

Floating Shoulder: Ipsilateral Clavicle, Scapular Body And Glenoid Fracture. A Case Report

Mehmet Elmadag, MD, Hasan H Ceylan, MD, Kerem Bilsel, MD, Mehmet Erdil, MD

Department of Orthopedics and Traumatology, Bezmialem Vakif University, Istanbul, Turkey

ABSTRACT

We present a case of shoulder instability following a traffic accident. Allman Type I midshaft clavicle, Ideberg Type II glenoid and DeCloux Type I scapular body fractures were diagnosed following radiologic examination. There were no signs of ligamentous injury. Mechanical instability was noted at the shoulder due to breakage of the supportive bony skeleton. The patient was treated surgically with plate and screw fixation. Surgical fixation allowed early postoperative physiotherapy and rehabilitation. This rare injury and its treatment options are discussed in the light of current literature.

Key Words:

floating shoulder, scapula, clavicle, glenoid, mechanical instability

INTRODUCTION

A case of ipsilateral mid-clavicular, scapular body and glenoid fracture is discussed. This condition is known as "floating shoulder", because of the inability to control the upper extremity due to mechanical instability resulting from the injury^{1,2,3}. In such cases, mechanical stability of the suspensory structures (i.e., muscles and ligaments) that cover the shoulder joint are disrupted due to breakage of the supportive bony skeleton. The clavicle displaces laterally and the glenoid fragment posteromedially when the weight of the arm pulls the shoulder.

CASE REPORT

A 30-year-old man presented at the emergency services unit following a public bus accident. After stabilisation of vital signs, the patient was sent to the orthopaedic department because of a swollen right shoulder joint. There was numbness around the ulnar nerve innervation area, typical for high energy trauma to the shoulder girdle, but no other neurovascular problems noted. Allman Type I midshaft clavicle, Ideberg Type II glenoid and DeCloux Type I scapular body fractures were diagnosed following radiologic examination. There were no signs of ligamentous injury.

The patient was hospitalised with a diagnosis of right floating shoulder. We treated this unusual injury by open reduction and internal fixation of the bony skeleton. The patient underwent general anaesthesia and was positioned supine on the operating table with the clavicle fracture exposed. A transverse incision was performed along the clavicle. After reduction, internal fixation of the fractured clavicle was accomplished using an anatomical plate and locking screws. The patient was then moved to a prone position and the scapular body was exposed via a modified Judet posterolateral incision. A custom-made scapula reconstruction plate was used for rigid fixation of the scapular body and lateral column. Lastly, the glenoid fracture was reduced and fixed using a cannulated screw under fluoroscopy guidance.

The patient was discharged after a three-day postoperative observation. After two weeks, pendulum exercises were prescribed. In the sixth week, the arm sling was removed and the patient was allowed to use his arm freely. No postoperative complications were seen. The patient returned to work and daily life activities after two months. At the eighth postoperative week, the patient's score on the Disabilities of the Arm, Shoulder and Hand (DASH) Questionnaire was 15 and the Western Ontario Shoulder Instability Index (WOSI) score was 214 (10.2%); active flexion was 120° and abduction was 80°.

DISCUSSION

Typically, ipsilateral clavicle and scapular neck fracture combinations are described as floating shoulder¹⁻⁵. However, recent biomechanical studies show that coracoacromial and acromioclavicular capsular ligament disruption is required for a floating shoulder diagnosis³. Ipsilateral fractures of the scapular neck and the clavicular shaft does not warrant a floating shoulder injury unless ligamentous injury is also present. Scapular fractures are indicative of high-energy direct trauma to the shoulder with traffic injuries as the most common cause of such injuries³. Direct anteroposterior and scapular Y radiographic views are helpful for diagnosis of floating shoulder. In case of suspicion without radiographic confirmation, computerised tomography (CT) can be helpful.

