Anterior dislocation of the shoulder with rotator cuff injury and brachial plexus palsy: A case report

Jean-Noël Goubier, MD, MS,[a] Louis-Denis Duranthon, MD, MS,[b] Eric Vandenbussche, MD, PhD,[b] Raoul Kakkar, MD,[a] and Bernard Augereau, MD,[b] *Paris, France*

Anterior dislocation of the shoulder with associated rotator cuff rupture and brachial plexus injury is rare. To our knowledge, it has been reported only three times in the literature.[4,6,7] However, in the previous cases, the rotator cuff injury was diagnosed and treated 3 weeks after the injury. We present a case of this unhappy triad in which the rotator cuff tear was confirmed and repaired acutely. The characteristics of this rare condition are discussed on the basis of our case and the published literature in order to improve early diagnosis and treatment of this lesion.

CASE REPORT

A 27-year-old right-handed male model was involved in a high-energy motorcycle accident and presented with an anteromedial dislocation of the left shoulder. The clinical examination showed complete motor and sensory deficit of the upper limb without a Horner's sign. The radial and ulnar pulses were palpable. A closed reduction was performed with the patient under anesthesia. Standard radiographs of the shoulder revealed a concentric joint position, a Hill-Sach's lesion, and a small fracture of the superior part of the greater tuberosity (Figure 1). Therefore, magnetic resonance imaging (MRI) was performed to confirm any rotator cuff injury. MRI showed a rupture of the distal part of the supraspinatus and infraspinatus tendons (Figure 2) without muscular atrophy or degenerative lesions. The brachial plexus could not be studied on MRI simultaneously because of the different parameters of recording. Operative repair of the rotator cuff tear was chosen.

At surgery, a distal rupture of the supraspinatus and infraspinatus tendons was present. No signs of rotator cuff lesions were noted. The cartilage of the glenoid and humeral head was found to be normal. The tendons were repaired with transosseous sutures without any tension. After the operation, the upper extremity was placed in a sling and passive range-of-motion exercises were initiated. After 6 weeks, which allowed time for tendon healing, the patient was started on a program of active movement.

After 3 weeks, electromyography was performed; nerve conduction confirmed the retroclavicular brachial plexus palsy. Twelve months after surgery, active shoulder abduction and forward elevation were 160° and external rotation was 40°. The triceps and biceps muscles were quoted at M4, and the patient recovered wrist and finger flexion and extension.

DISCUSSION

Anterior shoulder dislocation may be commonly associated with retroclavicular or infraclavicular brachial plexus injury with an axillary nerve lesion.[1,3,4,6–9,12] Moreover, anterior shoulder dislocation may be associated with rotator cuff tears in elderly patients.[9,10] However, cases of concurrent anterior shoulder dislocation and brachial plexus injury with a traumatic rotator cuff tear are extremely rare.[4,6,7] In our case, the brachial plexus injury was due to an anteromedial shoulder dislocation, as described previously.[9] Nerve injury with a shoulder dislocation has been reported to occur after low-velocity trauma, because the distance between the anchorage points of nerves in the upper limb is short, which makes the nerves vulnerable to traction.[12] However, in our case, rotator cuff injury associated with nerve lesions reveals a high-energy injury, resulting in a violent shoulder dislocation with significant migration of the humeral head. As a matter of fact, the patient in our case was younger than those in other publications, and the lesion of the rotator cuff cannot be explained by chronic tears of the tendons.[10] Moreover, no muscular atrophy was visualized on MRI, and no tendon degeneration was noted during surgical repair of the rotator cuff.

The rotator cuff tear in this unhappy triad is rarely diagnosed in the emergency department, and in most of the published cases, the diagnosis was confirmed 3 weeks after the injury when rehabilitation was started.[4,6,7] As a matter of fact, the diagnosis of a rotator cuff tear is difficult to confirm after reducing an anterior shoulder dislocation. However, the inability to abduct after shoulder dislocation points to a rotator cuff rupture or retroclavicular or infraclavicular brachial plexus palsy or both.[6,12] In our case, a small fracture of the greater tuberosity aroused the suspicion of a supraspinatus tendon injury, and the diagnosis was confirmed with MRI. Therefore, in the case of a brachial plexus palsy associated with an anterior dislocation of the shoulder, standard radiographs of the shoulder after reduction have to be minutely examined. MRI or computed to-

From the [a]Service de Chirurgie Orthopédique et Traumatologique, Urgences Mains, Hopital Bichat-Claude Bernard, and [b]Service de Chirurgie Orthopédique et Traumatologique B, Hopital Européen Georges Pompidou.

