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Case Report

UNFORESEEN COMPLICATION OF TRAMADOL ADMINISTRATION: A CASE REPORT

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ABSTRACT

We present a detailed case report of a 22-year-old male patient admitted with severe back pain who experienced an unexpected complication following tramadol administration. Despite initial investigations showing no abnormalities, the patient developed convulsions shortly after receiving tramadol. This case underscores the importance of considering rare adverse reactions when administering medications, even in patients without a predisposing medical history.

Keywords: Severe back pain, Tramadol, Convulsions, Complications.

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INTRODUCTION

Tramadol, a synthetic opioid analgesic, is widely used for the management of moderate-to-severe pain, including acute and chronic conditions [1,2]. Its unique pharmacological profile, combining weak mu-opioid receptor agonism with inhibition of serotonin and norepinephrine reuptake, makes it a valuable option for pain relief in various clinical settings [3]. Despite its efficacy, tramadol is not without risks, and adverse reactions can occur, ranging from mild gastrointestinal symptoms to life-threatening events such as seizures and respiratory depression. While tramadol is generally considered safer than traditional opioid analgesics due to its lower potential for respiratory depression and abuse liability, it still carries a risk of dependence and adverse effects, particularly at higher doses or in susceptible individuals [4]. Tramadol-induced seizures are a rare but recognized complication of tramadol therapy. The exact incidence of tramadol-induced seizures is uncertain, with estimates ranging from 0.1% to 1% [5,6]. Seizures typically occur within hours to days of initiating tramadol therapy and may occur even at therapeutic doses. The risk of seizures appears to be dose dependent, with higher rates reported with doses exceeding 400 mg/day [7]. Several mechanisms have been proposed to explain tramadol-induced seizures, including its effects on neurotransmitter systems, particularly serotonin and norepinephrine. Tramadol and its metabolites may lower the seizure threshold by enhancing excitatory neurotransmission and inhibiting inhibitory pathways within the central nervous system [8]. While tramadol-induced seizures can occur in patients with a history of epilepsy or seizure disorders, they may also occur in individuals without predisposing risk factors. Identifying patients at increased risk of tramadol-induced seizures remains challenging, as there are no reliable predictors of susceptibility. Nevertheless, factors such as concurrent use of other medications that lower the seizure threshold, history of substance abuse, and individual variability in tramadol metabolism may contribute to an increased risk [9]. Given the potential for serious adverse effects, including seizures, clinicians must weigh the benefits and risks of tramadol therapy carefully. Alternative analgesic options, such as non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and adjuvant medications for neuropathic pain, should be considered, particularly in patients at increased risk of adverse reactions [10].

CASE PRESENTATION

A 22-year-old male presented to the emergency department with complaints of severe back pain. The pain was sudden in onset and had been worsening over the past few days. The patient denied any history of trauma or recent illness. He had no significant past medical history and was not taking any regular medications. On examination, the patient appeared uncomfortable due to pain. Vital signs were within normal limits. Neurological examination revealed no focal deficits, and there were no signs of meningeal irritation. Initial laboratory investigations, including complete blood count, renal function tests, liver function tests, and random blood sugar, were unremarkable. An X-ray of the lumbar spine showed no evidence of fractures or other abnormalities. In addition, a lumbar spine magnetic resonance imaging (MRI) was performed, which revealed mild degenerative changes but no significant findings to account for the patient's symptoms. Based on the clinical presentation and initial investigations, the patient was diagnosed with non-specific low back pain, and conservative management was initiated. He was prescribed simple analgesics, including acetaminophen and ibuprofen, for pain relief. Despite the initial management, the patient's pain persisted and was becoming increasingly severe. In view of inadequate pain control, it was decided to administer tramadol as an adjunct analgesic. The patient received a single dose of tramadol 50 mg intravenously. Approximately 10 min after receiving tramadol, the patient experienced sudden-onset generalized tonic-clonic seizures lasting approximately 2 min. The convulsions were followed by a brief period of postictal confusion. An urgent neurological assessment was carried out, which revealed no residual neurological deficits. The patient's vital signs remained stable throughout the episode. He was closely monitored for any recurrence of seizures or other adverse events. Subsequent investigations, including a computed tomography (CT) scan of the brain, were unremarkable. Following the initial convulsive episode, the patient was transferred to the intensive care unit (ICU) for further monitoring and management. Neurology and neurosurgery consultations were sought to evaluate the possibility of an underlying neurological condition predisposing the patient to seizures. Detailed history-taking from the patient and his family members revealed no prior history of seizures, head trauma, or significant medical illnesses. A comprehensive review of the patient's medication history did not reveal any use of medications known to lower the seizure threshold. Furthermore, there was no history of substance abuse or recent changes in medication regimen. The patient denied any recreational drug use or alcohol consumption. Repeat laboratory investigations, including serum electrolytes, arterial blood gases, and toxicology screening, were within normal limits. An electroencephalogram (EEG) was performed to assess for any ongoing epileptiform activity. The EEG showed no abnormalities, ruling out an underlying epileptic disorder. Imaging studies, including repeat CT and MRI of the brain,

