A case of acromioclavicular dislocation without coracoclavicular ligament rupture accompanied by coracoid process fracture

Bir olguda korakoklaviküler ligamanın sağlam kaldığı akromioklaviküler eklen çıkışı ve korakoid çıkıntısı kırığı

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Acromioclavicular (AC) joint dislocation is usually associated with midsubstance rupture of the coracoid ligaments. AC joint dislocation with intact coracoclavicular (CC) ligaments and avulsion through the base of the coracoid is a rare injury. In the management of this injury, conservative and surgical treatment were performed in previous published cases.¹⁻⁷

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We present an adult patient who was managed surgically due to type 3 AC dislocation associated with a fracture of coracoid process and review of the literature.

![Image](a)

![Image](b)

![Image](c)

**Figure 1.** (a). The type 3 AC dislocation and fracture of the coracoid process can be seen in preoperative anteroposterior plain film of the right shoulder. The distance between clavicle and coracoid process is normal. (b). Computed tomography scan. The fracture line goes to base of the coracoid process. (c). Fracture line (empty arrow) of coracoid process (K) and intact CC ligaments (filled arrow) can be seen in magnetic resonance image.

**Case report**

A 30-year-old man was fallen directly on the right shoulder from two meters. Physical examination revealed prominence of the lateral portion of the clavicle, abrasion at the same area, diffuse tenderness around shoulder joint, local tenderness over the coracoid process with palpation and decreased movement of the shoulder due to pain. There were no concomitant injury and neurovascular injury. Anteroposterior plain film and computed tomography (CT) scan of the shoulder showed a type 3 AC joint dislocation and a displaced fracture of the coracoid process and not widening of the CC distance(Fig. 1a,b). The CC ligaments were seen intact on preoperative magnetic resonance image(Fig. 1c). At the operation, the CC ligament was intact(Fig. 2). The coracoid process was displaced and unstabled. Open reduction and internal fixation of the AC joint were performed using a knowless pin and the coracoid process was secured with a 4.0-mm malleolar screw and washer(Fig. 3a).

A regimen of active-assisted shoulder motion exercises was started at 1st week postoperatively and 3 weeks later, the patient returned work in his office with sling. At the 5th postoperative week, full activity without restriction was permitted. At the 7th postoperative month, knowless pin which is at the AC joint was removed under local anesthesia(Fig. 3b,c).

![Image](d)

**Figure 2.** Intraoperative dissection. The acromioclavicular ligament disruption and intact coracoclavicular ligaments is seen. AKL: acromioclavicular ligament. black arrow : trapezoid ligament, white arrow: conoid ligament.
Discussions

AC dislocation is a common injury following shoulder trauma. The usual mechanism of injury is cephalad to caudal force on the acromion caused by a direct blow or fall on to the shoulder. First, the AC ligaments are torn and then the deltoid and trapezius muscle attachments to the clavicle tear secondarily. Tearing of the CC ligament completes the injury. Consequently, dislocation of the AC joint occurs.

A fracture of coracoid process usually occurs in the base of the coracoid process at the junction between the coracoid process and the scapular body. Isolated fracture of the coracoid process is infrequent and occurs due to direct trauma or strong pull of coracobrachialis, short head of biceps, and pectoralis minor muscles. Ogawa et al. classified coracoid fractures (either isolated or combined): type 1 fracture locates behind CC ligaments and type 2 fracture is in front of the ligaments.

Combined AC dislocation with CC ligament disruption and coracoid process fracture may occur. This injury is extremely rare and there are two cases reported in the world literature. This injury occurs with two separate mechanisms. One of the mechanisms of injury is direct blow or fall on to shoulder cephalad to caudal direction and other is immediately forcibly pull of coracobrachialis, short head of biceps brachii, and pectoralis minor muscles, which would avulse the coracoid process.

In young patients who are under the age of 15-17 years, AC dislocation associated with avulsion fracture of the coracoid process can be seen. Prior to closure of the physis of the coracoid process, the coraco-clavicular ligaments are often stronger than the epiphyseal plate. Therefore, the epiphyseal plate of the coracoid process is avulsed by dislocation of AC joint and strong ligaments. Sometimes, unfused physis of the coracoid process can be misdiagnosed as a fracture.

In combined injury, the coracoid process breaks instead of the usual tearing of the CC ligaments during dislocation of the AC joint. AC dislocation associated with a fracture of coracoid process usually occurs in patients in the second or third decade of life. In combined AC dislocation with intact CC ligaments and coracoid process fracture, a fracture...
of the coracoid process usually associates with type 3 AC dislocation as in our patient. Besides, one case who has type 1 AC dislocation combined with physeal avulsion of the coracoid process\[^{[11]}\] and one case who has type 5 AC dislocation combined with fracture of the coracoid process\[^{[12]}\] have been published. Recently, Rockwood’s classification for AC dislocation has been modified and this combined injury has been classified as type 3 variant.\[^{[6]}\]

In a case with combined injury, a fractured coracoid process is easily overlooked when the attention is directed toward the more obvious AC separation.\[^{[1]}\] An axillary view or 30-degree cephalad view of the shoulder are recommended for visualisation of the coracoid.\[^{[1,4,13]}\] Moreover, tomograms may be needed to confirm the diagnosis.\[^{[1,4,13]}\] We recommend that routine anteroposterior, oblique, outlet and axillary view of the shoulder region should be achieved in patients with AC joint separation and also injured shoulder. It is recommended that the distance between coracoid and clavicle on direct radiography can be performed to evaluation of the CC ligaments.\[^{[8,9]}\] These ligaments can be visualized on magnetic resonance examination. Also, we think that the preoperative CT scan is important for diagnosis and evaluation of the degree of the displacement of the fracture of coracoid process.

Although both surgical\[^{[5,7]}\] and conservative\[^{[1-5]}\] treatment for this combined injury had been applied in previous published cases and results were seen similar with both treatment methods in long term follow-up,\[^{[6]}\] the number of cases treated surgically is lower than treated conservatively. Ogawa et al. classified coracoid fractures (either isolated or combined): type 1 fracture locates behind CC ligaments and type 2 fracture is in front of the ligaments.\[^{[9]}\] These authors suggested that type 1 fractures require operative treatment to begin physiotherapy early and operative treatment is not necessary for the type 2 fractures. Some authors recommend conservative treatment and immobilisation for 4-6 weeks in sling and then shoulder rehabilitation are recommended for the conservative management.\[^{[1,5]}\] In some cases who were managed by conservative treatment, cosmetic complaints and pain were observed.\[^{[1,4,6]}\] In a case, who was operated by Wilber et al. due to combined injury, pain and decreased range-of-motion due to failed physiotherapy were observed postoperatively.\[^{[7]}\]

In our case, because the rigid stability was achieved, we started active-assisted shoulder exercises on first week postoperatively and the patient returned to work in short-term (at 3rd weeks postoperatively). We achieved painless, active, strong and mobile shoulder at the 5th postoperative week. In conclusion, we suggest that early recovery to normal life is possible with surgical treatment in patients with AC dislocation combined with coracoid fracture.

References