

## Distinct EEG Patterns As Diagnostic Tool in Serotonin Syndrome, A Case Review

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### Introduction

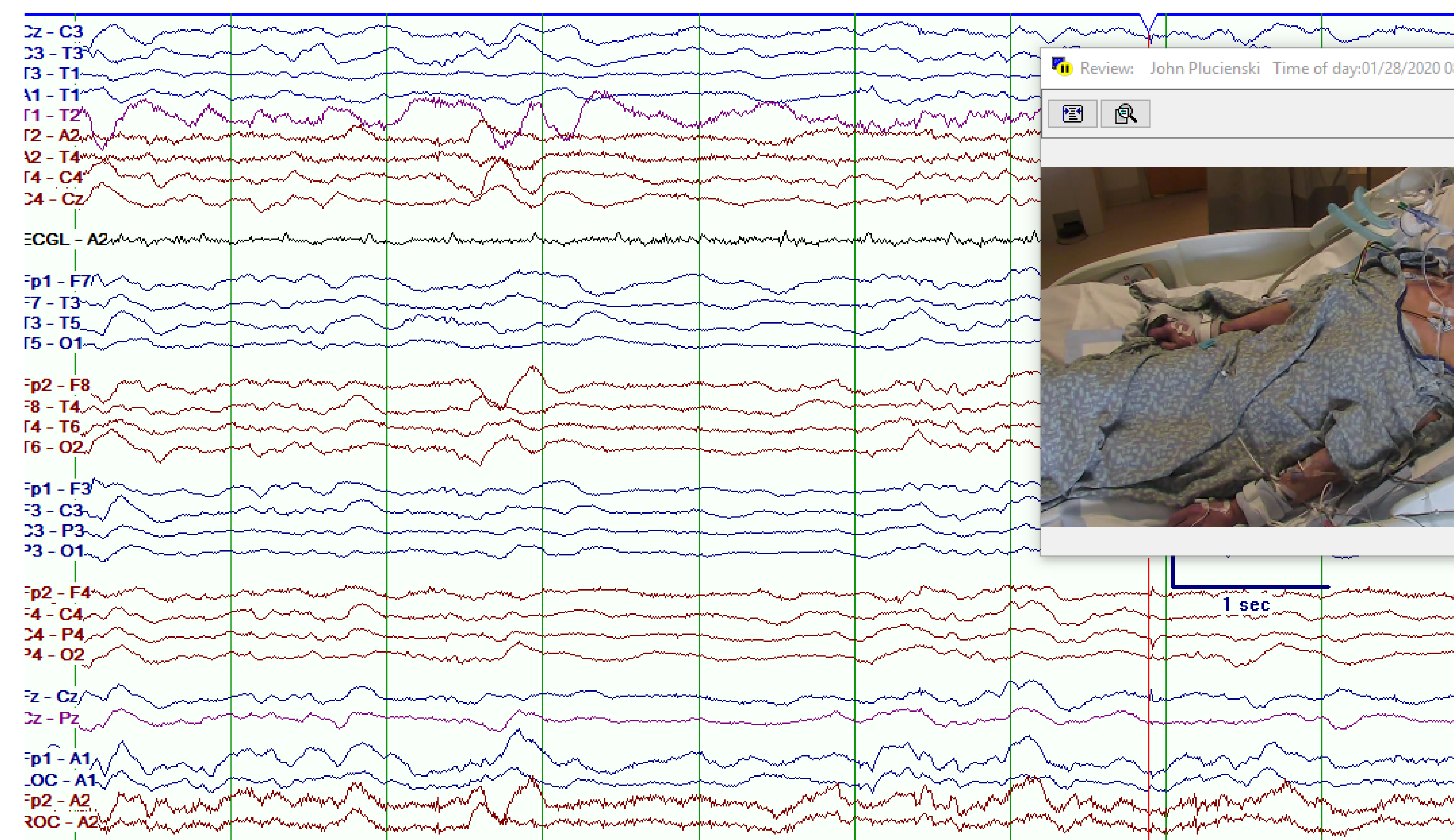
Serotonin syndrome is a constellation of symptoms, well described by Hunter serotonin toxicity criteria including clonus, diaphoresis, agitation, hyperreflexia, tremor, hypertonia, and temperature greater than 38 C. Serotonin syndrome is often triggered by adding opioids in a patient previously stable on a serotonergic agent. The incidence of Serotonin syndrome is unknown. This is partly because some of the actual cases are either missed or under-reported. We report a rare case of Serotonin Syndrome manifesting with decerebrate posturing associated with two distinct EEG patterns. One study has reported persistent rhythmic slow (theta) wave activity with occasional alpha waves on EEG of a patient with serotonin syndrome. One study on rats found different EEG patterns correlating with mild and severe syndrome as reduced amplitudes and seizure-like activity, respectively.

### Case presentation

A 73-year-old male with past medical history significant for cervical radiculopathy, chronic pain syndrome who was brought to emergency room via EMS with concerns for opiate withdrawal. He had been using Fentanyl patch with a prescription for 10 patches per month. Patient had run out of his patches with no refills five days prior to the admission. Although there were 2 fentanyl patch present on patient at time of presentation which he stated he obtained one hour prior to arrival.

Patient was in restraints due to restlessness and agitation and received diazepam, diphenhydramine, hydromorphone, lorazepam, and haloperidol for agitation control which led to respiratory failure and intubation. He was admitted to ICU and was started on propofol and fentanyl. Shortly after, patient exhibited writhing-like movements in lower extremities with shaking reactions and thus he was given further doses of benzodiazepines (14mg total of Lorazepam and 5mg of diazepam). At this point vital signs were significant for high temperature and high blood pressure. In exam, brisk reflexes, bilateral clonus, and upgoing toe on the right were present. Labs were significant for low GFR and elevated CPK. Patient underwent CT head, MRI brain, and EEG which were unremarkable except for generalized slow background consistent with encephalopathy.

Symptoms became worse, therefore Propofol was switched to Dexmedetomidine. Neurology indicated suspicion for Serotonin Syndrome and recommended to start cyproheptadine, discontinue fentanyl, avoid other serotonergic and anticholinergics, and to use benzodiazepines for sedation as needed. A rhythmic mid-range theta diffuse and intermittent pattern and a flat background with a diffuse 1 hertz low-voltage delta equal in both hemispheres. He had tonic flexion of his legs and extension of both arms without internal or external rotation at the transition between these 2 patterns.



### Outcome and follow up

Propofol was switched to Dexmedetomidine and Serotonin Syndrome was diagnosed. Unfortunately, patient received morphine as part of comfort care which caused his clinical condition worse again. 48 hours after discontinuation of all the offending agents, symptoms improved. Patient tolerated extubating and moved out from ICU.

### Conclusions

The important point of this report is the unique correlation of involuntary abnormal movements and EEG patterns. This case reports creates awareness about a different presentation of Serotonin Syndrome with two distinct EEG patterns correlating with decerebrate posturing and adds evidence to existing data about the odd presentations of Serotonin Syndrome. We propose to leverage electroencephalography data in the diagnosis or confirming of diagnosis of serotonin syndrome.

More studies and case reports in this regard would be helpful for neurologists to get more familiar with EEG patterns for diagnosis in questionable cases of serotonin syndrome.

### References

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