

Isolated traumatic fracture of acromion treated with tension band fixation (case report)

Abstract

Fracture and acromion, lateral projection of scapular spine, is an uncommon injury which is often diagnosed late. Though, usually managed conservatively, the indications for surgery in these fractures are very specific. We are reporting on a 56-year-old active woman with an isolated displaced base of acromion fracture treated by tension-band wire fixation which resulted into uneventful union, and obtained good shoulder Constant Score and UCLA shoulder score.

Keywords: Acromion, Bone Fractures, Scapula, Fracture Fixation.

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Introduction

Trauma to the superior shoulder, such as the strain of overwork, and any complications related to the reverse total shoulder arthroplasty procedures can all directly or indirectly cause acromion fractures. Approximately 8% of all scapular fractures have acromion fractures included in them, which makes it a rare fractures happening with the fractures of ipsilateral glenoid, neck and body of the scapula as a result of severe injuries⁽¹⁾. Recently, 5-6.9% of reverse total shoulder replacement has been shown to be associated with the acromion fractures. Diagnosis and treatment strategies in patients with traumatic acromion fracture are difficult⁽²⁾. Accordingly, three classifications have been considered for acromion fracture: 1. Ogawa and Naniwa classification which is divided into type 1 comprising lateral scapular spine and type II located in the spinoglenoid notch. 2. Kuhn classification including minimally displaced as type I fracture and displaced without any reduction in subacromial space as type II and a reduction in subacromial space as type III. 3. AO/OTA classification based on comminution and displacement levels⁽³⁾. Herein, we aimed to present a case of acromion fracture treated with tension band fixation.

Case Description

A 56-year-old female, following a car accident, referred to our hospital with acute pain in the right superior shoulder making her unable to move the shoulder. Right shoulder passive and active motion was severely painful and limited. Initial neurological and vascular evaluation showed no damage. Simple radiography showed no specific fracture. However, due to the severity of pain, more tests were required. Therefore, CT scan was performed and a displaced fracture at the base of acromion was finally detected (Figure 1). The patient was prepared for an open surgery with open reduction and internal fixation

(ORIF) of right acromion fracture. After a general anesthesia, an incision from anterior to posterior site of acromion was opened and fracture was visualized. Tear of deltoid muscle was not seen although a partial rupture of the rotator cuff was detected which was repaired. Subacromial bursa was removed. Tension band fixation of acromion fracture produced a stable bone.

Post-operative period was without complications. active movements and progressive exercises were initiated 3 weeks after the surgery within the limits of pain tolerance. After initial radiographs, six weeks, and 12 weeks post-operative radiographs showed acceptable reduction with a Open sub-acromial space. Bony union was evident by 12 weeks. At 12

months post-operative, the tension band was removed. The patient's shoulder function was evaluated using the University of California, Los Angeles (UCLA) Shoulder Rating Scale and the Constant- Murley Score at weeks 6, 12, 24, and 64 postoperative. The scoring progression was recorded

as follows: a score of 11 at week 6, 17 at week 12, 30 at week 24, and 32 at the final evaluation at week 64. During the final follow-up at week 64, the patient demonstrated excellent improvement in active shoulder movements, achieving 90 degrees of abduction and 90 degrees of flexion (Figure 2).



Figure 1: Non-revealing regular radiograph , and positive CT Scan of Right Shoulder Showing displaced Acromion fracture



Figure 2: Different views of healed acromion fracture after ORIF surgery

Discussion

The scapula, anatomically located in the posterior thoracic region, is attached to the thoracic by a group of muscles, playing a pivotal role in upper limb movements and the mechanical axis of the arm. Isolated acromion fractures without associated bony injuries caused by trauma are rare. However, some cases have been reported involving soft tissue and bony injuries surrounding the shoulder. It has been documented that less than 10% of scapular fractures are associated with acromion injuries. According to Cohen's classification, our patient was categorized as Type II, for which surgical intervention was performed⁽⁴⁾. It is worth to mention that such fractures generally heal without complications but

may lead to issues such as shoulder pain and functional disability. High nonunion rates have also been reported for this fracture type. To diagnose fractures associated with acromion injuries, serial trauma radiographs, including anteroposterior, axillary, and lateral shoulder views, are performed. CT scans with three-dimensional(3D) reconstruction are often crucial for detecting acromion fractures and are instrumental in determining and planning the appropriate treatment approach. In this case, we used X-rays and CT imaging for patient evaluation. The primary objective of our surgical intervention was to achieve reduction of the lateral acromion fragment, restore the subacromial space, provide stable fixation to counteract the forces exerted by shoulder muscles, and establish favorable mechanical conditions for faster bone healing. Open surgery is

considered the traditional method for treating acromion fractures, primarily aimed at preserving active shoulder mobility. Advanced fixation techniques have also been recommended and employed in recent surgical practices^(5,6). Cohen advocates for open surgical intervention in Type II fractures that restrict the subacromial space, symptomatic stress fractures, and painful fractures that exhibit nonunion⁽⁷⁾. Bauer et al emphasized that patient factors such as age, daily activity levels, general health status, and the degree of acromion displacement are critical determinants in the decision to proceed with surgical intervention⁽⁸⁾. Similarly, Hess et al concluded that patient-specific factors, particularly daily activity levels, play a key role in selecting the appropriate treatment strategy. Open reduction and fixation (ORIF) is the most reasonable approach for treating active adults who need a rapid return to work⁽⁹⁾. In this case, the patient was a highly active middle-aged woman, which led to the decision for surgical intervention. The open reduction was performed using tension band wiring to achieve Strong fixation. Postoperatively, the patient demonstrated significant functional improvement, regaining pre-injury activity levels without any signs of surgical site infection. Our findings are consistent with those of Harris et al. (2011), who reported that tension band wiring with two parallel pins is the most effective technique for managing acromion fractures⁽¹⁰⁾. Similarly, Wahlquist et al (2011) concluded that open surgery with tension band wiring offers an optimal surgical approach for patients with acromion fractures⁽¹¹⁾. Hill et al emphasized the necessity of open surgery in cases such as subacromial space narrowing, symptomatic adhesions, open fractures, displacements exceeding 1 cm, and neurovascular compromise in the shoulder complex⁽¹⁾. The choice of implants for acromion fractures depends on the fracture type and includes cancellous screws, narrow dynamic compression plates, 3.5-mm cortical screws, locking plates, smooth or threaded pins, and tension band wiring. Acromion fractures have also been treated using anatomical clavicle plates^(1,12-16). In our patient, no complications associated with the surgical procedure or the use of tension band wiring were observed. Functional recovery was assessed using the UCLA Shoulder Rating Scale and the Constant-Murley Score, with significant improvements noted at each follow-up visit.

Conclusion

In this case report, we found that using open reduction and internal fixation with tension band fixations is correlated with the healed acromion fracture. One of the advantages of using tension band fixations is the possibility of shoulder movements soon after surgery which reduces the risk of stiffness of shoulder in the affected patients.

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