SCRIPTA MEDICA (BRNO) – 77 (1): 3–10, *February 2004*

BILATERAL CLAVICULAR AND SCAPULAR NECK FRACTURES. CASE REPORT

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Received after revision February 2004

Abstract

The purpose of the report is to present a very rare case of unstable clavicular and scapular neck fracture of both shoulder girdles.

A 24-year-old female sustained a double floating shoulder injury and a fracture of one rib in a road-traffic car accident. She was operatively treated with open reduction and internal fixation of both bones on the one side and with only clavicular stabilization on the other with 3.5 mm reconstruction plates 4 hours after the injury. The plates were removed one year after the operation.

Two years after the injury at the last checkup, the patient was satisfied with the result of the treatment. The function of the shoulder at the time was evaluated using the scoring system of Constant and Murley (1), and it was the same on both sides (88 points). A radiograph after removal of the metal revealed clavicular union in mild displacement without functional influence on one side.

The conservative treatment affords good results in cases with nondisplaced fractures. In the case of bilateral unstable fractures treated surgically, an excellent result was found after operative treatment.

Key words

Bilateral floating shoulder, Surgical treatment

INTRODUCTION

Fractures of the scapula are not frequent, but can be seen with increasing frequency in high-energy injuries. Open reduction with or without internal fixation is rarely required for these fractures. Most of them can be treated by supporting the upper extremity in a sling with early active motion. On the other hand, clavicle fractures are one of the most common bone injuries, though they too do not very often require open reduction.

Both the scapula (the coracoid and acromion processes, the glenoid or the neck) and the clavicle (its lateral part) are important parts of the superior shoulder girdle suspensory complex, which also consists of soft tissue structures (acromioclavicular, coracoacromial, and coracoclavicular ligaments). In fractures of both the neck of

scapula and the clavicle, the suspensory complex tends to be unstable and may require operative stabilization. The injury is then often called "floating shoulder". Because of blunt trauma it is associated, in one fourth of the patients, with injury of the ipsilateral chest wall and lung. But in spite of the great force in the majority of cases one of the above-named ligaments remains intact and holds the distal fragment together with the proximal fragment. This fact usually produces the radiological finding of nondisplaced or minimally displaced scapular neck fracture.

We have to distinguish between stable and unstable extra-articular fracture patterns. We consider the parallel fractures of the scapular neck and the clavicle to be unstable when they are accompanied by fractures of the scapular spine or the coracoid process. If it is not the case, then the coracoacromial and/or coracoclavicular and/or acromioclavicular ligaments have to be disrupted to create a floating shoulder. These combinations may make the entire shoulder girdle unstable and give it a tendency to rotate caudally due to the weight of the arm. The inserting triceps muscle attachment at the infraglenoid tubercle may pull the glenoid fragment distally and tilt it laterally.

CASE REPORT AND METHODS

A 24-year-old female sustained an injury of both shoulder girdles in a road-traffic car accident. Radiographs revealed clavicular and scapular neck fractures of both shoulder girdles (bilateral floating shoulder injury) and a fracture of one rib. No other bone injury was detected. No symptoms of associated palsy of the brachial plexus were diagnosed.

A true AP x-ray view was used to assess the displacement of the fractures. The scapular neck fracture was significantly displaced on one side and only slightly displaced on the other. Both clavicular fractures were located in the middle third of the clavicle and were displaced (*Fig. 1*). Both shoulders had associated injuries of the acromioclavicular and coracoacromial ligaments.

The patient was operated on 4 hours after the injury. In this case, the patient was operatively treated with open reduction and internal fixation of both bones on one side and with only clavicular stabilization on the other. Surgical treatment on the side of only small scapular neck fracture displacement was used because of bilateral involvement.

The first step to restore the shoulder girdle stability was to fix the clavicle with a 3.5 mm 6-hole reconstruction plate (Synthes) through a transverse incision. No bone graft was used. To stabilize the persisted displaced scapular neck fractures after clavicular osteosynthesis the posterior approach was used. The buttress 3.5 mm 5-hole reconstruction plate (Synthes) was applied with the use of standard AO techniques and principles. Then, the second clavicle was stabilized in the same manner (*Fig. 2*). The operating time was 145 minutes.

Postoperatively, passive mobilization and strengthening exercises were started on the 5th day after the operation. The entire range of the motion restoration programme was started after the removal of stitches (12 days after the operation). The length of stay in hospital was 14 days.

