

Treatment of symptomatic acromioclavicular dislocation. Our experience

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Abstract

Purpose: the purpose of this study is to report the clinical and radiological results of the reduction of acromioclavicular dislocation during the healing period without the anatomical reconstruction of the CC and AC ligaments.

Materials and Methods: twelve patients were treated between 2012 and 2015 with a mean follow-up of 1.5 years. Patients were included if they had Rockwood types III, IV and V acromioclavicular dislocation and were treated during the acute period (i.e. during the first three weeks of the injury). The technique employed was arthroscopic with mini-invasive. The reduction of ACD was achieved during the healing period by using two titanium buttons connected by four highly-resistant, non-reabsorbable suture cord: one button was placed in the clavicle and the other in the coracoid.

Results: results were reported after two years of post-surgical follow-up. The measurements included the static and dynamic evaluation and the DASH outcome scoring. Static radiographic measurements of the CC distance with mean discharge was 0.93 cm compared to 2.7 cm at the initial examination ($p<0.0001$); and DASH outcome measure of 14 compared to a pre-surgical scoring of 52 ($p>0.001$). The patients were satisfied or very satisfied with the cosmesis and were able to return to their previous sorts and work routine normally.

Conclusion: this study confirms that the reduction of ACD by means of double button fixation during the acute healing period, and adequate immobilization helps to the biological repair without the need of anatomical reconstruction of AC and CC ligaments. In this way the patients could restore the function of the arm and achieve the static and dynamic stability. They were also able to reinstate their work and sport previous to the injury.

Keywords: acromioclavicular dislocation, button, arthroscopy, DASH score, coracoclavicular distance.

Introduction

Acromioclavicular (AC) joint dislocation involves 12% of shoulder joint injuries and is usually caused by direct or indirect force (1,2,3,4). This type of injury can involve individuals of all age groups and is a common injury as a result of accidents related to traffic, sports (especially falls during skiing and in contact sports with an incidence of 41% among football players), military training, and falls (5,6,7).

Treatment options for AC joint injuries have evolved over the years. Rockwood's classification (grades I to VI) is commonly used for grading the AC joint and is based on the degree of injuries (8,9,10,11).

Treatment of grade I and II AC joint dislocations can be performed conservatively. However, surgical intervention is required for patients with grades III (especially individuals who are workers with heavy manual occupations, overhead throwing athletes, and so on) and IV-VI (because of their common characteristics including instability in the horizontal and vertical direction of both due to AC ligament and coracoclavicular (CC) ligament disruption (12,13,14,16,17,18,19). Numerous surgical techniques have been suggested to treat AC joint dislocation. In this study, these surgical techniques reduce the distance between the clavicle and the coracoid, during healing period, which leads to primary healing of the ligament. However, these methods are not suitable for chronic dislocations, because the ligaments are not extensible to extremes (20,21,22,23).

Material and Methods

Patients and inclusion criteria

The study included all patients treated in the period from 2012 to 2015 with acute AC joint dislocation (Rockwood type III, IV or V) with clinical and radiographic evidence of dislocation. Twelve patients, 11 men and 1 woman, 12 affected shoulders treated in acute period (during the first three weeks of injury). To determine the lesion, three radiographic views were used: AP view (with a 10 degree cranial inclination of the beam or Zanca view), true axillary view in supine position and tension view of both sides of the AC joint and CC ligament).

The inclusion criteria were:

- 1) all cases of acute AC dislocation Type III, IV or V according to the Rockwood classification,
 - 2) no history of shoulder injuries and related operations,
 - 3) follow-up time greater than 18 months.
- The exclusion criteria were acromioclavicular dislocations of type I and II AC, chronic injury (separation of the AC joints superior to 4 weeks).

All surgeries were performed by the same surgical team, senior surgeon and assistant,

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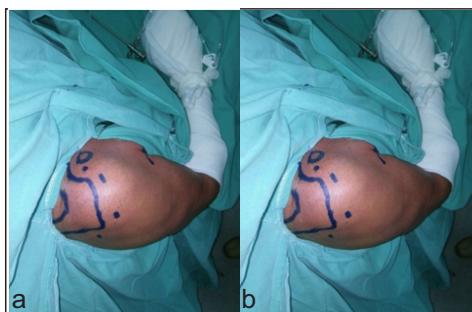


Figure 1: a and b Arthroscopic portals: one was placed medial to the tip of the coracoid process and another was placed laterally or slightly inferior to the tip of the coracoid process

all subjects were operated on by the same endobutton technique. All patients had shoulder x-ray control in AP and Zanca after surgery, at 30 days and at 3 months, 6 and 12 months. (Table N°1)

Surgical technique

The patient was placed in the position of the beach chair. There were two portals, an anterosuperior portal and antero-inferior and a mini-open access on the AC joint. The key to the technique lies in the arthroscopic visualization of the inferomedial border of the coracoid. The lower surface of the coracoid was wiped from all soft tissues with the radiofrequency device. Using a 4mm cannulated drill to create a tunnel through the clavicle and coracoid. The tip of the button pointer was placed on the lower surface of the coracoid arch through the anterior portal. The button was extracted through the clavicle and coracoid. Once the button was turned over, traction was applied and the sutures on the clavicle button were tied under direct visualization and controlling the reduction. The reduction of the clavicle in the subacromial space is observed with the arthroscope. An intraoperative fluoroscopic control of the reduction was performed.



