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Case Report
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Acromioclavicular Dislocation with Coracoid Fracture Operative Treatment: A Case Report

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Abstract

The acromioclavicular joint has special anatomical structure and biomechanical properties. The coracoid process is the hub of the shoulder joint, which gradually attracts attention in the diagnosis and treatment of acromioclavicular joint dislocation. A 65-year-old woman suffered a car accident injury with painful left shoulder and restricted restriction for 2 days. Preoperative X-ray and computed tomography revealed dislocation of the acromioclavicular joint with coracoid fracture. According to the anatomical characteristics of the acromioclavicular joint, we used an suitable surgical approach to the anterior shoulder. The postoperative X-ray showed good reduction of the acromioclavicular joint, stable fixation and good fixation of the coracoid. At the 3-month follow-up, the patient reported relief of his symptoms. The incidence of acromioclavicular joint dislocation combined with coracoid fracture is low and the management is complicated. Understanding the anatomical and biomechanical properties (especially the mechanical characteristics of the coracoclavicular joint and the shoulder during injury) is crucial to successful surgery and avoiding intraoperative complications.

Keywords: Acromioclavicular joint; Coracoid fracture; Case report

Introduction

The acromioclavicular joint is the fulcrum of the scapular suspension complex; the acromioclavicular joint can increase the range of shoulder abduction and upper lifting movement within a certain range; at the same time, the subacromial articular surface and the intact acromioclavicular ligament structure are the anatomical basis for maintaining stability above the glenohumeral join; the stabilization of the acromioclavicular joint in the vertical direction relies more by the cubic ligament and cone ligaments from the base of the coracoid; based on the anatomical and biomechanical basis of the acromioclavicular joint, shoulder trauma is easy to involve the acromioclavicular joint [1,2]. According to statistics, acromioclavicular joint dislocation accounts for 12% of the whole shoulder dislocation and 8% of the joint dislocation of the body [3]. Simple coracoid fracture, accounting for 3%~13% of the whole scapular fracture, is easy to miss diagnosis clinically. The coracoid is not only a hub for the scapular complex suspension, but also an attachment point for the combined tendon, so most coracoid fractures are mostly combined with peri-acromioclavicular joint injuries. Despite the low incidence of acromioclavicular dislocation with coracoid fracture, the impact on patients is greater and the management is complex [4,5]. We report a case with dislocation of the acromioclavicular joint with coracoid fracture. Our case report was in accordance with the CARE guidelines [6].

Case Presentation

A 65-year-old woman suffered a car accident two days before hospitalization, causing pain in her left shoulder and limited mobility. The X-ray and Computed Tomography (CT) revealed a dislocation of the acromioclavicular joint combined with a coracoid fracture (Figure 1). Physical examination showed swelling of the left shoulder with no significant local skin damage; surface tenderness of the acromioclavicular joint, key (+), Dugas of the left shoulder (-), Left shoulder arm stamp sign (-). According to the patient's condition, we make the surgical plan: 1. Use open reduction and intramural screw fixation management of coracoid fracture and dislocation of particular joint; 2. Clavicular hook plate internal fixation; 3. Calcified ligament anchor repair.

After the patient received anesthesia, the supine position with right deviation of the head.

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Figure 1: Preoperative X-ray and CT revealed dislocation of the acromioclavicular joint with coracoid fracture.

Figure 2: Preoperative positioning.

After accurate positioning (Figure 2), we oblique cut the skin and subcutaneous tissue at the outer margin of the coracoid along the deltoid/pectoralis major muscle space; separate the thoracic fascia along the muscle space and expose the coracoid, trapezius ligament, and conical ligaments. A fracture touching the coracoid base along the coracoid "knee" (The body turns the body to the base). Continued exploration revealed good integrity of the orthorhombic ligament and conical ligaments; above-mentioned ligament laxity was seen in the lower pressure acromioclavicular joint. The coracoid was reset with a fingertip, and along the finger direction, a 2.0 mm Kirschner wire was inserted from the tip of the coracoid "knee" to the base (keep the Kirschner wire direction perpendicular to the fracture surface); push test tested good coracoid reduction stability. Confirm Kirschner wire position and reset with X-ray; use a 3.5 mm × 36 mm hollow screw was drilled along the Kirschner wire to fix the coracoid process. At the distal part of the clavicle, the skin and subcutaneous tissue were cut layer by layer, and we found a tear of the acromioclavicular ligament; the "joint disc" is damaged in the joint space, and the joint is dislocated (Figure 3). Clean the soft tissue around the joint and try to down press the acromioclavicular joint to confirm that the joint can be reduced. Select the distal clavicle hook plate (5 wells with 15 mm cut) and insert the clavicle hook into the acromioclavicular joint space; adjust the plate proximal orientation and secure with a Kirch clamp. Passive movement of the shoulder joint to ensure good reduction of the acromioclavicular joint and stable fixation; coracoid is well fixed. Suitable length screws selected near and far. The wound was rinsed after surgery. The belt line anchor repaired the acromioclavicular ligament and joint capsule, stitched layer by layer, and properly bandaged and fixed. Later the patient was left to shoulder abduction 45 and fixed for 3 weeks. And guide the deltoid muscle isometric contraction, elbow, wrist joint flexion and extension activities. After 3 weeks, the active outreach, adduction and pendulum movement gradually began under the protection. The postoperative X-ray showed good fracture reduction, the patient recovered well and

