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Case Report

Posterior Reversible Encephalopathy Syndrome Following a Scorpion Sting

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ABSTRACT

Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiologic entity not yet understood, that is present with transient neurologic symptoms and particular radiological findings. The most common imaging pattern in PRES is the presence of edema in the white matter of the posterior portions of both cerebral hemispheres. The cause of PRES is unclear. We report a case of 13-year-old male who was stung by a scorpion and developed a severe headche, visual disturbance, and seizures and had the diagnosis of PRES with a good outcome. Numerous factors can trigger this syndrome, most commonly: acute elevation of blood pressure, abnormal renal function, and immunosuppressive therapy. There are many cases described showing the relationship between PRES and eclampsia, transplantation, neoplasia and chemotherapy treatment, systemic infections, renal disease acute, or chronic. However, this is the first case of PRES following a scorpion sting.

Keywords: Posterior reversible encephalopathy syndrome (PRES), scorpion sting, seizure, brain MRI, cerebral autoregulation, oedema, *Tityus bahiensis*.

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Introduction

Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiologic entity characterized by headaches, altered mental status, seizures, and visual loss and is associated with white matter vasogenic edema predominantly affecting the occipital and parietal lobes of the brain. [1]

The cause of PRES is not yet understood. Autoregulatory dysfunction, as suggested in hypertensive encephalopathy, is often cited as the underlying mechanism. On the other hand, vasospasm with ischaemic change is also observed in some patients. [2,3]

The most common imaging pattern in PRES is the presence of edema in the white matter of the posterior portions of both cerebral hemispheres, especially the parieto-occipital regions, in a relatively symmetric pattern. [1] However, other structures (such as the brain stem, cerebellum, and frontal and temporal lobes) may also be involved, and although the abnormality primarily affects the subcortical white matter, the cortex and the basal ganglia may also be involved. [4]

Of around 1,500 species of scorpions worldwide, but only 30 are potentially dangerous to human. [5] The incidence and severity vary around the world, in Brazil, *Tityus bahiensis* is one of the most venomous scorpions and is responsible for most of the accidents that occur in our country. [6] There is no relationship between PRES and scorpion sting in the literature.

Case Report

A male 13-year-old patient, previously health, was stung by a scorpion (*Tityus bahiensis*) in his right foot. Two hours after the sting, he initiated with severe headache, vomiting, and visual disturbance. He was dislocated to a Basic Health Unit, where he presented two seizures 12 hours after the sting, and after these seizures, he developed an altered mental state. On examination, he was obnubilate, afebrile, heart rate 92 per minute and his blood pressure was 90/60 mmHg. After 4 hours, he was hemodynamically stable (blood pressure 130/80 mmHg) and was dislocated to another hospital where he received an acute treatment (vaccine tetanus, intravenous saline .9%, and

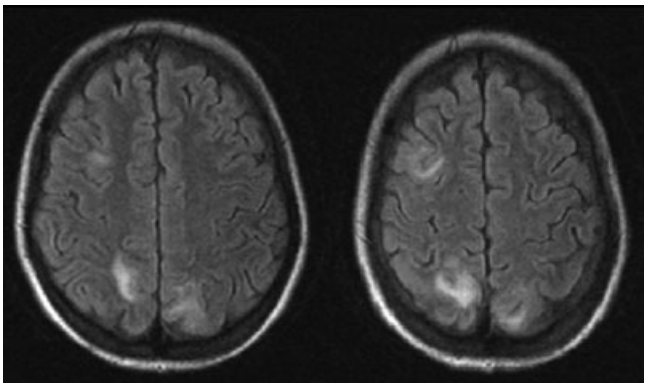

Fig 1. Brain MRI FLAIR showing an increase of signal in both occipital lobes and in right frontal lobe.

fenitoine). The creatinine was .83 and there was no other alteration in blood basic tests.

It was performed a brain MRI that shows an increase of signal in both occipital lobes, with a symmetric pattern and in right frontal lobe (Fig 1).

After 5 days, the patient was totally asymptomatic and a new brain MRI was performed 3 weeks after the first that shows no evidence of edema or other abnormalities.

