

A Retrospective Evaluation of the Functional Outcome of Conservative Treatment of Acute Type 3 Acromioclavicular Joint Dislocation

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Abstract

Aim: The aim of the study to evaluate the functional outcome of conservative treatment of acute type 3 acromioclavicular joint dislocations. **Methods:** A retrospective study was conducted in the Department of Orthopaedics, Nalanda Medical College and Hospital, Patna, Bihar, India for 15 months. 50 patients with acromioclavicular dislocation type III treated conservatively were included in this study. These patients were then followed up at 6 weeks, 3 months and 6 months interval. Patients with AC joint dislocation type I and II, men or women >60 yrs age, open dislocation, dislocation in a poly trauma patient and fracture of ipsilateral scapula, and fracture of the clavicle were excluded from the study. **Results:** Of the 50 patients, 43 were male (86%) and 7 were female patients (14%). Mean age was 35.5 years. 37 had excellent results having no pain or limitation of movements. 10 had good results and had mild pain only on excessive activity but with terminal restriction of abduction. 3 had fair results and there were no poor results. At final follow up, the mean score was 11.05. There was improvement in the mean score from 9.03 at 6 weeks to 11.05 at 6 months. Improvement in subjective and objective symptoms were highly significant as per Freidman test value ($p<0.01$). At final follow up, mean score for pain was 3.87 at final follow up. Reduction of pain was found to be highly significant ($p<0.01$) at final follow up and between each follow up. Mean score for abduction was 4.01 at final follow up. Improvement in the range of abduction was found to be highly significant ($p<0.01$) at final follow up and between each follow up. At final follow up only 5 patients had restriction of abduction (less than one third of normal side) and 45 patient's regained full range of movements. Follow up x-rays at the end of 6months showed that 41 A-C joints were still subluxed and 9 joints were dislocated. Mean score was 2.95 at final follow up. **Conclusion:** Conservative treatment of acute Type 3 Acromioclavicular joint dislocation with short periods of immobilization by bandages and slings and early rehabilitation of shoulder gives good short-term results clinically although not correlated radiographically.

Keywords: Acromioclavicular Joint, Dislocation, Management

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Introduction

Acromioclavicular (AC) joint dislocations are caused by disruption of the AC ligament, coracoclavicular (CC) ligaments, and deltopectoral fascia, resulting in a radiographically widened AC joint. Such injuries are not uncommonly found in orthopaedic practice, accounting for 9% to 12% of shoulder injuries[1,2]. AC joint dislocations are classified according to severity, ranging from mild sprains to complete disruption of the AC and CC ligaments. In general, type I and type II injuries undergo non-operative treatment that involves early range-of-motion and strengthening exercise after short-term immobilization with a sling. On the other hand, type IV, V, and VI injuries are accompanied by significant displacement, with complete rupture of the ligaments, and are thus typically indicated for surgical treatment, as conservative treatment may result in residual pain, weakness, and discomfort in the shoulder and arm[3].

Among professional performers and dancers, the career prevalence of injury ranges from 40% to 84%, with lower extremity and low back injuries being the most commonly reported.² Shoulder injuries are considered uncommon among professional performers. As such, the importance of recognizing the interplay of aesthetics and athletic demands imposed on the performer is critical. Impairments can negatively affect show productions and careers if shoulder injuries are not appropriately addressed. Furthermore, injury surveillance and injury management among dancers and performers have been limited[4]. This case report attempts to provide insight into a rare injury occurring in a dance performer that can be managed conservatively for return to a performing career. Type III AC separations pose a controversial course of therapeutic management[5]. The management for this injury has typically been surgical⁶; however, there is a growing consensus for conservative management, which is argued

to be as effective for allowing expeditious entrance to physical rehabilitation and subsequent return to activity[7]. The basis for surgical intervention is the premature onset of degenerative processes to the AC joint and associated limitations in range of motion (ROM), strength, and upper extremity function. Conservative strategies involving wearing a sling, modalities, and progressive rehabilitation have demonstrated minimal dysfunction and minimal evidence for degeneration. The literature does not support superiority of either method for the management of a type III separation.

Materials and methods

A retrospective study was conducted in the Department of Orthopaedics, Nalanda Medical College and Hospital, Patna, Bihar, India for 15 months, after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

50 patients with acromioclavicular dislocation type III treated conservatively were included in this study. These patients were then followed up at 6 weeks, 3 months and 6 months interval. patients with AC joint dislocation type I and II, Men or women >60 years age, Open dislocation, Dislocation in a poly trauma patient and Fracture of ipsilateral coracoid process of scapula, fracture of the clavicle were excluded from the study.

