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Diagnosis and Management of Posterior Fracture Dislocation of Shoulder : Case Report :

Tarik Bouziani[1], Mohamed Tazi[1], Guillaume Ducrot[2], Cyril Penz[2]

[1]Department of Orthopedic, Trauma, CHU Hassan 2, FES, Maroc
[2]Department of Orthopedic, Trauma, Alpes Leman, Nangy, France
Address for correspondence : CHU Hassan 2, route sidi Hrazem, BP : 1835 Atlas, Fès, Avenue Hassan II, Fès 30050
E-mail address : tarik.bouziani1@gmail.com

Abstract : *Bilateral shoulder dislocations are rare, posterior dislocations being rarer and the association of bilateral posterior fractures and dislocations following convulsive episodes are extremely rare which make the diagnosis more challengnig. In this case presentation, we describe the diagnostic approach of a young patient who suffered a posterior bilateral dislocation fracture of shoulders after an idiopathic seizure .the management, very controversial in the literature, was by open reduction internal fixation (ORIF) on the left side and closed reduction with hemiarthroplasty on the right side*

Keywords: Shoulder dislocation, Posterior dislocation, proximal humerus fracture-dislocation, Treatment algorithm.

INTRODUCTION :

Posterior glenohumeral dislocation is rarely unilateral (2 to 4%) [1], it is more common when bilateral [2], bilateral Posterior shoulder dislocation accounts for 2%-5% of all the shoulder dislocations, where as fractures account for 1%[3], and bilateral posterior fracture dislocation, first described in 1902 by Mynter [4], is even more uncommon, representing only 5% of all posterior fracture dislocations.[5]

The main etiologies have been described as the triple "E" syndrome : electric shock, excessive trauma, and epilepsy or convulsive seizures (up to 90% for the bilateral posterior shoulder dislocations with fracture) [6] [7] [8]

The mechanism of shoulder injury during a seizure activity progress with a posteriorly and superiorly movement of the humeral head due to an unbalanced muscle contractions (internal rotators more stronger than external rotators) [9], causing dislocation with a Reverse Hill-Sachs lesion and continuing force against the glenoid rim leading to fracture of the humeral head with possible comminution[10],[11]

missed or delayed in 50%-80% of cases, posterior shoulder dislocation is often a challenging diagnosis which combining : detailed physical examination with typical position of the shoulder and adequate imaging techniques.[12]

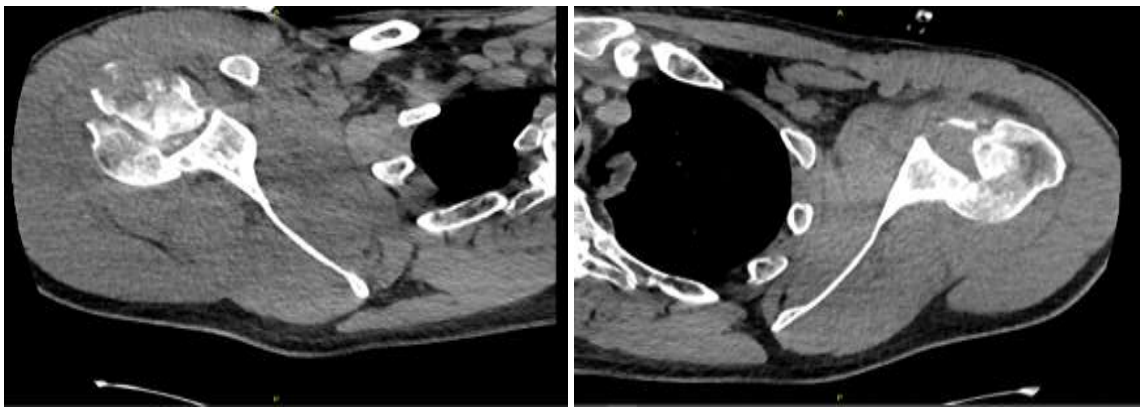
The objective of this systematic review is to present a case of bilateral posterior dislocation fracture of the shoulder and to summarize the current principles of management.

CASE REPORT:

