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CASE REPORT

Posterior dislocation fractures of the shoulder in seizure disorders—two case reports and a review of literature

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We present two patients with complaints of shoulder pain after an epileptic seizure. Both patients had a posterior dislocation fracture of the shoulder. After reviewing the literature the following conclusions can be drawn:

- (1) A posterior shoulder dislocation fracture is rare.
- (2) One should not underestimate the muscular forces in seizure disorders and be alert for dislocation fractures of the shoulder and/or other joints.
- (3) The diagnosis is frequently missed, but an axillary radiograph or a CT scan always reveals the fracture.

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INTRODUCTION

Of all shoulder dislocations only 1.5–4.3% are posterior. A posterior dislocation fracture is even rarer. In 50–80% of all cases the dislocation is only recognized after initial assessment. This means a posterior dislocation and/or fracture is often missed^{1–4}.

The main causes of a posterior dislocation fracture of the shoulder are either seizures or a direct trauma on the anterior side of the shoulder or indirect trauma by falling on the outstretched arm. Muscular forces generated during a seizure can lead to various fractures and dislocations including those of the shoulder, hip and jaw. Reports of fractures following seizures without direct trauma appear almost exclusively in the context of electroconvulsive therapy and as case reports in the orthopaedic literature in association with shoulder fractures^{1,3,5–7}.

In this paper we present two patients who were seen shortly after each other in the emergency department. They presented with complaints of pain in the shoulder and inability to externally rotate the shoulder after

a seizure. In both cases we found a unilateral posterior dislocation fracture of the shoulder.

CASE REPORTS

Case I

A 38-year-old female presented at the emergency department after having seizures earlier that evening. Her husband described the attack as follows: she started to roll her eyes, stiffened, convulsed and became unconscious. The duration of the seizures was unknown. She did not fall on her right shoulder. Further medical history was not relevant and the patient had no history of epilepsy. On arrival the patient was semi-conscious and looked anxious. Cardiovascular examination was normal. There were signs of a bitten tongue. She complained of a painful right arm and shoulder.

Neurovascularly the right arm was intact. An X-ray showed a posterior dislocation fracture of the right shoulder (Fig. 1). She was operated on the same evening: the dislocation fracture was reduced



Fig. 1: Trauma case I.

and stabilized with the use of two screws. Investigations for epilepsy were performed: a cerebral CT scan showed no abnormalities. An electroencephalogram (EEG) showed mild nonspecific bi-temporal abnormalities, but without clear epileptic activity. Cerebral MRI showed no abnormalities. Six months later she had a seizure again, apparently on the same day her daughter had died some years before. After a further history was taken it appeared that the patient had had previous attacks on or around the day her daughter had either been born or had died. Two years after the operation the range of movement of her shoulder is still less than the opposite shoulder but she has no problems in daily living.

Case II

A 59-year-old male was brought into the emergency department after having had a seizure. According to bystanders he fell off his bike but not on his shoulder or arm. In addition to the seizure he had lost sphincter control. A medical history revealed coronary heart disease and hypertension. Apart from the cardiac medication he used disulfiram for alcohol abuse. He had had absences previously and these were thought to be caused by a combination of disulfiram and alcohol. The patient was orientated normally on arrival but he could not remember the accident. He did not smell of alcohol. Cardiovascular examination was normal. On physical examination a posterior dislocation of the humerus was palpable. Basic blood examination was



Fig. 2: Trauma case II.

normal except for a slightly raised gamma-GT of 39 U/l. Blood alcohol was 0.1 ppm. On X-ray the head of the humerus was not only dislocated posteriorly, but also fractured in four parts (Fig. 2). A cerebral CT scan revealed some small lacunar infarcts but no signs of a large, new infarct or of a mass lesion. An EEG showed an irregular background pattern with much slow activity in the left temporal region, with some isolated sharp waves, but no clear epileptic activity. The seizure was diagnosed as an alcohol-withdrawal seizure. The dislocation fracture of the shoulder was openly reduced and immobilized with two screws. Because of post-traumatic necrosis of the humeral head (possibly also related to his alcoholism) with progressive pain a hemiarthroplasty of the left shoulder was performed. The patient has no pain but his shoulder function 2 years after the operation is suboptimal and he is hindered in his daily life.

DISCUSSION

Traumatic posterior shoulder dislocation (with or without fracture) can be caused by uncontrolled muscular contractions, as in epilepsy or other seizure disorders, electric shock therapy or spasticity. A fall on the outstretched arm or a direct blow on the anterior side of the shoulder can also cause a posterior shoulder dislocation and/or fracture. In the absence of an electrical shock or direct trauma in a patient with a posterior shoulder dislocation fracture, epilepsy or another

seizure disorder should be suspected. Bilateral posterior dislocation fractures of the shoulder are very suggestive, if not pathognomic, of a seizure disorder. In the literature a case is described of an epileptic seizure caused by a brain tumour resulting in a posterior shoulder dislocation fracture⁵.

Unilateral posterior dislocation of the shoulder is one of the most often missed diagnoses after trauma. In 50–80% of all posterior dislocations the diagnosis is missed at the first examination^{1–4}. In a series of 40 patients the mean interval between the accident and the diagnosis was 1 year⁶. During physical examination suspicion should arise of a posterior shoulder dislocation and/or fracture in patients with pain or stiffness of the shoulder after a seizure. The arm is adducted and internally rotated with inability to abduct or externally rotate. Early recognition is important for the prognosis. A long interval between trauma and therapy gives a bad outcome.

Other dislocations and fractures caused by a seizure have also been described: dislocations of the hip with or without fractures of the acetabulum or the femoral head or femoral neck, compression- or burst-fractures of the vertebrae, dislocations with or without fractures of the temporomandibular joint.

The mechanism for a posterior dislocation fracture of the shoulder during a seizure was described by Shaw in 1971³. The position of the shoulder during a seizure is one of adduction, internal rotation and flexion. In this position the humeral head is drawn cranially and posteriorly against the acromion and medially against the glenoid fossa by generalized contraction of the shoulder muscles. The infraspinatus, teres minor, deltoid, latissimus dorsi and teres major provide sufficient power to dislocate the humerus posteriorly. When a seizure has ended the head of the humerus is behind the glenoid fossa, often with a large impression fracture of the head just medially to the minor tubercle near the anatomical neck of the humerus (reversed Hill–Sachs lesion). With an ongoing seizure the anatomical neck of the humerus will be drawn to the rim of the glenoid fossa and becomes impacted and is eventually fractured. The subscapular and infraspinatus muscles draw the two fragments from each other, resulting in the typical ‘four-part fracture’ according to Neer⁷. Further comminution can oc-

cur by forceful contraction of the triceps, the coracobrachialis, the biceps and the deltoid muscles, which will pull the head of the humerus cranially to the acromion.

Radiological investigation of the shoulder joint on suspicion of posterior dislocation and/or fractures should always contain an axillary of thoracic X-ray. In a study by Hawkins *et al.* only 20 of 41 posterior dislocations were recognized with a standard AP and lateral X-ray. With the axillary X-ray the diagnosis was made in all cases⁶. It is often very difficult to take an axillary X-ray in a patient with pain and the inability to abduct. A CT scan can be very helpful in obtaining the diagnosis and in subsequent surgery.

CONCLUSION

Although a posterior fracture dislocation of the shoulder is rare it is important not to underestimate the forces that exist in a seizure, think about a dislocation fracture of the shoulder in patients with a painful shoulder after having a seizure and be alert to other fractures and/or dislocations. An aid to the diagnosis can be an axillary X-ray or a CT scan of the shoulder.

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