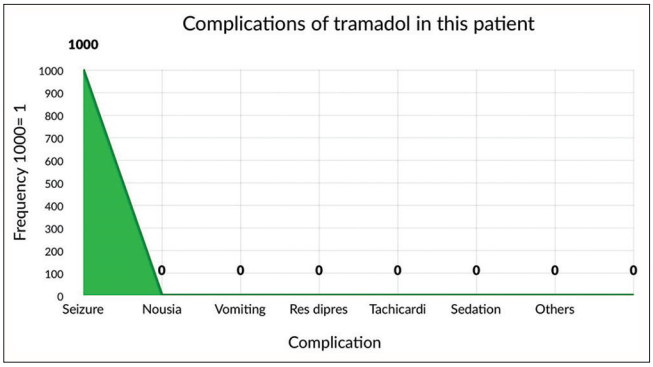

Fig. 1: Complications of Tramadol

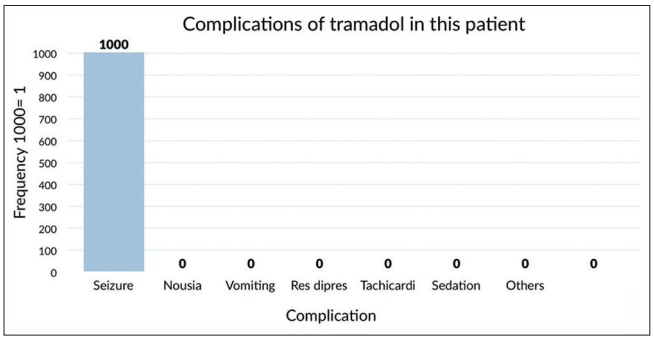

Fig. 2: Complications of Tramadol

were unremarkable, with no evidence of structural abnormalities or intracranial pathology. A lumbar puncture was performed to exclude infectious or inflammatory causes of seizures, and cerebrospinal fluid analysis was normal. Despite extensive investigations, no definitive cause for the patient's convulsive episode was identified. Based on the temporal association with tramadol administration and the absence of alternative explanations, the convulsions were attributed to tramadol-induced seizure activity [1,4,7-9]. The patient was managed with supportive measures, including seizure precautions, continuous EEG monitoring, and intravenous benzodiazepines for seizure control. Tramadol was discontinued, and alternative analgesic modalities, such as NSAIDs and neuropathic pain medications, were considered for pain management. Over the subsequent days, the patient remained seizure-free, and his neurological status gradually improved. He was transferred out of the ICU to the general medical ward for ongoing monitoring and rehabilitation. A multidisciplinary team approach involving neurology, neurosurgery, and pain management specialists was employed to optimize the patient's care and facilitate his recovery.

DISCUSSION

Tramadol-induced convulsions are a rare but recognized adverse event [2,3]. The exact mechanism underlying tramadol-induced seizures is not fully understood but is thought to involve multiple pharmacological actions [4,6,8]. Tramadol and its metabolites may lower the seizure threshold by enhancing serotonin release and inhibiting the reuptake of serotonin and norepinephrine, leading to alterations in neuronal excitability and seizure susceptibility. Several risk factors have been associated with increased susceptibility to tramadol-induced seizures, including a history of epilepsy or seizure disorders, concurrent use of other medications that lower the seizure threshold (such as antidepressants or antipsychotics), and high doses or rapid escalation of tramadol therapy [9]. Given the potential for serious adverse effects, including seizures, clinicians must weigh the benefits and risks of tramadol therapy carefully [5]. Alternative analgesic options should be considered, particularly in patients at increased risk of adverse reactions [10].

CONCLUSION

This case underscores the importance of considering rare adverse reactions when prescribing medications, even in patients without a predisposing medical history. Clinicians should carefully weigh the benefits and risks of tramadol therapy, considering alternative analgesic options, particularly in patients at increased risk of adverse reactions. Furthermore, close monitoring and prompt recognition of adverse events are essential for optimizing patient safety and minimizing potential harm associated with tramadol therapy. In light of this case, further research is warranted to better understand the mechanisms underlying tramadol-induced seizures and identify strategies for mitigating the risk of this rare but serious adverse event. Enhanced pharmacovigilance and continued surveillance of tramadol safety are essential for informing clinical practice and optimizing patient care in the management of pain conditions.

ETHICAL APPROVAL

Approved.

AUTHOR CONTRIBUTION

Dr. Yugal Chandrakar: Formulation of the case report, abstract formulation, introduction, discussion, conclusion, figures and table formulation, and overall supervision.

CONFLICTS OF INTEREST

Nil.

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