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Original Article

Unstable acromioclavicular joint injuries: Is there really a difference between surgical management in the acute or chronic setting?

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ABSTRACT

Aim: To compare the outcomes of unstable ACJ injuries managed with an arthroscopy-assisted anatomic reconstruction of the coracoclavicular (CC) ligaments in the acute and chronic setting.
Methods: A retrospective revision was performed. The SF36, visual analog scale for pain, DASH questionnaire, constant score and the global satisfaction were assessed at the last follow-up visit.
Results: 22 patients were included. Results of the questionnaires assessed at the last follow-up visit showed no significant differences between the study groups.
Conclusion: Management of ACJ injuries in the acute or chronic setting may involve comparable outcomes if biological and mechanical aspects are considered.
Level of evidence: Level III, retrospective cohort study.

1. Introduction

Surgical management of acute unstable acromioclavicular joint (ACJ) injuries should be focused on realigning the torn ends of the ligaments, because it is accepted that in the acute phase they still have healing potential.[1] On the other side, surgical management of chronic ACJ injuries should incorporate a biological augmentation, because it is accepted that after 3 weeks from shoulder injury the AC and the CC ligaments have lost their property to heal.[2]

Previous studies that compared the surgical management in the acute setting versus surgical management in the chronic setting suggest that better outcomes may be obtained from early management.[1,3] Surgical techniques performed in these studies were non-anatomic procedures, which incorporated temporary metal hardware, both for patients managed in the acute and chronic setting.[1,3]

It has been reported that non-anatomic procedures may involve worst clinical and radiological outcomes than anatomic ligaments reconstructions.[4] It has been also reported that reconstructions with tendon allograft for chronic injuries tend to involve partial lost of reduction with follow-up because elongation of the graft.[5] It is actually clear that outcomes depend on the technique performed.[6]

As far as we have knowledge, there are not studies that provide comparative evidences regarding the outcomes of unstable ACJ injuries managed with an anatomic reconstruction of the CC ligaments in the acute setting versus those injuries managed in the chronic setting.

The aim was to provide evidences about the clinical and radiological outcomes of unstable ACJ injuries managed with an arthroscopy-assisted anatomic reconstruction of the coracoclavicular (CC) ligaments in the acute and chronic setting.

We hypothesized that patients with unstable ACJ injuries managed with an anatomic reconstruction of the CC ligaments performed in the acute setting by means of two CC suspension devices anatomically placed, would have similar outcomes than patients with unstable ACJ injuries managed with an anatomic reconstruction of the CC ligaments performed in the chronic setting by means of a CC ligaments reconstruction with a tendon allograft, protected by a primary mechanical stabilizer during the integration process of the graft to the bone tunnels.

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2. Patients and methods

2.1. Study design

A retrospective cohort study was performed in two tertiary hospitals. Patients with unstable ACJ injuries (grade IIIB-V according to the modified Rockwood classification) managed by means of an anatomic reconstruction of the CC ligaments arthroscopy-assisted, performed in the acute and chronic setting were included. The inclusion period ran from January 2011 to January 2013.

2.2. Study population

Patients were included in the study following these inclusion criteria: (a) either sex; (b) radiographic diagnosis of unstable ACJ injury (Rockwood IIIB-IV-V); (c) physically active and between 18 and 55 year-old at the moment of shoulder surgery; (d) managed operatively by means of an arthroscopy-assisted CC reconstruction with two suspension devices (ACUTE-group) or by means of an arthroscopy-assisted CC reconstruction with a tendon allograft plus a suspension device (CHRONIC-group); (e) with a clinical history and radiological examination complete and available at the moment of the revision of the records; (f) with a minimum follow-up of 24 months after surgery and (g) operated by the same shoulder surgeon. The exclusion criteria were: (a) radiographic diagnosis of an ACJ injury Rockwood grade I-II-IIIA; (b) previous injuries to the respective shoulder and (c) surgical techniques other than acute or chronic arthroscopically assisted anatomic CC reconstruction. The patients who fulfilled these eligibility criteria were contacted and proposed to be included in the study. Once patients accepted to participate in the study, they signed an informed consent, and radiographic and clinical examinations of the injured shoulder were collected.

