

Focal seizure as a manifestation of serotonin syndrome: case report

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Access this article online

Website: www.avicennajmed.com

DOI: 10.4103/ajm.AJM_7_19

Quick Response Code:



ABSTRACT

Serotonin syndrome is a life-threatening condition. Seizure is one of the complications of serotonin syndrome that may delay diagnosis and complicate management. We report a patient who had a focal seizure with abnormal electroencephalogram in the setting of serotonin syndrome with no prior history of epilepsy or seizure-provoking factors (fever, electrolyte abnormalities, specific medication combinations, and specific medication overdosing). Recognition of seizure as a symptom of serotonin syndrome is important for early treatment and avoidance of long-term consequences. Treatment of serotonin syndrome is mostly supportive. However, a short course of antiepileptics may be needed if these patients develop seizures.

Key words: Cortical excitement, electroencephalography, focal slowing, seizure, serotonin syndrome

INTRODUCTION

Serotonin syndrome is a life-threatening condition.^[1] The core manifestations of this syndrome are neuromuscular excitation, autonomic nervous system hyperactivity, and change in mental state.^[2] Seizures in the setting of serotonin syndrome have been reported before. Seizures related to serotonin syndrome can be secondary to hyperthermia that exceeds 40°C, electrolyte abnormalities, specific medication combinations (fluoxetine–lithium, meclizemide–clomipramine), and specific medication overdosing including fluvoxamine, trazodone, tramadol, selective serotonin reuptake inhibitors, and 3,4-methylenedioxymethamphetamine.^[3–10] Although overdose can lead to serotonin syndrome, it is most commonly caused by combining two or more serotonergic agents, which can include drugs for many different purposes (antibiotics, antiemetics, supplements, etc.), not just psychiatric agents.^[11] Recognition of seizure as a symptom of serotonin syndrome is very important for early treatment and avoidance of long-term consequences. In this case, we report a patient who had a focal seizure with abnormal

Electroencephalogram (EEG) in the setting of serotonin syndrome with no prior history of epilepsy or seizure provoking factors.

CASE REPORT

Our patient is a 56-year-old Caucasian male with a known medical history of severe major depressive disorder and attention deficit hyperactivity disorder (ADHD). He was initially admitted to an outside hospital for acute onset of confusion, agitation, and sweating. The examination was remarkable for fever of 38.1°C, sinus tachycardia, tachypnea, upper chest and face flushing, altered mental status, hyperreflexia, rigidity, and resting fine tremors. Initial workup showed normal electrolytes, serum glucose, and thyroid function. Computed tomography of the head was unremarkable. Review of medications list

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Cite this article as: Almallouhi E, Rahwan M, Dainton H, Bonilha L. Focal seizure as a manifestation of serotonin syndrome: case report. *Avicenna J Med* 2019;9:119-21.

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revealed that patient was on duloxetine and aripiprazole with the new addition of amphetamine (for ADHD) and dextromethorphan (for upper respiratory infection symptoms) a few days prior to symptom onset.

While inpatient, the patient had an episode of behavioral arrest followed by rhythmic clonic movements of the left upper extremity for 3–4 min that was witnessed by a physician in the facility. The patient was hard to arouse for a few hours afterward. Routine electroencephalography (EEG) was performed and was remarkable for continuous focal slowing over the right temporal region. The patient was started on anti-seizure medication (levetiracetam) and transferred to a tertiary medical center for further management.

At the tertiary medical center, further workup was conducted including lumbar puncture procedure with unremarkable cerebrospinal fluid (CSF) analysis. The patient was placed on continuous EEG monitoring, which initially showed right side temporal mixed delta and theta focal slowing in addition to asymmetric decreased amplitude over the right side [Figure 1]. Contrasted brain magnetic resonance imaging (MRI) study did not show any focal lesions or any other intracranial process that can explain his symptoms.

The most likely diagnosis is serotonin syndrome per Hunter criteria and after ruling out other possibilities (central nervous system infection, autoimmune or inflammatory process, and thyroid storm).^[10] Serotonergic medications including duloxetine, aripiprazole, amphetamine, and dextromethorphan were all held. The patient was started on standing benzodiazepine doses and cyproheptadine to

alleviate the nervous system hyperexcitability. His symptoms gradually improved, and he returned to baseline within 4–5 days. During a subsequent encounter, a routine EEG study was carried out and was only significant for mild generalized slowing, without any focal findings.

DISCUSSION

In this case, the patient was found to have new onset focal clinical seizures with evidence of focal abnormality on EEG likely secondary to serotonin syndrome in the setting of normal MRI and CSF studies. None of the usual mechanisms of seizures in serotonin syndrome (severe hyperthermia, electrolytes abnormalities or medication overdosing) were involved in this case, which suggests that seizures in serotonin syndrome can be secondary to the generalized nervous system excitation. We hypothesize the patient's encephalopathy was, in part, secondary to seizures as his mental status improved with seizure control as well as discontinuation of the offending medications and symptomatic management of serotonin syndrome manifestations. In one literature review, seizure frequency was as high as 29% of patients with serotonin syndrome.^[4] In the published case reports, the seizure semiology was generalized.^[5-7,9] In previous case studies, there are also some EEG findings that may help differentiate serotonin syndrome from other acute causes of seizures, especially neuroleptic malignant syndrome. These include delta range activity, slow waves, spike and waves, polyspikes, and triphasic waves, which will resolve as the serotonin syndrome resolves.^[11] The suggested pathophysiology for seizures in the setting of serotonin syndrome is likely



Figure 1: A sample page of electroencephalogram during admission shows right side temporal mixed delta and theta focal slowing in addition to asymmetric decreased amplitude over the right side on a longitudinal bipolar montage (double banana). Low frequency filter: 1 Hz, high frequency filter: 70 Hz, notch filter: off, sensitivity: 7 uV/mm

related to cortical excitement in the prefrontal region given that it is rich with 5HT receptors in animal models.^[12]

This is the first case to report new onset focal clinical seizures with evidence of focal abnormality on EEG in the setting of serotonin syndrome in a patient without a known history of epilepsy or seizure-provoking factors. Treatment of serotonin syndrome is mostly supportive. However, a short course of antiepileptics may be needed if these patients develop seizures.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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