Figure 2: A: pre-operation radiography, B: post-operation radiography in a patient with the button fixation system

Rehabilitation

Even though the theoretical ability to accelerate post-operative rehabilitation due to the biomechanical resistance of the techniques, rehabilitation should be approached with foresight. In the POP period a sling is placed with a good support for 8 weeks, the sling helps to support the weight of the arm, reducing tension through the AC joint. Elbow, wrist and hand movements are recommended. A radiographic check is performed weekly. El paciente puede ejecutar ejercicios suaves de amplitud de movimiento en supino, y evitar ejercicios de pie x 8 semanas. After 8 weeks, the sling is removed, and the patient is allowed to progress with soft mobilization and stretching exercises. From week 8 to 12 you should go from isotonic to isometric exercises. From 3 months should be allowed aerobic exercises, such as gentle trotting, after 4 months is allowed weight lifting. (Table 2).

Results

Twelve patients met the inclusion criteria during the study period. The mean age was 40 years (range 35 - 55 years). The mean age was 40 years (range 35 - 55 years). The mechanisms of injury were traffic accidents, three cases were dislocation grade III and 9 degree V. The mean follow-up time was 2 years (mean 1.5 years) 1 patient was reintervened by button migration, and

problems associated with loop fit during surgery were recorded in 7 patients. Static radiographic measurements of the CC distance with mean discharge was 0.93 cm compared to 2.7 cm at the initial examination ($p<0.0001$); and DASH outcome measure of 14 compared to a pre-surgical scoring of 52 ($p>0.0001$). The patients were satisfied or very satisfied with the cosmesis and were able to return to their previous sorts and work routine normally.

Discussion

Although AC lesions are frequent, their surgical treatment is still a challenge, because they suggested different methods to manage acute joint dislocation of AC. More than 70 methods have been suggested for management of complete AC joint separation. However, according to the literature the rate of complications is high with these methods(26). Other techniques such as Kirschner wires, pins, screws or hook plates are also used to manage AC joint dislocation (27,28,29,30). This study confirms the hypothesis of biological restoration, because the fixation of the button has the advantage of maintaining the reduction during the biological healing process. It is a combined surgical alternative (arthroscopic with mini-invasive) provides the aesthetic and functional advantage of great impact in the society as much in the personal as in the labor since it allows to

Table 1: Demographic and Surgical details

P N°	Ge	Age	Injury	Job	Time to surgery	Grade	surgical time	re surgery
1	M	44	Road accident	Worker	20 days	III	120 min	
2	M	38	Road accident	Worker	22 days	III	110 min	
3	M	41	Road accident	Worker	20 days	V	120min	
4	M	53	Road accident	Worker	18days	V	120min	
5	M	56	Road accident	Worker	15 days	V	120min	
6	M	33	drop	Worker	15 days	V	120min	
7	M	30	Road accident	carpenter	23 days	V	120min	
8	M	43	Road accident	worker	20 days	V	120min	
9	F	32	Road accident	hosuewife	12 days	V	120min	yes
10	M	49	Road accident	worker	20 days	III	120min	
11	M	50	Road accident	worker	24days	V	120min	
12	M	56	drop	worker	26days	V	120min	

Table 2: Rehabilitation process and outcomes

P N°	Ge	Age	cosmesis	supine	isometric & isotonic	aerobics excise	Weights
1	M	44	satisfied	6 a 8 week	8 a 12 week	8 a 12 week	16 week
2	M	38	very satisfied	6 a 8 week	8 a 12 week	16 week	20 dias
3	M	41	satisfied	6 a 8 week	10 a 12 week	16 week	Higher 4 m
4	M	53	satisfied	6 a 8 week	10 a 12 week	16 week	Higher 4 m
5	M	56	satisfied	6 a 8 week	8 a 12 week	16 week	Higher 4 m
6	M	33	very satisfied	6 a 8 week	8 a 12 week	16 week	Higher 4 m
7	M	30	muy satisfecho	6 a 8 week	10 a 12 week	16 week	Higher 4 m
8	M	43	satisfied	6 a 8 week	8 a 12 week	16 week	Higher 4 m
9	F	32	very satisfied	6 a 8 week	12 week	20 week	no
10	M	49	very satisfied	6 a 8 week	8 a 12 week	16 week	Higher 4 m
11	M	50	very satisfied	6 a 8 week	10 a 12 week	16 week	Higher 4 m
12	M	56	very satisfied	6 a 8 week	10 a 12 week	16 week	Higher 4 m

restore the function of the arm and the obtaining of static and dynamic stability, Giving patients the opportunity to rejoin the work and sports activity prior to the injury. The main objective was the

anatomical restoration of the AC joint with good cosmesis and reincorporation to the activities in a short-term follow-up. (Table N°2).

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Conflict of Interest: – NIL
Source of Support: NIL

How to Cite this Article

Yedro ED, Saglio CAC .Treatment of symptomatic acromioclavicular dislocation. Our experience. Acta of Shoulder and Elbow Surgery July - Dec 2017;2(2):27-29