms of mean±sd after 6 weeks of treatment.

Results: The age of the patients ranged from 18 years to 65 years with a mean of 41.63±11.41 years. 37 (46.3%) of the study participants were male while 43 (53.8%) were female. In 45 (56.3%) patients right side was involved while in 35 (43.8%) patients left side was involved. However, there was no significant difference between the two groups in terms of mean age ($p=0.267$), gender ($p=0.501$) and side involved ($p=0.499$). When compared the outcome, surgical treatment was better than conservative treatment in terms of mean improvement in pain score (11.68±3.10 vs. 9.48±3.13; $p=0.0002$), mean activities of daily living score (16.80±3.15 vs. 12.45±4.10; $p=.000$), mean movement score (34.98±4.22 vs. 26.53±7.01; $p=0.000$) and mean strength score (21.80±2.61 vs. 17.95±4.05; $p=0.000$). The overall mean constant score was significantly better in Group-B than Group-A (85.25±6.029 vs. 66.40±9.58; $p=0.000$). There was no statistically significant difference when compared the mean constant score among age groups ($p=0.824$), gender ($p=0.727$) and side involved ($p=0.802$) confirming that surgical treatment was better than conservative treatment in all age groups and gender and was not affected by side involved.

Conclusion: Surgical treatment is better than conservative treatment in terms of significantly higher mean of constant score in patients with Rockwood Type-III AC dislocation.

Keywords: Rockwood Type-III AC dislocation, Conservative Treatment, Surgical Treatment, Mean of Constant Score

INTRODUCTION

The acromioclavicular (AC) joint is one of the most frequently injured joint in the human body, especially in overhead activities, sports and trauma in everyday life, accounting for 9% of all injuries to the shoulder girdle.^{1,2} Both the increase in road traffic accidents and the increase in certain leisure activities with a corresponding risk of injury have resulted in a steadily growing rate of AC joint injury over the past few years. A common such injury is acromioclavicular joint dislocation.²

The most commonly used classification to classify and accordingly manage patients with AC dislocation is Rockwood Classification. The aim of the management is to correct deformity, restore shoulder mobility and relieve pain. Treatment approaches; whether conservative or surgical are well known for all the types of AC dislocation except Rockwood Type-III AC dislocation (characterized by torn Acromioclavicular and Coracoclavicular ligaments with >5 mm elevation of AC joint in unstressed X-ray) which has been a

matter of debate for the past few decades.³ A number of previous studies have compared the conservative and surgical treatments in patients with type-III AC dislocation. The problem identified while reviewing the existing literature is the variation of surgical techniques and outcome assessment criteria used across different studies. Virtually every study has used different criteria to assess the final outcome after management.⁴ Gstettner et al. in 2008 used Constant score to describe the functional shoulder recovery among two groups and showed that surgical treatment was significantly better (90.4 ± 12.9 vs. 80.7 ± 17.4 ; $p=0.03$) than the conservative treatment.⁵ However, reciprocal results were achieved by McKee et al. in 2012. They showed that conservative treatment was better (constant score; 75 vs. 52; $p < 0.0001$; no SD available) than surgical treatment.⁶ Esen et al. in 2011 compared the two treatment approaches using Poigenfurst's criteria. They documented that conservative treatment had better outcome; perfect (52.94% vs. 41.17%; $p=0.492$) and good (47.06% vs. 58.82%; $p=0.492$) than the surgical treatment. Although the difference by Esen et al. is statistically insignificant, but it means that conservative treatment is at least as effective as surgical treatment.⁷

At the moment no such local published material was available which necessitated the present study.

PATIENTS AND METHODS

This was a randomized controlled trial conducted at the Department of Orthopedic Surgery, Sir Ganga Ram Hospital, Lahore over 2 years period from June 2013 through June 2015. Sample size of 80 patients (40 in each group) was calculated by

WHO manual with 80% power of test and 95% confidence interval (two sided) while taking mean constant score to be 80.7 ± 17.4 in conservative and 90.4 ± 12.9 in surgically managed patients with Rockwood Type-III AC Dislocation.⁵ Patients of both genders with ages in the range of 18-65 years presenting with Rockwood Grade-III AC Dislocation were enrolled. Patients with pre-existing injury or deformity of the shoulder joint or those with open dislocation were excluded from this study. These patients were then divided into two groups randomly using lottery method. Patients in Group-A underwent Conservative Treatment which involved resting of the arm in a broad arm sling for 3 weeks followed by physiotherapy. While patients in Group-B underwent Surgical Treatment which involved open reduction and stabilization of the joint using a hook plate followed by physiotherapy starting at 2 weeks post-operatively.

Outcome was described by using constant score in terms of mean \pm sd after 6 weeks of treatment.

RESULTS

The age of the patients ranged from 18 years to 65 years with a mean of 41.63 ± 11.41 years. 37 (46.3%) of the study participants were male while 43 (53.8%) were female. In 45 (56.3%) patients right side was involved while in 35 (43.8%) patients left side was involved. However, there was no significant difference between the two groups in terms of mean age ($p=0.267$), gender ($p=0.501$) and side involved ($p=0.499$). These findings have been summarized in Table 1.