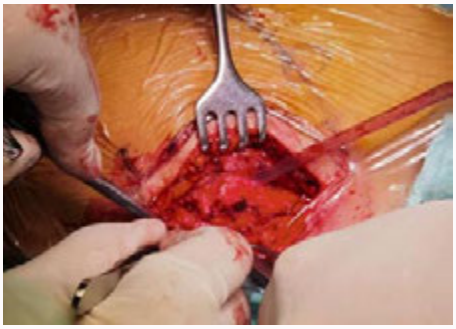

Figure 3: A tear of the acromioclavicular ligament; the "joint disc" is damaged in the joint space, and the joint is dislocated.

Figure 4: The postoperative X-ray showed good fracture reduction.

complete resolution of preoperative symptoms (Figure 4).

Discussion

The acromioclavicular joint is the fulcrum of the scapular suspension complex suspended on the trunk. In the process of shoulder abduction, upper lifting and forward flexion, the acromioclavicular joint can adjust the dynamic position of the scapula through muscle movement, so as to maintain the stability of the whole shoulder joint. The stability of acromioclavicular joint can be divided into dynamic stability and static stability. The coracoclavicular ligament composed of the conical and trapezius ligaments forms the core of the static stable structure of the acromioclavicular joint [7,8]. Their coordination with an intact coracoid structure can limit the acromioclavicular movement. If the coracoid structure is damaged, the acromioclavicular joint will lose its stability. Patients will experience shoulder ringing, pain, and limited movement [9,10].

The main mechanism of acromioclavicular joint injury is the extreme adduction of the shoulder when touching the ground, while the clavicle maintains a normal anatomical position due to the interlocking of the sternoclavicular ligament; at this point, the scapula adducts, the acromion and coracoid displaced below, resulting in Coracoclavicular ligament, acromioclavicular ligament and other tears. At this time, the acromioclavicular joint may have different degrees of damage from relaxation to tear. The coracoid fracture is mostly caused by strong elbow flexion of patients and short head pull of biceps muscles after injury [11-13]. We believe that this patient had further internal rotation and adduction during the collapse, impacted the coracoid process, and a strong elbow pulling caused simultaneous injury of the ligament and coracoid process in the final patient.

For the simple acromioclavicular joint dislocation, we applied the distal clavicle hook plate fixation. This mode of fixation has yielded beneficial results in the vast majority of patients with acromioclavicular dislocation. However, due to its mechanical stimulation, the hook plate may lead to subacromial impact, acromial dissolution, and even acromial fracture and osteoarthritis complications [14]. Here, we attempt to utilize an elastic-fixation scheme. Elastic fixation of the parenchyma is mimicking the action of the coracoclavicular ligament. Stability of the acromioclavicular joint using nonabsorbable sutures. Elastic fixation is more in line with shoulder biomechanics than rigid fixation and hardly causes secondary acromioclavicular joint impingement. However, elastic fixation requires a complete "anchor point" of the coracoid, which is why elastic fixation was not considered in this patient.

For coracoid fractures, the purpose of surgery is to restore its stability and provide the basis for reattachment of the coracoid ligament. Due to its special anatomical structure and rare incidence of disease, this fracture is prone to miss diagnosis. For patients with periarticular injuries, clear preoperative shoulder CT thin scans can have an important impact on our clinical decision making. For coracis base fractures (Eyres-IV), according to the principle of AO fixation, it can basically solve this problem. During the operation, more attention is paid to the direction of the screws and the protection of the surrounding important structures.

Intraoperative ligament reconstruction, especially double-bundle anatomical reconstruction, is more conducive to restore physiological structures. But look from the following two aspects, still have its drawbacks: 1. Increased operative time and surgical trauma. Precise positioning, the selection and preparation of autologous tendons have increased the surgical steps. 2. In addition, for doctors with little experience, during the tunnel preparation process and early after surgery, the artificial destruction of local bone structure resulted in the risk of clavicle and coracoid fracture during surgery or rehabilitation.

Whether it is dislocation or coracis fracture, the purpose of surgery is to restore the shoulder function as early as possible and prevent traumatic arthritis and joint stiffness. We believe that 3 weeks after surgery is mainly detumescence to improve the local inflammatory response and pain. External booth fixation can avoid prolonged adduction of joint capsule contracture. This stage needs to emphasize the recovery of the elbow and wrist joint flexibility. After 3 weeks, the cartilage scab at the fracture end has formed an initial coverage, and the passive joint stretching and active muscle contraction under protection can gradually stimulate the recovery of the function of various tissues around the shoulder joint.

Conclusion

Dislocation of the acromioclavicular joint with coracoid fracture is rare. Our study highlights the importance of accurate diagnosis and preoperative assessment of anatomical structures. In normal circumstances, choosing a suitable surgical method can avoid most postoperative complications.

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