

Bilateral fracture of the shoulders following epileptic seizures: a case report

Fratura bilateral de ombros após convulsões epilépticas: relato de caso

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ABSTRACT

Convulsive seizures caused by hyponatremia occur when this condition is severe and develops quickly, resulting in a brain's adaptive inability to contain brain swelling. Seizures are rarely the cause of shoulder fractures. This is a case report of bilateral humerus fracture following a single epileptic seizure caused by drug hyponatremia, an unconventional event in medical practice. A 69-year-old woman was admitted to the emergency room after a single tonic-clonic seizure with spontaneously ceased sphincter relaxation, showing Glasgow 6. No falls or restraint were reported by observers. When alert, the patient reported pain and difficulty moving both arms. During examination, the movement was limited to the right and left. Anteroposterior radiographs revealed bilateral fracture at the neck of humerus. To complement investigation for further lesions, a computed tomography confirmed bilateral fracture-dislocation with impaction of the humeral head with the glenoid. Atraumatic bilateral fracture-dislocation of the humerus after epileptic seizure is a very rare event. It is believed that some of these diagnoses have been neglected due to the difficulty of characterizing the patient's pain in a postictal state. The importance of a detailed physical examination shall be emphasized in risk groups such as the polymedicated elderly.

Keywords: Seizures; Hyponatremia; Fractures, bone; Shoulder fractures

RESUMO

Crises convulsivas causadas por hiponatremia ocorrem quando esse problema é grave e se instala rapidamente, resultando na incapacidade adaptativa do cérebro de conter o inchaço cerebral. As convulsões raramente são a causa das fraturas do ombro. Este é um relato de caso de fratura bilateral de úmero após crise epiléptica única causada por hiponatremia medicamentosa, evento não convencional na prática médica. Uma mulher de 69 anos foi admitida no pronto-socorro após crise tônico-clônica única com cessação espontânea do relaxamento esfíncteriano, evidenciando Glasgow 6. Não foram relatadas quedas ou contenção pelos observadores. Quando alerta, a paciente relatou dor e dificuldade de movimentação dos dois braços. Durante o exame, o movimento era limitado à direita e à esquerda. Radiografias anteroposteriores revelaram fratura bilateral no colo do úmero. Para complementar a investigação de novas lesões, uma tomografia computadorizada confirmou fratura-luxação bilateral com impactação da cabeça umeral com a glenoide. A fratura-luxação bilateral atraumática do úmero após crise epiléptica é um evento muito raro. Acredita-se que alguns desses diagnósticos tenham sido negligenciados devido à dificuldade de caracterizar a dor do paciente em estado pós-ictal. É necessário enfatizar a importância de um exame físico em grupos de risco como os idosos polimedcados.

Descritores: Convulsões; Hiponatremia; Fraturas ósseas; Fraturas do ombro

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Submission date: 20/8/2019. **Acceptance date:** 27/9/2019.

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Financial support: none

Conflicts of interest: none

Approval by the Research Ethics Committee: Hospital Regional de São José, protocol 3.266.472.

Authors contributions:

Project conception and design: TM.

Data collection, analysis, and interpretation: SDN.

Manuscript text and critical review: GS, LJV, HLB e TSB.

Approval of manuscript final version to be published: TM, SDN, LJV, GS, HLB e TSB.

BACKGROUND

During epileptic seizure associated with falls, people with epilepsy have a higher risk of fractures due to direct trauma when compared to the general population. While the most common and expected in this condition are fractures of lower limbs and hip, fractures of the upper limbs, mainly bilateral fractures, are less frequent.¹ Anterior shoulder dislocations occur secondary to trauma, while posterior shoulder dislocations usually occur after strong muscular contractions from electrical shocks and epileptic seizures.¹ Posterior dislocations are rare, about 1% to 4% of all shoulder dislocations. Only 50% are diagnosed in the acute phase, due to lack of clinical signs and inadequate radiographic assessment, which prevents the early treatment, possibly implicating movement restriction.²

CASE REPORT

A 69-year-old female patient, admitted to the emergency room during postictal period of a tonic-clonic epileptic seizure with spontaneously ceased sphincter relaxation.

Previous history of depression, hypertension, coronary artery disease, taking hydrochlorothiazide, diltiazem hydrochloride, simvastatin, mirtazapine, and flurazepam.

On clinical examination she showed a regular general condition, with stable vital signs. Glasgow coma scale six (eye opening four, verbal response one, best motor response four), right upper limb with grade three strength flexion and grade two in the upper left limb. A computed tomography of the skull was performed with discrete hypoattenuating area poorly defined

in the cerebellar trunk to the right, with probable artefactual nature. Laboratory tests identified serum sodium 108mEq/L (reference range: 135 to 145 mEq/L), creatinine phosphokinase (CPK) of 390U/L (reference range: <120), and leukocytes 16.480mm³ (reference range: 5.000 to 10.000/mm³).

A convulsive crisis analysis was performed, showing level of consciousness decrease, hyponatremia, leukocytosis, and strength decrease in upper limbs. Regarding treatment, hydrochlorothiazide has been discontinued because it is a hyponatremia inducer.