The patient was monitored at regular intervals. All four girdle fractures healed. The plates were removed one year after the operation. A radiograph after removal of the metal revealed clavicular union in mild displacement on one side (*Fig. 3*). The follow-up period to the last clinical checkup was 24 months. The function of the shoulder at that time evaluated using the scoring system of Constant and Murley (*1*) was the same on both sides (88 points). The score for pain was 15 points and that for strength 25 points. The functional score was 16 and the the motion range score was 32 points. Muscle power assessed manually was also equal. No "drooping" of the injured shoulder was observed.

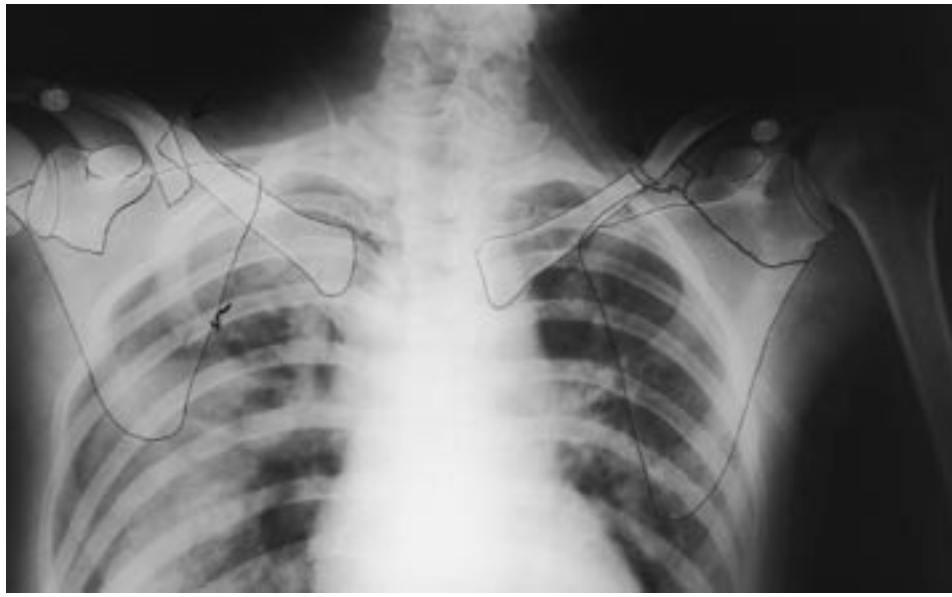


Fig. 1
A preoperative AP radiograph with illustrative drawing shows bilateral injury: severely displaced scapular neck fracture with clavicular fracture on the right, minimally displaced clavicular and scapular neck fractures on the left side.