Reprint requests: Jean-Noël Goubier, MD, MS, Service de Chirurgie Orthopédique et Traumatologique, Urgences Mains, Hopital Bichat-Claude Bernard, 46 rue Henri Huchard, 75877 Paris Cedex 18, France. (E-mail: *goubjnal@club-internet.fr*).

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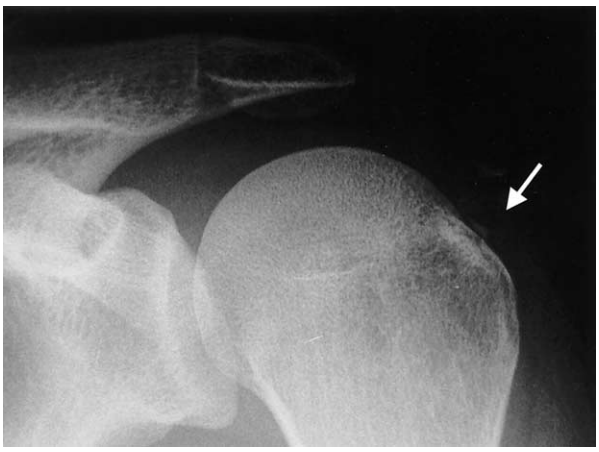

Figure 1 Radiograph of injured shoulder revealed a fracture of the greater tuberosity allowing the diagnosis of supraspinatus tear (*arrow*).

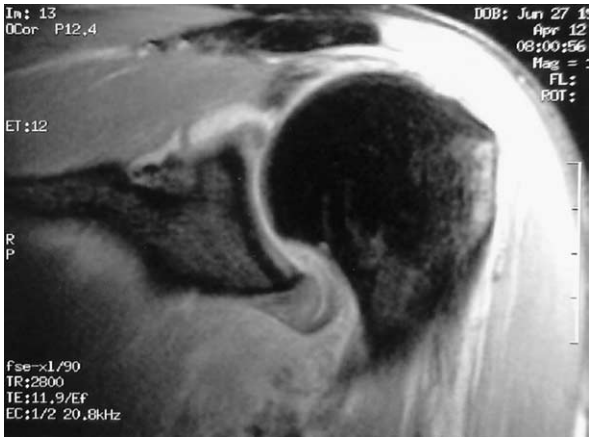

Figure 2 Magnetic resonance image of the rotator cuff showed a rupture of the insertion of the supraspinatus and infraspinatus tendons on the greater tuberosity.

mography arthrography has to be performed early to program surgical repair. In addition, the rotator cuff should be systematically studied in cases of brachial plexus palsy to avoid needless nerve surgery. Moreover, rotator cuff tears may probably increase the inferior prolapse of the humeral head when associated with nerve injuries. Electromyography must be proposed 3 weeks after the injury in the case of severe palsies or paralysis of the upper limb associated with a shoulder dislocation.[12] Clinical examination of the shoulder muscle function is difficult to determine in the emergency department because of the associated shoulder dislocation and rotator cuff lesions. Therefore, electromyography allows us to verify the innervation of the supraspinatus and infraspinatus muscles that is normal in retroclavicular or infraclavicular brachial plexus injury. In the case of total brachial plexus palsy (associated with anterior shoulder dislocation and rotator cuff tear) confirmed by electromyography, MRI or computed tomography scan must be performed in order to diagnose root avulsions. However, to our knowledge, no case of all of these lesions occurring simultaneously has ever been described in the literature.

The treatment of an anterior shoulder dislocation is well defined: closed reduction of the shoulder dislocation under anesthesia. However, the rotator cuff tear has to be repaired early to improve functional recovery and avoid fatty degeneration of shoulder muscles.[5] Rehabilitation is performed after a period of immobilization of 6 weeks in a splint with moderate abduction and neutral rotation. In the case of complete infraclavicular brachial plexus palsy, a program of hand, wrist, and elbow mobilization has to be started.

The prognosis of this unhappy triad has been principally established for anterior dislocation with axillary nerve injuries.[2–4,6–9,11] The results are favorable in all publications, with complete range of motion of the shoulder and return to previous activities.[4,6,7] In our case the nerve lesions were more serious, with complete infraclavicular brachial plexus palsy, and the return to previous range of motion and strength of the upper limb took longer than in other publications. Therefore, in our opinion, the prognosis depends essentially on brachial plexus recovery when the rotator cuff has been repaired early.

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