Electrolyte deficiency was progressively and cautiously corrected during hospitalization with a 3% sodium chloride (NaCl) hypertonic solution (0.5 to 1.0mEq/hour and up to 12mEq/day). During clinical examination, the patient reported pain and difficulty to move both arms. An anteroposterior radiography was performed evidencing bilateral fracture of humeral neck (Figure 1). To confirm the suspected fracture and to schedule a possible therapeutic intervention, a computed axial tomography was requested, which identified the fracture, dislocation, and posterior impaction of the humeral head with the glenoid bilaterally (Figure 2). The patient was referred to the orthopedics and traumatology department for surgery. The patient underwent surgery and was discharged after good clinical progression. She has been referred to rehabilitation with physical therapy.

DISCUSSION

Hyponatremia is the main hydroelectrolytic disorder and the most important clinical manifestations of sodium disturbance are neurological disorders.⁵ Low serum sodium, especially in its severe form (<115meq/L),

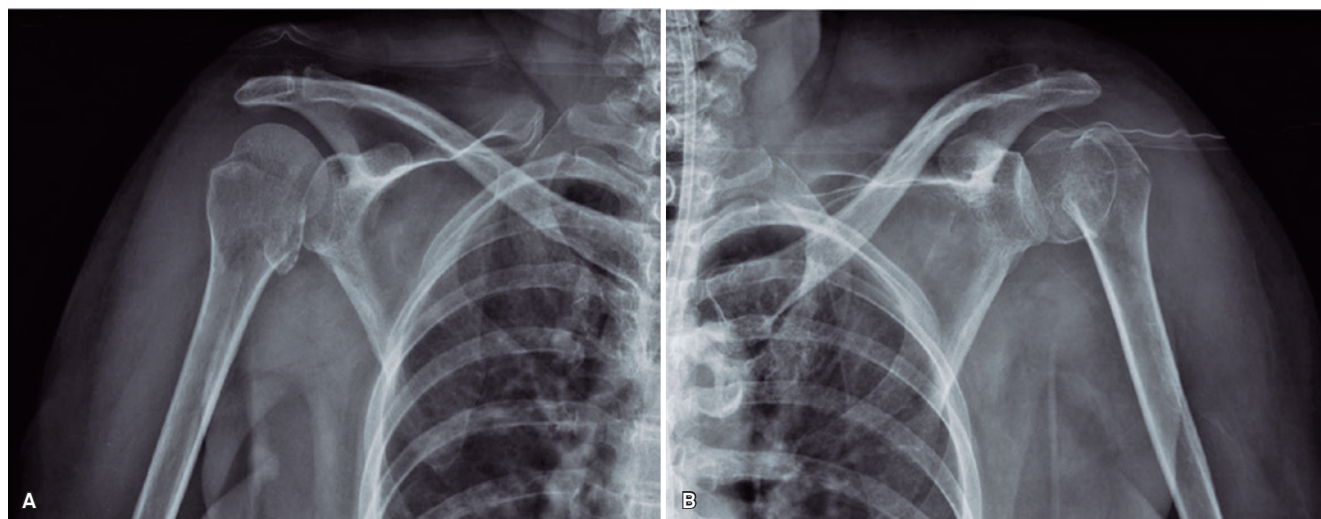


Figure 1. Fracture with posterior dislocation. (A) Right shoulder. (B) Left shoulder.

may produce systemic effects like somnolence, coma, and epileptic seizures when abruptly installed.³ The convulsive crisis develops through the process of cerebral edema and the inability of the brain to adapt quickly to this condition.^{4,5}

Shoulder fractures may occur after violent trauma, electrocution, or convulsions involving large amount of kinetic energy.¹ The causes of seizure-induced fractures include epileptic seizure, electroconvulsive therapy, seizure secondary to hyponatremia, diabetes mellitus, contrast media (Iohexol) injection, alcohol withdrawal antibiotic therapy, eclampsia, or dialysis for patients with renal failure.⁶ The main risk factors are age (≥ 45 years old), male sex, generalized tonic-clonic epileptic seizure, and the use of antiepileptic drugs.⁷

The rate of injury after convulsion is approximately 14%, with 6% being fractures.^{2,8}

Finelli et al., in a study carried out with 2,800 hospitalized patients diagnosed with epileptic seizure, reported 1.1% suffered a fracture. Of these, 0.5% had a fracture by direct trauma, and 11 of the 17 fractures involved the skull, nasal bones, and clavicle, whereas in the non-trauma group, the proximal humerus was the spot of six of the nine fractures. These findings indicate that a fracture is an uncommon complication of an epileptic seizure and it is extremely rare in the absence of trauma.⁹ According to information gathered from witnesses in this case, there was no trauma or restriction.

The mechanism of fracture during an epileptic seizure can be explained by the typical position of adduction, internal rotation and shoulder flexion, which forces the head of the humerus over the glenoid cavity. It can also be triggered by forced restraint of the limbs, which can originate fractures and joint dislocations, especially in the shoulder and hip.¹⁰



Figure 2. Fracture, dislocation and posterior impaction of the humeral head with the glenoid bilaterally.

The bilateral posterior dislocation or fracture-dislocation of the shoulder is considered pathognomonic of epileptic seizures, while the unilateral one is highly suggestive.⁹

About 50% to 79% of patients do not obtain an early diagnosis of fractures and dislocations, due to the few clinical signs, since in postictal states pain can be confused as muscular pain, along with the difficulty of identification in radiographs in conventional position.

Thus, in suspected situations it may be necessary to perform a computed tomography, since it provides better visualization of the humeral head when compared to conventional radiography.¹⁰

The most frequent complications are avascular humeral head necrosis and osteoarthritis, which may compromise movement if not properly treated.¹⁰

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