

Bilateral Locked Posterior Fracture-dislocation of the Shoulders due to Electric Shock

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Bilateral locked posterior fracture-dislocation of the shoulders is very uncommon. The majority of cases are caused by seizure. We report a patient with bilateral locked posterior fracture-dislocation due to electric shock; he underwent bilateral hemiarthroplasty surgery two weeks after being electrocuted. The patient was able to return to work and was satisfied with his shoulder mobility on follow-up examination 6 years after surgery. (*Mid Taiwan J Med* 2006;11:132-7)

Key words

posterior shoulder dislocation, fracture dislocation, electric shock

INTRODUCTION

Pure posterior shoulder dislocation is a relatively uncommon condition, and accounts for only 1% to 4.7% of all shoulder dislocations. Unilateral fracture-dislocation is less common, with a reported incidence of 0.9% out of every 1500 fractures and dislocations of the shoulder [1,2]. Bilateral posterior fracture-dislocation of the shoulders is even less common and convulsive seizures are the most common cause.

We present a patient who sustained locked posterior fracture-dislocations of both shoulders after being electrocuted; he was treated by hemiarthroplasty.

CASE REPORT

A 33-year-old man sustained a 440 volt electric shock on 17 October 1999. He received

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primary care for electric shock injury at a local hospital. Five days later, he presented to our hospital complaining of painful limitation of motion of both shoulders; furthermore, both of his arms were fixed against his body. Ecchymosis and swelling were noted on both shoulders. The electric inlet was located over the volar aspect of the right index and long fingers. The electric outlet was noted over the oral mucosa of the lower lip. Physical examination revealed that both shoulders and arms were tender; the patient had full motor function of both hands and wrists, but functional inability of both shoulders. Results of vascular and neurologic examinations were within normal limits. Anteroposterior (AP) and lateral radiographs of both shoulders demonstrated bilateral fracture-dislocation (Figs. 1, 2). Computed tomography (CT) confirmed the presence of a bilateral locked posterior fracture-dislocation (the right shoulder revealed a four-part fracture-dislocation and the left shoulder revealed a three-part fracture-dislocation according to the



Fig. 1. Anteroposterior X-ray of the right shoulder shows comminuted fracture of the proximal humerus.



Fig. 2. Anteroposterior X-ray of the left shoulder shows fracture of the proximal humerus.

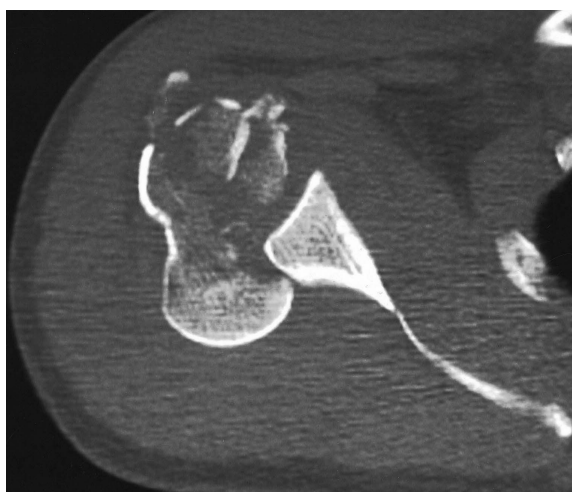


Fig. 3. CT examination of the right shoulder shows posterior locked fracture-dislocation.

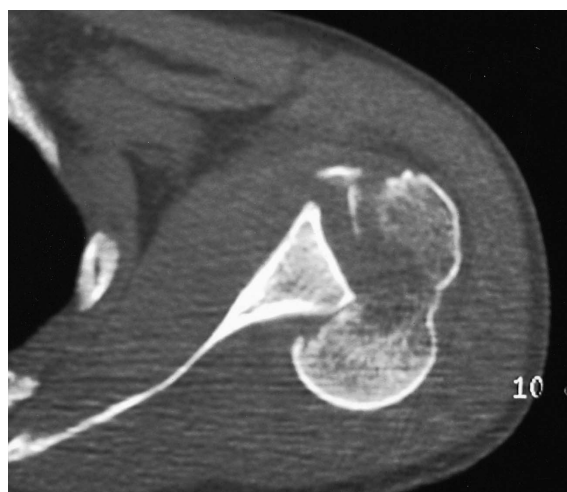


Fig. 4. CT examination of the left shoulder shows posterior locked fracture-dislocation.