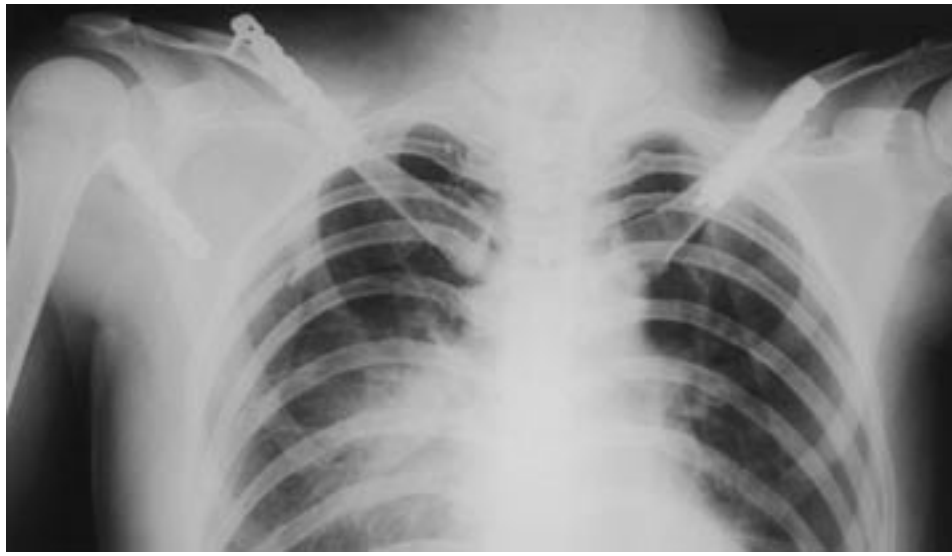
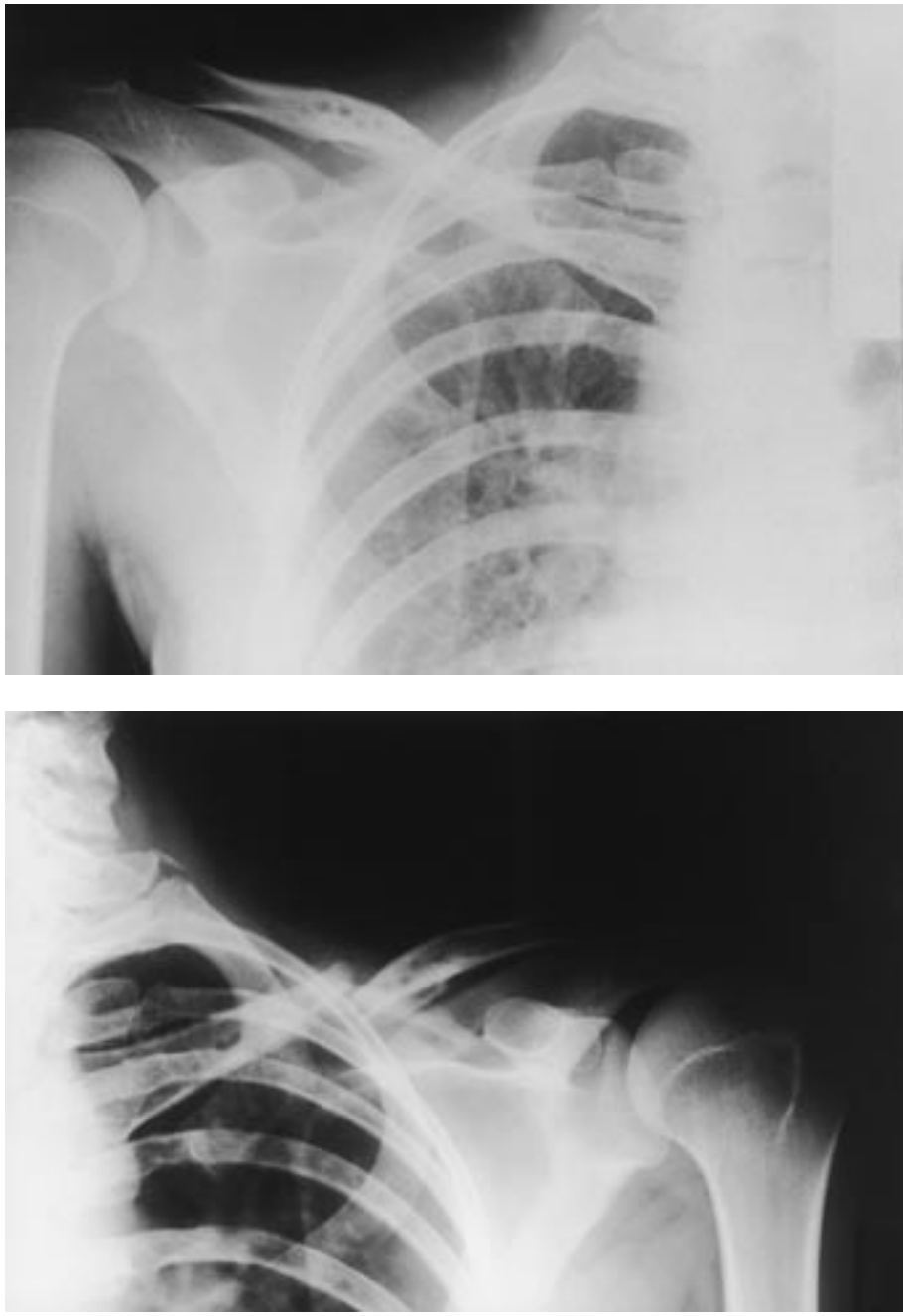


Fig. 2
Postoperative appearance after reduction and stabilization using the buttress 3.5 mm reconstruction plates. The left shoulder girdle was stabilized because of bilateral affection.



Figs. 3 a, b
Radiographs of both sides after removal of metal.

DISCUSSION

Nonoperative treatment is mostly recommended for fractures of the scapula (*2*). The operative procedure is rarely required. A distinct situation is in patients with displaced fractures of the glenoid (*3*) and displaced ipsilateral fractures of the scapular neck and clavicle. The indication for floating shoulder operative management is usually a severely displaced fracture of the scapular neck with an angulation greater than 40° or a displacement greater than 1 cm. In these cases some authors recommend open reduction and internal fixation to reduce the incidence of a foreshortened extremity with muscular weakness and the potential for chronic brachial plexopathy *(4-7*).