Discussion

Since the first large series of PRES described by Hinchey in 1996, many papers were published; however, the precise pathophisiological mechanism remains unclear. [1] In 2000, Casey et al proposer the term PRES. [7] Numerous factors have been seen in the setting of PRES or in association with PRES including: acute elevation of blood pressure, abnormal renal function, and immunosuppressive therapy. [1] Other possible etiologies are eclampsia, [8] transplantation, neoplasia and chemotherapy treatment, [9] systemic infections, renal disease acute, or chronic. [10]

We conducted a review of the Pubmed in May 2012 and found only one case that shows the relationship between insect bites/sting and PRES. Loh and colleagues report a case of a 29-year-old woman who presented acute renal failure and PRES after a multiple wasp sting. [11]

Scorpion sting has many clinical manifestations, such as pain sensation at the sting site, followed by itch, erythema, local tissue swelling, and ascending hyperesthesia, that persists for several weeks, and is the last symptom to resolve before the victim recovers. Hyperthermia, tachypnea, tachycardia, hypertension, arrythimia, and other symptoms are also described. [12]

The most common neurological manifestations are ptosis, dysphagia, pharyngeal reflex loss or muscle spasm, paralysis, and seizure. Scorpion sting can cause cerebrovascular accidents by various mechanisms such as venom-induced autonomic disorders leading to hypertension, hypotension, disseminated intravascular coagulation, or vasculitis.

There are few reports about central neurological manifestation and the venom of scorpion. Dube and colleagues reported a case of intracerebral bleed following scorpion sting. [13]

PRES is commonly seen in the setting of hypertension or endothelial dysfunction; probably due to a breakdown of autoregulation. The autoregulation is an intrinsic function of the vasculature of the brain, designed to maintain a stable blood flow independent of the variation of blood pressure. In animal models, when a severe increase in blood pressure beyond the upper limit of autoregulation was caused, occur an arteriolar dilation, injury to the capillary bed, vasogenic edema, and vessel injury with altered artery morphology. [14] The upper limits of autoregulation range among the patients. This limit depends primary on the capillary hydrostatic pressure, under the influence of the systolic blood pressure, the integrity of blood-brain barrier, and other situations (various disease and neurotoxic agents). [15]

In this case, we think that variation of blood pressure and endothelial dysfunction due to scorpion venom can lead to a breakdown of cerebral autoregulation. Another potential cause in this case could be systemic immune trigger in the setting of scorpion venom. This clinical report demonstrated that scorpion sting can lead to a PRES.

References

1. Hinchey J, Chaves C, Appignani B, et al. A reversible posterior leukoencephalopathy syndrome. *N Engl J Med.* 1996;334:494-500.
2. Schwartz RB. Hyperperfusion encephalopathies: hypertensive encephalopathy and related conditions. *Neurologist* 2002;8:22-34.
3. Bartynski WS, Boardman JF. Catheter angiography, MR angiography, and MR perfusion in posterior reversible encephalopathy syndrome. *AJNR Am J Neuroradiol* 2008;29:447-455.
4. Lamy C, Oppenheim C, Méder JF, et al. Neuroimaging in posterior reversible encephalopathy syndrome. *J Neuroimaging* 2004;14:89-96.
5. Prendini L. Scorpion higher phylogeny and classification, taxonomic anarchy and standards for peer review in online publishing. *Cladistics* 2005;21:446-494.
6. Lourenço GA, Lebrun I, Dorce VAC. Neurotoxic effects of fraction isolated from Tityus bahiensis scorpion venom. *Toxicon* 2002;40:149-157.
7. Casey SO, Sampaio RC, Michel E, et al. Posterior reversible encephalopathy syndrome: utility of fluid-attenuated inversion recovery MR imaging in the detection of cortical and subcortical lesions. *AJNR Am J Neuroradiol* 2000;21:1199-1206.
8. Schwartz RB, Feske SK, Polak JF, et al. Preeclampsia-eclampsia: clinical and neuroradiographic correlates and insights into the pathogenesis of hypertensive encephalopathy. *Radiology* 2000;217:371-376.
9. Marrone LC, Marrone BF, Raya JP, et al. Gemcitabine monotherapy associated with posterior reversible encephalopathy syndrome. *Case Rep Oncol* 2011;4:82-87.
10. Bartynski WS, Boardman JF, Zeigler ZR, et al. Posterior reversible encephalopathy syndrome in infection, sepsis, and shock. *AJNR Am J Neuroradiol* 2006;27(10):2179-2290.
11. Loh HH, Tan CHH. Acute renal failure and posterior reversible encephalopathy syndrome following multiple wasp sting: a case report. *Med J Malaysia* 2012;67:133-135.
12. Petricevich VL. Scorpion Venom and the inflamatory response. *Mediators Inflamm* 2010;2010.
13. Dube S, Sharma VK, Dubey TN, et al. Fatal intracerebral haemorrhage following scorpion sting. *J Indian Med Assoc* 2011;109(3):194-195.
14. Auer LM. The pathogenisis of hypertensive encephalopathy: experimental data and their clinical relevance with special reference to neurosurgical patients. *Acta Neurochir Suppl (Wien)* 1978;27:1-111.
15. Feske SK. Posterior reversible encephalopathy syndrome: a review. *Semin Neurol* 2011;31(2):202-215.

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