Neere classification) (Figs.3,4). Hemi-arthroplasties of both shoulders was performed 14 days after injury. Surgery was delayed because of marked swelling of both shoulders and because the heart function needed to be observed.

Hemiarthroplasty was performed via an antero-lateral approach between the deltoid and pectoral major muscles. The shoulder joint was operated on after dividing the subscapularis muscle. The humeral head was dislocated posterior to the glenoid fossa and was difficult to remove because it was blocking the posterior glenoid rim; the greater and lesser tuberosities were prepared for reattachment to the shoulder hemiarthroplasty prosthesis. After the operation, the patient wore a Velpeau sling to immobilize

both arms, and gentle pendulum exercises were begun 1 week after the operation. More aggressive physical therapy began after 1 month.

The patient was quite satisfied with the surgical result at six year follow-up. X-ray showed good position of both prostheses (Figs. 5, 6). He is pain-free and has mild functional limitation of his shoulders (Fig. 7). Movement in both shoulders recovered to allow 150 degrees of flexion, 150 degrees of abduction, 70 degrees of medial rotation, 45 degrees of lateral rotation and 45 degrees of extension.

DISCUSSION

Bilateral posterior fracture-dislocation of the shoulders is a rare injury. Of the 35 cases

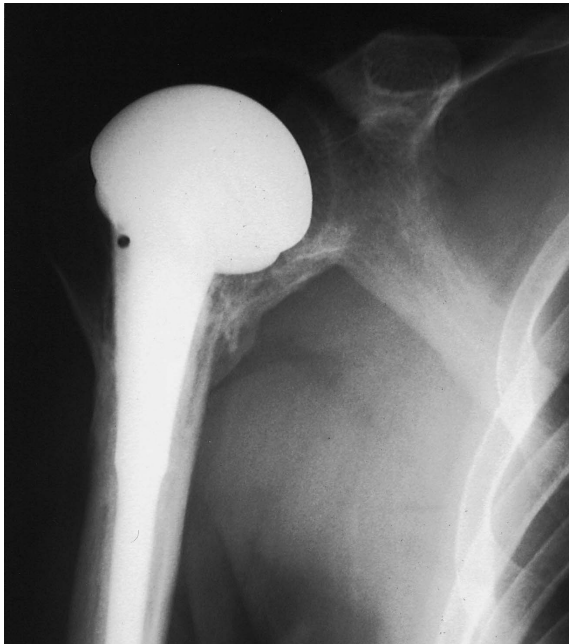


Fig. 5. Anteroposterior X-ray of the right shoulder 6 years after surgery shows good position of the prosthesis.



Fig. 6. Anteroposterior X-ray of the left shoulder 6 years after surgery shows good position of the prosthesis.

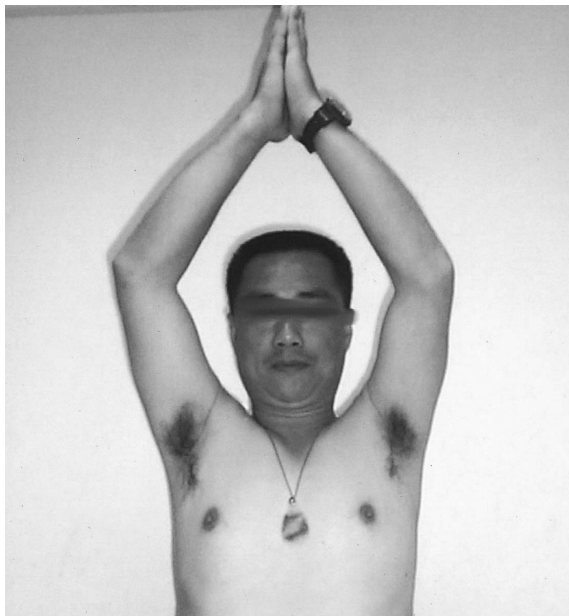


Fig. 7. Anterior view of the patient shows good range of motion of both shoulders.

which have been reported in the literature, most occurred as a result of seizure; other causes such as electrocution and extreme trauma are less common [3,4]. Our report is the third known case due to electrocution. The cause of bilateral posterior fracture dislocation of the shoulder

could be presented as the "triple E syndrome", which describes the causative factors involved in this injury: epilepsy (or any convulsive seizure, including ethanol or drug withdraw seizures), electrocution (including electroconvulsive therapy) and extreme trauma (such as motor vehicle accidents [3,4]).