Table 1: Baseline Characteristics of Study Groups

| Characteristics | Overall n=80 | Conservative Treatment n=40 | Surgical Treatment n=40 | P value |
|-----------------|-------------------|--------------------------------|----------------------------|---------|
| Age (years) | 41.63 ± 11.41 | 43.05 ± 12.70 | 40.20 ± 9.92 | 0.267 |
| Gender | | | | |
| • Male | 37 (46.3%) | 20 (50.0%) | 17 (42.5%) | 0.501 |
| • Female | 43 (53.8%) | 20 (50.0%) | 23 (57.5%) | |
| Side | | | | |
| • Right | 45 (56.3%) | 24 (60.0%) | 21 (52.5%) | 0.499 |
| • Left | 35 (43.8%) | 16 (40.0%) | 19 (47.5%) | |

Independent sample t-test, chi-square test, observed difference was statistically insignificant

Table 2: Comparison of Mean of Constant Score between the Study Groups

| Characteristics | Conservative Treatment n=40 | Surgical Treatment n=40 | P value |
|---------------------------------------|--------------------------------|----------------------------|---------------|
| Mean Pain Improvement Score | 9.48±3.130 | 11.68±3.100 | 0.002* |
| Mean Activities of Daily Living Score | 12.45±4.095 | 16.80±3.148 | 0.000* |
| Mean Movement Score | 26.53±7.013 | 34.98±4.221 | 0.000* |
| Mean Strength Score | 17.95±4.051 | 21.80±2.614 | 0.000* |
| Mean Constant Score | 66.4±9.578 | 85.25±6.029 | 0.000* |

Independent sample t-test, *The observed difference was statistically significant

When compared the outcome surgical treatment was better than conservative treatment in terms of mean improvement in pain score (11.68±3.10 vs. 9.48±3.13; $p=0.0002$), mean activities of daily living score (16.80 ±3.15 vs. 12.45±4.10; $p=0.000$), mean movement score (34.98±4.22 vs. 26.53±7.01; $p=0.000$) and mean strength score (21.80±2.61 vs. 17.95±4.05; $p=0.000$). The overall mean constant score was significantly better in Group-B than Group-A (85.25±6.029 vs. 66.40±9.58; $p=0.000$) as shown in Table 2. There was no statistically significant difference when compared the mean constant score among age ($p=0.824$), gender ($p=0.727$) groups and side involved ($p=0.802$) confirming that surgical treatment was better than conservative treatment in all age groups and gender and was not affected by side involved.

DISCUSSION

Acromioclavicular joint (ACJ) injuries have been recognized since the time of Hippocrates and the treatment has ranged from skillful neglect to various forms of operative stabilization. Current treatment recommendations are based on the severity of injury. Non operative treatment is advised for acute minor injuries whereas surgical stabilization is generally recommended for the more severe separations.¹ The treatment of intermediate separations or dislocations is controversial with available literature recommending non operative management in most cases. Early surgical intervention for intermediate separations is a common recommendation in a select subgroup of patients (heavy manual laborers, overhead workers and elite sportsmen who require the ability to throw) for optimum outcome.² This is supported by the literature findings that approximately 17% to 28% of patients treated non operatively will have disability with pain, weakness, fatigue, impingement and ACJ instability.⁸

In the present study, the age of the patients ranged from 18 years to 65 years with a mean of 41.63±11.41 years. 37 (46.3%) of the study participants were male while 43 (53.8%) were female giving a male to female ratio of 1:1.6. Guan et al. in 2009 observed similar mean age of 41.2±8.16 years in Chinese such patients but with a male predominance with a male to female ratio of 2.4:1. Calvo et al. reported similar mean age of 39.5±6.75 years in Spanish such patients with much higher male predominance of 5.4:1⁹. The mean constant score was significantly better with surgical treatment (85.25±6.029 vs. 66.40±9.58; $p=.000$) as compared to conservative treatment. Our results match with those of Gstettner et al.⁵ (90.4±12.9 vs. 80.7±17.4; $p=0.03$) and confirm the advantage of surgical treatment in such patients.

CONCLUSION

Surgical treatment is better than conservative treatment in terms of significantly higher mean of constant score in patients with Rockwood Type-III AC dislocation.

REFERENCES

1. Mazzocca AD, Arciero RA, Bicos J. Evaluation and treatment of acromioclavicular joint injuries. *Am J Sports Med* 2007;35(2):316–29.
2. Trainer G, Arciero RA, Mazzocca AD. Practical management of grade III acromio-clavicular separations. *Clin J Sport Med* 2008;18(2):162–6.
3. Nemeč U, Oberleitner G, Nemeč SF, Gruber M, Weber M, Czerny C, et al. MRI versus radiography of acromioclavicular joint dislocation. *AJR Am J Roentgenol* 2011;197(4):968-73.
4. Ceccarelli E, Bondi R, Alviti F, Garofalo R, Miulli F, Padua R. Treatment of acute grade III acromioclavicular dislocation: a lack of evidence. *J Orthop Traumatol* 2008; 9(2):105–8.

5. Gstettner C, Tauber M, Hitzl W, Resch H. Rockwood type III acromioclavicular dislocation: surgical versus conservative treatment. *J Shoulder Elbow Surg* 2008;17(2):220–5.
6. McKee MD, Pelet S, Vicente MR. Operative versus nonoperative treatment of acute dislocations of the acromioclavicular joint: results of a multicenter randomized, prospective clinical trial. *Upper Extremity Injuries* 2012;91.
7. Esen E, Ozturk AM, Dogramaci Y, Kanatli U, Bolukbasi S. Comparison of Surgical Treatment and Conservative Approach for Type III Acromioclavicular Dislocations. *Turkiye Klinikleri J Med Sci* 2011;31(1):109-14.
8. 126. Spencer EE Jr. Treatment of grade III acromioclavicular joint injuries: A systematic review. *Clin Orthop Relat Res* 2007;455:38-44.
9. Calvo E, López-Franco M, Arribas IM. Clinical and radiologic outcomes of surgical and conservative treatment of type III acromioclavicular joint injury. *J Shoulder Elbow Surg* 2006;15(3):300-5.