

Case Report: Multiple Trauma and Serotonin Syndrome

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Annotation: Serotonin syndrome is a life-threatening condition that may be caused by an unanticipated interaction of serotonergic drugs, this produces excess serotonin in the central nervous system. Medications of this category are routinely prescribed during treatment of blast injury. This drugs causes a drug reaction that affect serotonin level. Their effect on serotonin receptors should be taken into account to prevent the development of serotonin syndrome. A patient was transported from another hospital directly to the ICU to continue treatment of consequences of multiple blast injuries of lower limbs and abdomen, complicated by wound infection and clinical depression. Treatment with linezolid which is a serotonergic and duloxetine another serotonergic drug combined with repeated surgical interventions with opioid-based anaesthesia has resulted in development of the serotonin syndrome, manifesting as tremor and frequent clonic seizures. Complete revision of the prescribed pharmacological therapy as well the approach to sedation and anaesthesia has led to a complete resolution of clinical symptoms of this complication. In this case, improvement was achieved through discontinuation of fluoxetine and linezolid. All unfavourable drug interactions must be taken into account in management of complex blast injury. Limiting opioid use through regional anaesthesia and prescription of sedative agents that do not promote serotonin accumulation may prevent the development of serotonin syndrome in such patients.

Keywords: Serotonin Syndrome, Blast Injury, Sedation, Fluoxetine, Linezolid, Seizures.

Introduction

Serotonin syndrome is a condition caused by an accumulation of serotonin, commonly caused by an excessive use of serotonergic medications, either through overdose of a single drug or due to an unanticipated interaction of multiple agents [9]. Its milder symptoms, such as tremor, hyperthermia, hypertension, and mental status alteration often get misattributed to other diseases, which may lead to both initiations of inappropriate treatment and continuation of serotonergic medications, eventually leading to manifestation of severe complications: clonic seizures, coma and life-threatening hyperthermia [7]. The prevalence of serotonin syndrome is 0.07 %-0.19 % among patients receiving at least one serotonergic agent, as report by some authors [6]. There are few projections that the incidence of serotonin syndrome will be on increase as there is an increase of serotonergic drugs in clinical practice [8]. This syndrome is mostly caused by excessive stimulation of serotonin (5-HT) receptors, the following mechanisms: increased serotonin synthesis, increased serotonin release from the presynaptic vesicles, inhibited serotonin metabolism, sensitization of postsynaptic receptors, effect of serotonin agonists [1]. In clinical practice drugs that stimulate the syndrome are used to patients as their needs arises but could be a potential trigger these drugs include opioids, antibiotics, which are widely used in ICU and anaesthesia, fentanyl, procaine, linezolid, dextromethorphan, diphenhydramine.

Diagnosis of this syndrome is based on clinical symptoms detection of serotonergic drugs or its markers in patient serum. Many authors have developed standard diagnosis methods to confirm of diagnosis of serotonin syndrome – Sternbach, Radomski and Hunter criteria, is widely accepted [2, 3]. Medical examination of the patient reveals that patient presents mostly with constant tremor, multiple neuropathic sensitivity disorder, end-point nystagmus.

In our index case, evaluating available data, patient's condition was initially attributed to posttraumatic encephalopathy with focal seizures. Seizures occurred on several occasion and was treated with diazepam 20 mg and magnesium sulphate 25 % 10 ml.

Due to repeated seizures and other neuropathies, a multidisciplinary meeting was held in the ICU after much discussion the syndrome was diagnosed. Treatment was commenced using Sternbach and Hunter criteria and the drugs implicated were discontinued.

Seizure episodes were continued in three days 12 was recorded lasting within 20 minutes in total. In most of the seizures IV diazepam was used, thiopental sodium was used in some cases.

A continuous intravenous infusion of dexmedetomidine 1 mcg/kg/ hr was administered, titrated to maintain a Richmond Agitation Sedation Scale was used to monitor the level of sedation., we managed our patient within -1/-2, drowsy and light sedation. With constant titration of sedative there was a gradual regression in duration and frequency of seizure, on the 5th day of the treatment the last seizure was recorded and it lasted less than a minute. Other treatment of injury sustained continued, surgical procedures done were under regional anaesthesia. To manage pain in the ICU a selective system nerve block was done. While in the ICU other specialist were co-managing the patient, hence further investigation was done, CT scan, and a psychiatrist's evaluation done. CT scan – normal CT reading. EEG – had disorganized bioelectrical activity, unspecific diffuse slowing, diminished reactivity to afferent stimuli and no epileptiform activity.

Discussion

Usage and discontinuation of drugs must be viewed with severe caution understanding the role it plays in treating the patients and the roles it plays in the development of serotonin syndrome. In treating Those drugs that are not primarily serotonergic can be seen as safe in the development of the syndrome like antidepressants. The agents that are implicated in the syndrome must be discontinued but justifying the risks and benefits, antibiotic therapy of a resistant bacterial infection. It is worth to note that, linezolid was majorly the drug that triggered the serotonin syndrome. Some authors have highlighted that this drug is implicated for the development of this syndrome [4], there also some analysis that did not conclude this drugs as a potential risk for these patients [5]. Life threatening seizures persisting for 5 days was issue of concern, there was also a delay in recovery of patient even after discontinuation of all serotonergic agents.

Case description

A 52-year-old male patient was transferred directly to the ICU through the ER on June 13th, of April 2014, using an emergency ALS ambulance. Patient sustained multiple injury 6 months ago and been receiving treatment from another facility.

Patient has initial diagnosis of multi trauma, penetrating abdominal injury, fractures of the middle third of Rt femurs with external fixation there was soft tissue abnormally. Patient had had surgical interventions, repeated debridement. In the ICU for pain management fentanyl was used.

Psychologically patients developed depression in the hospital, this warranted the addition of duloxetine 60 mg daily.

Wound swab was taken and MCS was done, the result shows a heavy growth of *K. pneumoniae* susceptible to polymyxin E, *C. striatum* was also cultured susceptible to linezolid. Antibiotic therapy was prescribed: colistin 2g / day, and linezolid 600 mg/day. After 6 month of hospital, treatment tremor was noticed, (initially in the treatment tetanus toxoid was administered), the tremor intermittently continued while at rest no change in mental status. Intravenous infusion Diazepam 10 mg was administered bolus; patient was relieved temporarily.

It is important to note that there may be an increase in serotonin syndrome. Even though is its rare syndrome its clinical manifestation is relatively understood, the high-risk populations are patient with sever multiple trauma, patients with gunshot injuries. With the insurgency and banditry on going in Nigeria, the uncontrolled use of antibiotics, poor antibiotic stewardship, high usage of opioids and narcotic drugs, also the usage of antidepressants in management of psycho-neurological disturbances. These risks factors can increase the prevalence of serotonin syndrome, even though the cases are rare it is important to look out for the Serotonin syndrome. The occurrence mild be rare, when the syndrome

is mild it could be attributed to other diseases, like severe traumatic brain injury, sepsis, and narcotic drugs withdrawal symptom, so great vigilance should be employed when serotonergic drug is used for management of patients not undermining treatment results.

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