In 2001, *Williams Jr. et al.* (*8*) presented a complex biomechanical study of human cadavers to determine the contributions of the clavicle and the coracoclavicular, acromioclavicular, and coracoacromial ligaments to the stability of ipsilateral scapular neck fracture and clavicular fracture. They concluded that this injury did not cause a floating shoulder without additional disruption of the coracoacromial and acromioclavicular capsular ligaments. Acromioclavicular ligament disruption is easy to diagnose with physical examination and routine radiography. When the coracoacromial ligament disruption is also present, the scapular neck fracture and clavicular fracture are more displaced than are those without ligamentous disruption. Without these ligamentous lesions functional loss and deformity are not imminent.

In 1992, *Herscovici et al.* (*6)* published the outcomes of 9 cases with a mid-shaft clavicular fracture and an ipsilateral scapular neck fracture with an average follow-up period of 4 years. All the fractures united. Seven patients had been treated surgically with stabilisation of the clavicle and all were rated as excellent at review. Of the two patients treated conservatively one had a good and one a poor result. However, both of them showed “drooping”of their injured shoulders.

In 1993, *Leung and Lam* (*7*) reviewed the results of 15 men with displaced scapular neck fracture and concomitant ipsilateral clavicular fracture with an average follow-up period of 2 years. All cases were treated with open reduction and internal fixation of both fractures. Eight patients had excellent results, 6 had good results, and 1 had a fair result. All fractures healed at an average of 8 weeks postoperatively. They concluded that operative treatment was safe and yielded predictably good results. They emphasized fixation of both fractures because of greatly facilitated postoperative rehabilitation.

In 1995, *Rikli et al*. (*9*) reported on the operative treatment of 12 cases with displaced scapular neck and clavicular fractures. All cases had been treated surgically, 1 with open reduction and internal fixation of both the scapula and the clavicle and 11 with stabilisation of only the clavicle. In all cases good results were reached.

In 2001, *Egol et al*. (*10*) evaluated retrospectively 19 patients who had sustained a displaced fracture of the scapular neck with an ipsilateral clavicular fracture or

acromioclavicular separation. This was the first study comparing the clinical and functional outcomes of operative and nonoperative treatment of floating shoulders, but the numbers of the patients were not large enough to generate statistically significant results. Twelve patients were treated nonoperatively and 7 with surgical stabilization. The operative procedures consisted of fixation of both the scapular fracture and the clavicular or acromioclavicular joint injury with plates and screws. Good results were found after both operative and nonoperative treatment. Therefore, the authors cannot universally recommend operative treatment for a double disruption of the suspensory shoulder complex.

The results obtained in our study show that conservative treatment provides very good results in cases with nondisplaced fractures. This method of treatment in fractures with fragment displacement gives poorer outcomes, and especially strength and range of motion are reduced. In cases with displaced fractures treated surgically, similar results were found as in shoulders with nondisplaced fractures treated conservatively. Consequently, we recommend operative treatment for the double disruption of the suspensory shoulder complex only in displaced cases. If surgery is contraindicated in these patients, e.g. because of polytrauma, we have to take into account the possibility of reduced strength and range of motion

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OBOUSTRANNÁ ZLOMENINA KLÍČNÍ KOSTI A LOPATKY KAZUISTIKA

S o u h r n

Cílem kazuistiky je ukázat velmi vzácný případ nestabilní zlomeniny klíční kosti a krčku lopatky obou ramenních pletenců u téhož pacienta.

24-letá žena utrpěla oboustranné poranění a zlomeninu jednoho žebra při automobilové nehodě. Byla léčena 4 hodiny po úrazu operačně otevřenou repozicí a vnitřní fixací 3,5 mm rekonstrukční dlahou, a to obou kostí na jedné straně a pouze klíční kosti na straně druhé. Dlahy byly odstraněny za rok do uvedeného výkonu.

V době poslední kontroly, tj. 2 roky po poranění, byla pacientka spokojená s výsledkem operační léčby. Při klinickém hodnocení podle *Constanta a Murleye* (1) bylo dosaženo oboustranně 88 bodů. Radiologická kontrola po odstranění kovového materiálu prokázala na jedné straně zhojení klíční kosti v mírném posunu, ale bez vlivu na funkční výsledek.

Konzervativní léčba poskytuje dobré výsledky v případech stabilních poranění. V daném případě byla operační léčba indikována pro nestabilitu poranění a pro oboustranné postižení.

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