PROGRESS IN MEDICAL SCIENCES, 2021
VOL 5, NO. 1, PAGE 1 – 3
DOI: doi.org/10.47363/PMS/2021(5)152

CASE REPORT

Open Access

Propofol as a Rare Cause of Serotonin Syndrome

James Richard Allen[1], Zohra Razaq Malik[2]*, Zareen Razaq[3] and Nathan Rothman[2]

[1]Department of Internal Medicine, Saint John's Episcopal Hospital, New York, USA

[2]Saint John's Episcopal Hospital

[3]North Mississipi Medical Center, Tupelo

ABSTRACT

Serotonin is a hormone that has wide-ranging effects on the body including stabilization of mood, feelings of well-being, and happiness. Serotonin syndrome was first described in the early 1960s in animals. This syndrome was first fully described in humans by Sternbach in a review of 38 case reports. In this study, it was found that nearly all reported cases were found in patients taking a combination of antidepressants and other agents [1]1 Serotonin syndrome is a disease that is easily missed as there are no defining features in most cases. Symptoms such as confusion and tremors have a gamut of potential causes. Laboratory tests are non-diagnostic with possible changes including an increase in white blood count, creatinine phosphokinase, and decrease in bicarbonate levels. Here we present a case of Serotonin syndrome that was caused by Propofol use in which led to the patient presenting with respiratory arrest. The patient was treated appropriately and was discharged home in good health.

ARTICLE HISTORY

Received June 13, 2021
Accepted June 21, 2021
Published June 25, 2021

Introduction

Serotonin syndrome is a potentially life-threatening condition due to elevated serotonergic activity in the central nervous system (CNS). Although most commonly associated with selective serotonin reputable inhibitors (SSRIs), it has also been linked to Monoamine Oxidase Inhibitors and Tricyclics antidepressants. With the increased use of these medications, the incidence has been increasing. Serotonin syndrome is triggered by therapeutic medication use, overdose, or drug interactions [2]. We present a case of serotonin syndrome induced by anesthetic doses of propofol.

Case Report

A 43-year-old male with a past medical history of hypertension and depression presented to the emergency department status post respiratory arrest. The patient had undergone a routine screening colonoscopy. During the procedure, the patient exhibited bradycardia, respiratory distress, and hypotension. The patient was intubated, received epinephrine x2, and was brought to the emergency department. Propofol was the anesthetic used during the colonoscopy. The patient's home medications are lisinopril, bupropion, and rosuvastatin. Upon evaluation, the patient had a temperature of 100.9, heart rate of 160, and blood pressure of 180/100. The patient was diaphoretic with muscle rigidity, clonus, positive Babinski bilaterally, and hyperreflexia. The patient was admitted to the ICU for supportive care, sedated with Ativan drip, and treated with cyproheptadine. The patient's symptoms improved in the next 24-48 hours and was extubated 48 hours after admission. The patient had clinical evidence of serotonin syndrome in the absence of typical offending agents.

Discussion

Serotonin syndrome was first described in humans by Sternbach in a review of 38 case reports [1]. Serotonin affects multiple actions in the CNS, including behavior and thermoregulation. Serotonin's effect in the somatosensory cortex has been measured in animal studies [3]. Effects on the peripheral nervous system are primarily via intestinal enterochromaffin cells, involved in gastrointestinal motility and bronchoconstriction. Neuromuscular hyperactivity can manifest as tremors, myoclonus, muscle rigidity, hyperreflexia, and Babinski sign. Serotonin's effect on the autonomics induces diaphoresis, tachycardia, hypertension, and hyperthermia [4]. Serotonin syndrome typically develops over 24 hours following drug exposure. Serotonin syndrome is a clinical diagnosis [2]. An important differential to Serotonin syndrome is Neuroleptic Malignant Syndrome (NMS). NMS develops over days to weeks and presents with a decreased neuromuscular response such as rigidity and bradyreflexia, whereas hyperreflexia and myoclonus are rare. The treatment of Serotonin syndrome is the discontinuation of the offending agent, supportive care, and administration of serotonin antagonists (cyproheptadine). Patients with temperature >41.1C and who are critically ill often require neuromuscular paralysis and intubation. Propofol is an

Contact Zohra R. Malik ✉ Zohrarazaq@gmail.com Department of Internal Medicine, Saint John's Episcopal Hospital, New York, USA

anesthetic that increases GABA-mediated inhibitory tone in the CNS. Changes in propofol infusion rate correlate with propofol levels in the brain and blood. Anesthetic doses of propofol increase the functional activities of dopamine and serotonin in the cortex [1]. A differential that was considered was Bupropion as the trigger, but studies have shown that bupropion does not affect serotonin levels [5]. We suspected that this increased activity of serotonin at a higher anesthetic infusion rate of propofol was the cause of Serotonin Syndrome.

Conclusion

Serotonin syndrome is mostly linked with a combination of SSRIs and agents that act on serotonin receptors. SSRI monotherapy has been described through case reports but is very rare [6]. This syndrome occurs in 14-16 percent of people who overdose on SSRIs [7]. Serotonin is difficult to diagnose as symptoms are non-specific and have many mimickers. To compound the issue, over 85 percent of physicians are unfamiliar with serotonin syndrome as a clinical diagnosis [8]. As this condition life-threatening condition is potentially reversible with early recognition and treatment. We hope to demonstrate the benefit of having a high clinical suspicion for serotonin syndrome despite the absence of typical offending agents [9].

References

[1] Sternbach H. The serotonin syndrome. Am J Psychiatry 1991; 148:705-713.

[2] Boyer EW, Shannon M. The serotonin syndrome [published correction appears in N Engl J Med 2005; 352:1112-1120.

[3] doiShyr MH, Tsai TH, Yang CH, Chen HM, Ng HF, et al. Propofol anesthesia increases dopamine and serotonin activities at the somatosensory cortex in rats: a microdialysis study. Anesth Analg 1997; 84:1344-1348.

[4] Stahl SM, Pradko JF, Haight BR, Modell JG, Rockett CB, et al. A Review of the Neuropharmacology of Bupropion, a Dual Norepinephrine and Dopamine Reuptake Inhibitor. Prim Care Companion J Clin Psychiatry 2004; 6:159-166.

[5] Isbister GK, Bowe SJ, Dawson A, Whyte IM. Relative toxicity of selective serotonin reuptake inhibitors (SSRIs) in overdose. J Toxicol Clin Toxicol 2004; 42:277-285.

[6] Sampson E, Warner JP. Serotonin syndrome: potentially fatal but difficult to recognize. Br J Gen Pract 1999; 49:867-868.

[7] Hudd TR, Blake CS, Rimola-Dejesus Y, Nguyen TT, Zaiken K. A Case Report of Serotonin Syndrome in a Patient on Selective Serotonin Reuptake Inhibitor (SSRI) Monotherapy. J Pharm Pract 2020; 33:206-212.

[8] Mackay FJ, Dunn NR, Mann RD. Antidepressants and the serotonin syndrome in general practice. Br J Gen Pract 1999; 49:871-874.

[9] Mills KC. Serotonin syndrome. A clinical update. Crit Care Clin 1997; 13:763-783.