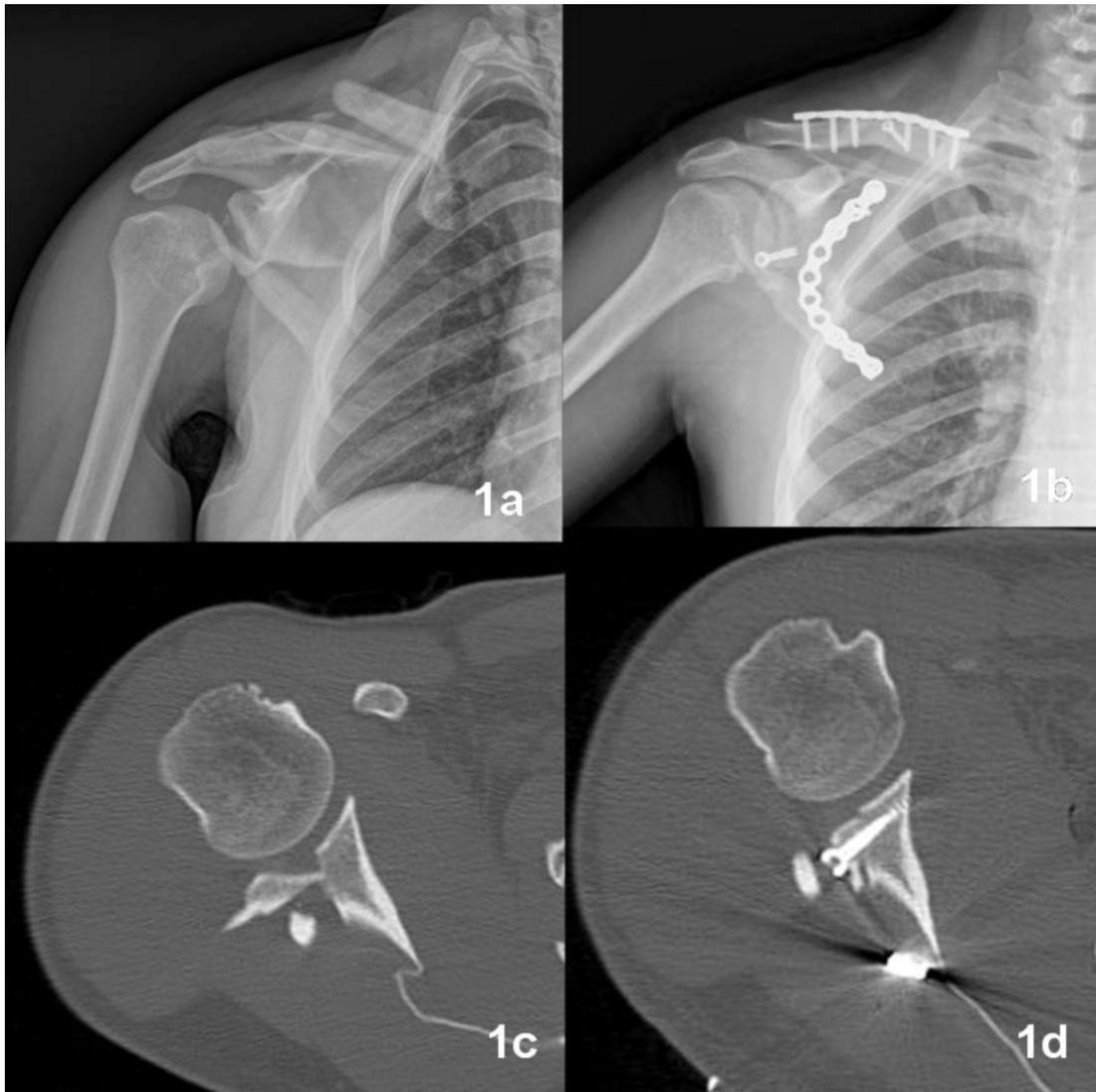


Fig. 1: (1a) Preoperative x-ray examination, (1b) Postoperative x-ray examination, (1c) Preoperative CT imaging, (1d) Postoperative CT imaging.



Fig. 2: Postoperative one year follow-up clinical photos of the patient.

Fractures of the scapula occur mainly from direct trauma involving considerable violence and associated injuries of the shoulder and thorax. Such patients should therefore be examined carefully for additional or more extensive injuries problems. In most cases, early functional treatment of fractures of the shoulder region gives good or excellent results. Operative versus non-operative management of these cases remains a controversial issue. Current literature reports show good to excellent results for both of these treatment methods^{4,5}. Ada *et al.* reviewed 113 cases and reported poor functional outcomes for nonoperatively treated scapular neck fracture cases⁴. In contrast, Edwards *et al.* reported excellent results with conservative treatment for 20 consecutive patients. Five of these patients had glenoid fractures which were displaced more than 5 mm⁴.

However, operative treatment may be indicated, especially with displaced intra-articular fractures, fractures of the glenoid rim with humeral head subluxation, or unstable fractures of the scapular neck^{1,3}. Van Noort *et al.* suggest that non-operative treatment should be considered in the absence of caudal dislocation of the glenoid fracture⁴. Lantry *et al.* conclude that displacement of the glenoid fracture greater than 5 mm is an acceptable indication for surgical treatment despite an ipsilateral clavicle fracture⁴. Due to rotator cuff impairment, abduction deficits and pain may be seen in displaced glenoidal rim fractures.

Some authors recommend surgical intervention in all circumstances¹. Internal fixation of the fractured clavicle is recommended to prevent late deformity and researchers suggest that this is sufficient for maintaining stability of the shoulder girdle and preventing scapular malunion¹. Hashiguchi and Ito⁵ reported excellent results with surgical fixation of the clavicle only, whereas Noort *et al.*⁴ claim just the opposite.

Operatively treated shoulders are deficient in external and internal rotation, but differences when compared to the contralateral shoulder were not statistically significant². Earlier initiation of mobilisation and physiotherapy is one of the main advantages of surgical management.

Patients diagnosed with floating shoulder injuries should undergo surgical treatment. The aim of surgery is to restore the joint, which allows for early motion and effective physiotherapy exercises of the shoulder. Treatment methods may vary for each patient.

As management of floating shoulder is controversial according to the current literature, treatment options are still open to possible changes. Both surgical and conservative treatment can give good results^{1,5}. Protocols used are related to the experience of the surgeon and patient expectations. Prospective, multicentre studies can add clinically important information to enable treating physicians to choose the optimal treatment for these injuries.

REFERENCES

1. Owens BD, Goss TP. The floating shoulder. *J Bone Joint Surg Br.* 2006; 88(11): 1419-24.
2. Egol KA, Connor PM, Karunakar MA, Sims SH, Bosse MJ, Kellam JF. The floating shoulder: clinical and functional results. *J Bone Joint Surg Am.* 2001; 83(8): 1188-94.
3. Williams GR Jr, Naranja J, Klimkiewicz J, Karduna A, Iannotti JP, Ramsey M. The floating shoulder: a biomechanical basis for classification and management. *J Bone Joint Surg Am.* 2001; 83(8): 1182-7.
4. Lantry JM, Roberts CS, Giannoudis PV. Operative treatment of scapular fractures: a systematic review. *Injury* 2008; 39(3): 271-83.
5. Hashiguchi H, Ito H. Clinical outcome of the treatment of floating shoulder by osteosynthesis for clavicular fracture alone. *J Shoulder Elbow Surg.* 2003; 12(6): 589-91.