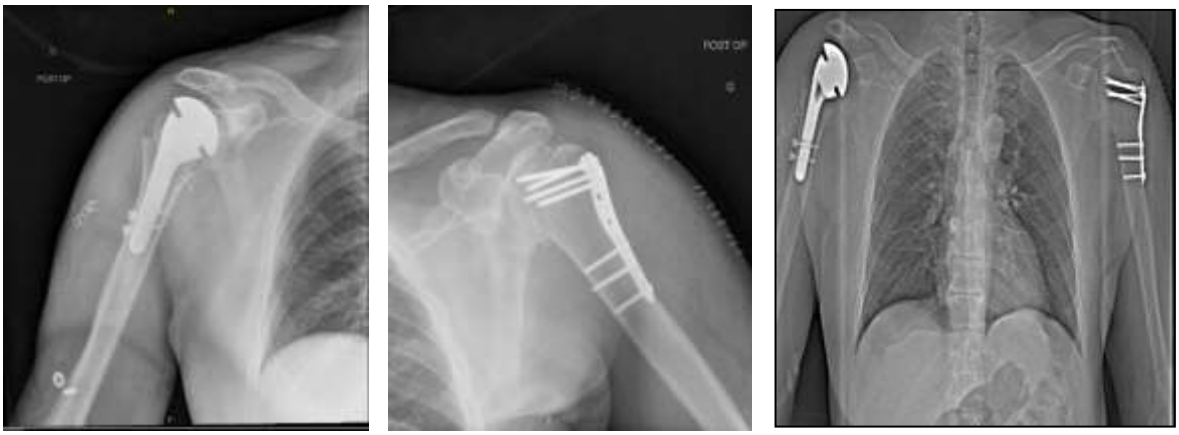
Male of 45-year-old , right-handed dominant, industrial painter with a very heavy toxic history (the consumption of tobacco and cannabis since the age of 14, cocaine and heroin by period, daily alcoholism as well as the random use of morphine derivatives and benzodiazepines),high cardiovascular risk (hypercholesterolemia, overweight with BMI: 27, recurring angina pain which improves on trinitrine, cardiovascular family background (sudden death of the grandfather, heart problem of a father who is 50 years old) without any history of seizures.
Admitted to emergency following an inaugural tonic-clonic convulsive seizure that occurred at his workplace, most likely related to an alcohol withdrawal syndrome (sudden cessation a few days ago). His blood pressure was 160/100 mmHg and pulse rate was 95/min, GCS at 15 in postical state with general tiredness and neurological examination without particularities also fundus, the biological assessment, cerebral scanner and EEG.
The abnormalities were the bilateral vicious position in « adduction - internal rotation » and diffuse soft tissue swelling. Due to his muscularity, neither of his humeral heads could be palpable from his posterior shoulder. The detected neurovascular status of both upper limbs was intact.

X-ray revealed a bilateral fracture of the humeral surgical neck with posterior shoulder dislocation and CT confirmed a 4-fragment fracture-dislocation with comminution and interfragmentary space especially on the right side
patient admitted the same day to operating room in the beach chair position, with a trans-deltoid approach, we have proceded on the left side with a laborious open reduction internal fixation (ORIF) with PHILOS plate (synthès) of the proximal humerus on which the two tuberosities have been fixed with MAXBRAID threads. On the right side we have managed to make closed reduction. subsequently (d+5), the patient benefited from a total prosthesis of the shoulder with authorization of pendulum movements bilateraly.
The arms were left immobilized in the splints for 2 weeks, then gentle pendulum exercises and passive physical therapy were started
The etiological assessment of the first seizure carried out. All investigations showed the absence of any structural brain abnormality. Therefore, the patient was diagnosed with idiopathic generalized epilepsy and an antiepileptic treatment was prescribed.

Emergency department X-ray in AP view.



Emergency department CT scan.



Post-operative AP radiograph and CT scan of bilateral shoulder status

DISCUSSION :

Diagnosis :

Posterior dislocation is a challenge diagnosis to make, not only taking into account its rarity but also different conditions like : insufficient cooperation of patients, lack of clear clinical symptoms, inappropriate imaging evaluation, insufficient familiarity of experts with the disease, and especially in a patient with a first episode of convulsive seizure who wakes up with painful stiff shoulders without memory of any trauma[5], contributing to misdiagnosis may exceed 50% at the first clinical examination[13–15-16] and 3 quarters of this injury can be diagnosed late with an average interval of 1 year.[17]

the diagnosis is highly suspect with loss of normal contour of shoulders, bruising and intense pain in both arms commonly locked in flexion-adduction-internal rotation with severe limitation of external rotation, increased prominence of the coracoid and palpable protuberance of humeral head at the back of the shoulder . [18,19]
The association with different types of fractures ranging from an impaction fracture of anteromedial humeral head to complex fractures in the proximal humerus makes the diagnosis more and more difficult [20].

Radiologic examination :

The appropriate anteroposterior (AP) in the scapular plane and the scapular lateral imaging also the axillary view when it feasibale can detect the posterior dislocation such as light bulb sign, double shadow line sign, ice cream cone sign, rim sign, trough line sign, vacant glenoid sign.[21,22]. CT image gives more details: reverse Hill-Sachs lesion, fractured region, degree of bone impaction and nombre of fragments [23] [24].

According to Robinson and Aderinto, the 3 degrees of humeral head defect are: small (<25%), medium (25%e50%) and large (>50%), and the most common and complex types are : 2-part of the lesser tuberosity, 3-part of the anatomic neck and complex 3- and 4-part fractures of the proximal humerus 25,26,27
In our case we found bilateral posterior fracture dislocation with 4 fragments according to neer's classification and a large bone defect.