2.3. ACJ injury classification

Classification was made by means of observing the X-rays performed at the initial visit post injury. Radiographic examinations of both shoulders were performed to all patients at the initial visit post injury. The X-rays protocol of these two institutions included: strict anteroposterior (AP) view (both shoulders), Zanca view (both shoulders) and axillary view (only injured shoulder). Axillary views were performed with the patient in the prone position. The cross-body adduction view (Alexander view) was performed at the initial visit post injury in all patients, so in accordance to the diversification of the Rockwood classification proposed by ISAKOS,[7] the classification could be updated as it was done previously.[8] Rockwood IIIB injuries were those in which there was evidence of the clavicle overriding the acromion in the Alexander X-rays[7].

Grade III and grade V injuries were differentiated according to the traditional Rockwood classification.[9] A grade III if the CC distance of the injured shoulder was increased between 25 and 100% when compared to the non-injured shoulder; and a grade V if the CC distance of the injured shoulder was increased between 100 and 300% when compared to the non-injured shoulder.[9] These assessments were made on Zanca views. Diagnosis of ACJ injuries Rockwood grade IV was made by means of observation in the axillary view of the clavicle posteriorly dislocated in relation to the acromion.[9]

2.4. Clinical assessments and quality of life (QoL) evaluations

The clinical outcomes and the QoL were evaluated by means of the Health Survey questionnaire (SF36), the visual analog scale (VAS) for pain, the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire, the constant score and the global satisfaction (scale from 0 to 10), assessed at the last follow-up visit.

2.5. Management decision-making

There was no randomization before decision-making. Patients with acute unstable ACJ injuries Rockwood grade IV–V (Fig. 1A) were told that there were international recommendations regarding the surgical management for this type of injuries[11]; and patients with Rockwood grade III ACJ injuries were told that there were no evidence-based medical guidelines for decision-making and that surgery was recommended in active patients with high demands on the shoulder function. In summary, indications were based on the radiological magnitude of displacement between the clavicle and the acromion, which at the end is the indicator of a tear or not in the CC ligaments with affection or not of the deltotrapezial fascia,[10,11] which also plays a determinant role in the vertical and horizontal stability of the ACJ.[12]

Once the diagnosis unstable ACJ injury was established, patients were informed about the different treatment options. The timeline between acute and chronic injuries, as well as the surgical technique, were established according to current international consensus.[6] Acute injuries were managed with two CC suspension devices anatomically placed within the first three weeks after injury (Fig. 1B), and chronic injuries were managed with tendon graft augmentation after three weeks from shoulder injury (Fig. 1C and D). Patients who at the initial visit post injury at the shoulder clinic, agreed to undergo for surgical management were included in the ACUTE-group. Patients of the CHRONIC-group were those who initially rejected surgery in the acute setting, thus were initially managed conservatively. After a period of conservative measures with no remission of the symptoms these patients were proposed to have surgery in the chronic setting. Patients of both groups were told about the risks of a surgical intervention.

2.6. Surgical technique

2.6.1. ACUTE-group

The performed technique involves the placement of two CC suspension devices by means of an arthroscopy-assisted procedure. This technique has been previously described adding an ACJ horizontal augmentation.[12] In the series of patients of this study, no horizontal augmentation was performed.

The coracoacromial (CA) ligament is followed until its insertion at the coracoid. The base of the coracoid is cleaned with a vaporizer. The suspension devices are passed through the tunnels in a retrograde direction. The retrograde direction (from coracoid to clavicle) implies making CC tunnels with a diameter of 3.5 mm, thus minimizing the probability of coracoid fracture. A transverse incision with a length of 3 cm is made 2 cm medial to the lateral edge of the clavicle. This incision is made between the locations where the native origins of the conoid and trapezoid ligaments should be in the inferior aspect of the clavicle. The native origin of the conoid is 4.5 cm medial to the lateral edge of the clavicle, and the trapezoid is 2.5 cm and slightly anterior when compared with the conoid.[13] A cross section of the deltotrapezial fascia is performed. The traction is released, and a Biomet AC drilling guide (reference 909511) with a calibrated angulation of 80 to 90 is placed at the base of the coracoid, adjacent to the wall of the scapula, and 5 mm lateral to the medial border of the coracoid, with the sliding tube of the guide located in the superior aspect of the clavicle, 4.5 cm medial to the ACJ (conoid native origin) (Fig. 2A). A 2.4-mm K-wire is passed through the AC guide. The location of the AC guide is then changed. In the inferior aspect of the coracoid, the AC guide is placed 5 mm medial to the lateral