The mechanism of this injury has been described as an extended injury of posterior dislocation [3]. The humeral head is forced superiorly and posteriorly over the glenoid edge as the result of adduction, medial rotation and flexion of muscle spasm. If the convulsion stops, the humeral head stays lodged behind the glenoid, often with a depression noted in the head just medial to the lesser tuberosity. With further convulsive force, however, the glenoid edge shears off the humeral head with associated avulsion of a fragment of the tuberosity caused mainly by spasm of the subscapularis and the infraspinatus muscles. Further comminution is produced by forced contraction of the triceps, the coracobrachialis, the biceps and the deltoid muscles thrusting the fragment of the humeral shaft upwards against the acromion. Thus a four-part fracture with posterior dislocation is

separated from the shaft and the two fragments of the tuberosity [5].

Initial scapular anteroposterior, lateral and axillary X-ray examinations are essential. The axillary view is difficult to perform because it requires patients to abduct their shoulders, which is not always possible after injury. It is not easy to confirm the final diagnosis by X-ray examination, especially if an axillary view cannot be obtained. Computer tomography is essential for this kind of injury and provides excellent visualization of the relationship between the glenoid and the humeral head. The presence, size, and shape of the humeral defect are well demonstrated on CT images, which is useful to the surgeon when surgical intervention is a consideration [6,7]. In our patient, we could not make an accurate diagnosis after viewing the anteroposterior and lateral view of X-ray films of both shoulders. However, a reverse Hill-Sach lesion (> 50 % of articular surface) and extreme fragmenting of both humeral heads were noticeable on CT.

There are several methods for treating posterior fracture-dislocations of the shoulder: closed reduction, open reduction and internal fixation, McLaughlin's procedure and its modifications, hemiarthroplasty, total shoulder arthroplasty, and arthrodesis, depending on a number of factors: patient age, the chance of avascular necrosis, duration of the dislocation, defect of the articular surface of the humeral head, and extent of damage to the glenoid [8].

The major arterial supply of the humeral head is via the anterior humeral circumflex artery. The vessel runs parallel to the lateral aspect of the tendon of the long head of the biceps and enters the humeral head where the proximal end of the intertubercular groove meets the greater tuberosity [9]. After a four-part fracture, open reduction with internal fixation is essential if arcuate artery is preserved. The radiographic indication for arcuate artery preservation is the attachment of the neck's medial cortex to the shaft [10].

In our experience, closed reduction is rarely successful for treating acute posterior fracture-

dislocation. Martens and Hessels [11] described a method with a small posterior arthrotomy that allowed reduction of the humeral head using a finger; however, many reports suggest treating these lesions with open reduction [3,12,13] and internal fixation or hemiarthroplasty [14,15].

When an extensive fragmentation is present, especially in four-part fracture-dislocations, the risk of avascular necrosis increases and hemiarthroplasty is preferred. In young patients, hemiarthroplasty should be avoided only when the risk of avascular necrosis is high. Because of extensive fragmentation and severe cartilage compression in our patient, open reduction with internal fixation was impossible and hemiarthroplasties were performed although the patient was young. Excellent functional results in both shoulders were achieved post-operatively.

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電極引發雙側肩關節後脫位合併骨折

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雙側肩關節後脫位合併骨折為少見之病例，文獻中只有少數病例被發表，但大多為癲癇發作所引發。我們報告之病例為遭受電極且於發生二星期後接受半肩關節置換手術，手術6年後追蹤可得滿意之肩關節活動度及可回到先前之工作。(中台灣醫誌 2006;11:132-7)

關鍵詞

關節後脫位，骨折脫位，電極

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