On initial presentation, a detailed clinical examination was performed. Any pain, swelling, and loss of function were noted. On examination any tenderness over acromioclavicular joint, swelling, deformity, Range of Movements and any associated injuries were noted. Stress X-Rays were taken comparing both the AC joint with 5kg weights on either side suspended through wrist joints.

The A.C. joint was reduced with upward pressure from elbow and downward

pressure applied over medial end of clavicle and was supported by Jones adhesive strapping which encircled it from middle third of clavicle to around the elbow joint. Arm was placed in adducted position with another strap applied horizontally. Careful padding was done around elbow joint and lateral end of clavicle to avoid pressure. This immobilization was continued for 3 weeks and later the strapping was removed and over next three weeks rehabilitation was started with gentle mobilization of shoulder joint. Heavy lifting or contact sports were avoided for 8-12 weeks. Patient was evaluated at each follow up at 6 weeks, 3 months and 6 months and was evaluated subjectively for pain and stiffness, objectively for ROM (abduction) and Radiographs for displacement.

Results

Of the 50 patients, 43 were male (86%) and 7 were female patients (14%). Mean

age was 35.5 years. Mechanism of injury was road traffic accident in 37 and fall from height in 13 patients with most of them giving history of direct trauma to shoulder girdle. All patients had severe pain and tenderness localized over A-C joint. Range of movements were restricted (abduction was more affected than rest). Deformity was present in all patients and radiographs revealed superior displacement of lateral end of clavicle when compared to normal side. Results were assessed at 6 weeks, 3 months and 6 months.

Follow up results at 6 months

37 had excellent results having no pain or limitation of movements. 10 had good results, had mild pain only on excessive activity and terminal restriction of abduction. 3 had fair results and there were no poor results

Table 1: Statistical analysis of conservative treatment

Time	N	Mean	Standard deviation	Freidman test value	P-value
6 weeks	50	9.03	1.49	40.12	0.001 HS
3 months	50	10.45	0.91		
6 months	50	11.05	0.97		

At final follow up, the mean score was 11.05. There was improvement in the mean score from 9.03 at 6 weeks to 11.05 at 6 months. Improvement in subjective and objective symptoms were highly significant as per Freidman test value ($p < 0.01$).

Table 2: Statistical analysis of pain score at each follow up

Time	N	Mean	Standard deviation	Freidman test value	P
Pain 6 weeks	50	2.66	0.41	33.57	0.000 HS
Pain 3 months	50	3.29	0.36		
Pain 6 months	50	3.87	0.49		

At final follow up, mean score for pain was 3.87 at final follow up. Reduction of pain was found to be highly significant ($p < 0.01$) at final follow up and between each follow up.

Table 3: Statistical analysis of range of abduction at each follows up

Time	N	Mean	Standard deviation	Freidman test value	P
Abduction 6 weeks	50	2.98	0.71	29.55	0.000 HS
Abduction 3 months	50	3.77	0.51		
Abduction 6 months	50	4.01	0.23		

Mean score for abduction was 4.01 at final follow up. Improvement in the range of abduction was found to be highly significant ($p < 0.01$) at final follow up and also between each follow up. At final follow up only 5 patients had restriction of abduction (less than one third of normalside) and 45 patient's regained full range of movements.

Table 4: Radiological assessment at each follows up

Time	N	Mean	Standard deviation	Freidman test value	P
X-ray 6 weeks	50	2.55	0.48	10.10	0.006 HS
X-ray 3 months	50	2.95	0.37		
X-ray 6 months	50	2.95	0.37		

Follow up x-rays at the end of 6 months showed that 41 A-C joints were still subluxed and 9 joints were dislocated. Mean score was 2.95 at final follow up.

Although the radiographic improvement was significant at final follow up, pair wise study showed that no statistically significant improvement between 3 months and 6 months. There was no clinical and radiological correlation as per this study as patients had significant improvement in pain and ROM although x-rays showed AC joint subluxation/dislocation. Patients had negligible deformity at final follow up. None of the patients complained about the deformity.

Discussion

The framework of shoulder in upright position is maintained in its normal anatomical position by the interlocking of sternoclavicular ligaments. The second mechanism which resists any significant downward displacement of the distal clavicle is by upward support of the trapezius muscle. The scapula is suspended from clavicle primarily by coracoclavicular ligament. There is considerable controversy as to the best method of management of Type 3 AC dislocation. In 1959 Urist[8] published an extensive survey of treatment of AC dislocation involving 32 methods of conservative treatment and 5 open techniques. Patients younger than 18 years were arbitrarily excluded because of presence of open epiphysis which theoretically may introduce an important variable. In this study grade 1 and grade 2 dislocations were excluded as conservative

treatment is the accepted standard treatment. Stress x-rays were used to differentiate between grade 3 and grade 2 at initial presentation.