Management

The management plan must be individualized and multifactorial taking into account: age, profession, duration of dislocation, type of lesion, defect humeral head, patient's physical condition and requirements.[28,29,30,31] also Hertel criteria (predictors of humeral head ischemia) should be considered in the surgical planning: <8 mm of calcar length attached to articular segment, disrupted medial hinge, increasing fracture complexity, displacement >10mm, angulation >45°.[32]
Age is essential in the therapeutic decision:

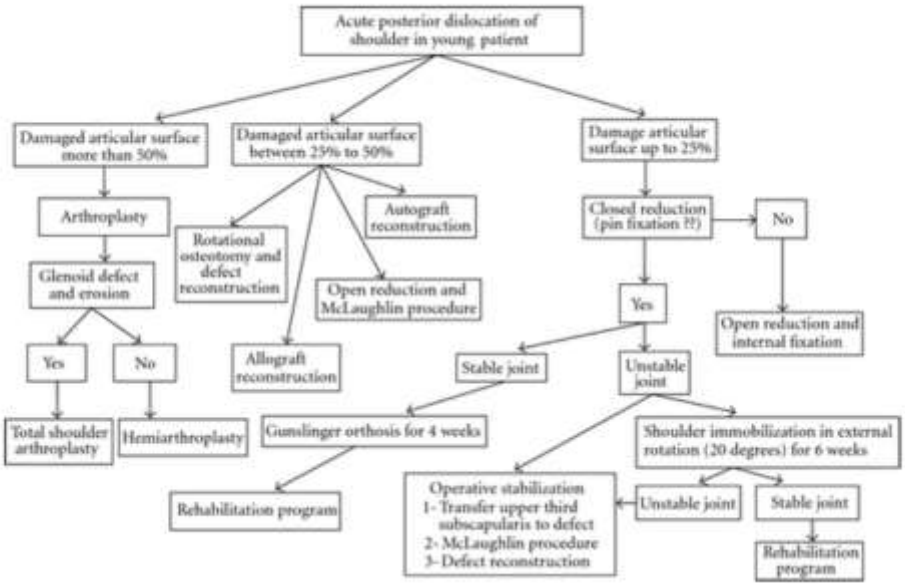
- Young patients with acute displaced fractures, closed reduction is the first to be tried, if this fails, ORIF can be attempted. The ideal indication of the hemiarthroplasty are complex fractures +/- displaced joint(more than 50% of the humeral head or when a Neer three- or four-part fracture is complicated by the presence of dislocation) [33,34,35] and failure of osteosynthesis with a continent rotator cuff [36]
- > 65years old : recent meta-analysis [37] confirming previous reviews [38] on the lack of superiority of surgical treatment versus non-surgical treatment, especially for nondisplaced or minimally displaced fracture. For 3- or 4-fragment fractures, due to the high risk of avascular necrosis of the humeral head, hemiarthroplasty is the preferred option.[45] otherwise if the head of the humerus and the glenoid cavity are damaged, the total shoulder prosthesis should be considered [46] . However, an increasing number of authors suggest reverse shoulder arthroplasty (RSA) rather than hemiarthroplasty (HA) or open reduction and internal fixation (ORIF). [39] [40] [41] [42] [43–46]

In terms of humeral head articular surface defect and dislocation duration :

- Acute dislocation (<3 weeks) with < 25% of defect: closed reduction under general anesthesia is recommended [47], with possible risk to increase necrosis of the humeral head by aggravating the impaction defect or displacing the fracture lines already present in the surgical neck or tuberosities[48], also open reduction can be attempted.[49]
- Chronic dislocations, closed reduction is almost impossible and surgery is usually required [50,51,52] and if the humeral head is viable, open reduction and soft tissue release can be attempted.
- 25 to 50% of the joint surface defect : surgical treatment is necessary [53], especially since the lesion is bilateral due to an idiopathic crisis as in our case, which may require reconstruction, McLaughlin techniques by transposition of the subscapularis tendon, McLaughlin techniques modified by Neer with transposition of the trochin, rotational osteotomy, etc. while for cooperative and especially muscular patients, a closed support can also be attempted.[54]
- More than 50% : surface replacement arthroplasty or hemiarthroplasty are the choice methods.[55–57]

The restoration of the sphericity of the humeral head is a key factor for a favorable clinical outcome [58].

In situations where simultaneous bilateral proximal humeral fractures occur, the choice of treatment remains a subject of controversy. The management options can vary, ranging from conservative approaches [59] to closed reduction and percutaneous fixation [60], or (ORIF) of one or both sides[61]. Other treatment possibilities include hemiarthroplasty (HA) of one side combined with conservative management [62] or ORIF [5,18], or osteochondral autograft [63] of the contralateral side. In some cases, bilateral HA may even be considered[64,65]. Simultaneous bilateral four-part fractures of the proximal humerus are even rarer, with only a limited number of cases reported in the literature[62,64,66].



Algorithm of managnement of acute posterior shoulder dislocation in young patient :[67]

CONCLUSION :

Diagnosing a bilateral posterior shoulder dislocation fracture in a timely manner can be challenging due to its rarity in the emergency department. Several factors impact functional prognosis, such as age, type of fracture, comminution, and choice of therapeutic interventions, which continue to be a subject of surgical debate.

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