In a study conducted by Timothy et al.[9], 127 patients with acute acromioclavicular joint injuries were treated. 88 percent of the patients were males and 12 percent were female and 73 percent of the patients were between eighteen and twenty-five years of age. J.J Dias et al.[10], conducted a study on 53 patients with acromioclavicular joint injuries. There were 38 men (72 percent) and 6 women (28 percent). In this study, 86 percent were men and 14 percent were women. Acromioclavicular joint injuries were seven times more common in men compared to women as per this study. In a study conducted by Bannister G.C et al.[11], out of 60 conservatively treated patients, all regained movement significantly. In our study only 5 out of 45 patients had terminal restriction of abduction (less than one third the normal limb) and rest of the patient's regained full range of movement at the end of 6 months.

Phillips A.M. et al.[12], compared operative and non-operative group for grade 3 dislocations and concluded that both groups had good pain relief, but non operative group had better outcome for range of movements. Similarly, J.J. Dias et al.[10], treated 53 patients with grade 3 dislocations and at the end of 5 years only one patient had painful subluxation. In our study patients out of 50 had no pain even on excessive activity and rest of the patients complained of mild pain on excessive activity only and none of the

patients had to change their profession due to pain. A study conducted by Bernard Jacobs[13] showed that there was no definite relationship between residual joint separation and residual symptoms. In our study also there was no clinical and radiological correlation as all patients had good pain relief with near normal range of movements, yet x-rays showed subluxation in 41 patients and dislocation in 9 patients. Most of our patients were not concerned with the appearance of their shoulder as the residual deformity was negligible apart from the 9 patients where A.C joints were completely displaced at the end of 6months.

Conclusion

Conservative treatment of acute Type 3 Acromioclavicular joint dislocation with short periods of immobilization by bandages and slings and early rehabilitation of shoulder gives good short-term results clinically although not correlated radiographically.

Reference

1. Fraser-Moodie JA, Shortt NL, Robinson CM. Injuries to the acromioclavicular joint. *J Bone Joint Surg Br.* 2008;90(6):697–707.
2. Mazzocca AD, Arciero RA, Bicos J. Evaluation and treatment of acromioclavicular joint injuries. *Am J Sports Med.* 2007;35(2):316–29.
3. Beitzel K, Cote MP, Apostolakis J, et al. Current concepts in the treatment of acromioclavicular joint dislocations. *Arthroscopy.* 2013;29(2):387–97.
4. Hincapie C, Morton E, Cassidy JD. Musculoskeletal injuries and pain in dancers: a systematic review. *Arch Phys Med Rehab* 2008; 89:1819-29.
5. Ceccarelli E, Bondi R, Alviti F, Garofalo R. Treatment of acute grade III acromioclavicular dislocation: a lack of evidence. *J Orthop Traumatol* 2008; 9:105-8.
6. Post M. Current concepts in the diagnosis and treatment of acromioclavicular dislocations. *Clin Orthop Relat Res* 1985; 200:234-48.
7. Walsh W, Peterson D, Shelton G, Neumann R. Shoulder strength following acromioclavicular injury. *Am J Sports Med* 1985; 13:153-60.
8. Urist MR. The treatment of dislocation of the acromioclavicular joint: A survey of the past decade. *Am J Bone joint surg* 1959; 98:423-431.
9. Timothy N et al. Dislocation of acromioclavicular joint. An end result study. *Journal of bone and joint surgery* 1987.
10. Dias JJ, Steingold RF, Richardson RA et al. The conservative treatment of acromioclavicular dislocation. Review after 5 years. *J Bone Joint Surg* 1987;69B:719- 722.
11. Bannister GC et al. The management of acute acromioclavicular dislocation. A randomised prospective controlled trial *J Bone Joint Surg Br* 1989;71(5):848-50.
12. Phillips AM, Smart C, Groom AF. Acromioclavicular dislocation. Conservative or surgical therapy. *Clin Orthop Relat Res* 1998; 353:10-7.
13. Bernard Jacobs, Preston Wade A. Acromioclavicular-Joint Injury: An endresult study. *J Bone Joint Surg Am* 1966; 48:475-486