

## Anti-Seizure Medication Induced Seizure—A Case Report

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### Abstract:

Seizure-inducing effects have been observed in the treatment of Epileptic patients with anti epileptic drugs. The paradoxical increase may occur as a result of different mechanisms. Oxcarbazepine, a structural derivative of Carbamazepine is used as an anti-convulsant drug and mood stabilizing agent.

Hyponatremia is seen in patients on oxcarbazepine, but symptomatic hyponatremia is rare in patients on oxcarbazepine. Here we present a case of a 65 year old male with Seizure disorder with old CVA and systemic hypertension who was on oxcarbazepine therapy developed further increase in seizures and worsening mental status secondary to Severe hyponatremia.

**Keywords:** Seizures, oxcarbazepine, hyponatremia

**Key messages:** certain drugs like oxcarbazepine which is used in the treatment of epilepsy can itself cause seizures due to hyponatremia.

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### I. Introduction:

Seizure-inducing effects are noted in patients with antiepileptic drugs (AED).

Some of the drugs associated with increasing seizure activity are valproate, carbamazepine and phenytoin. Oxcarbazepine (OXC) is a keto analog of carbamazepine (CBZ) is used as an antiepileptic agent and in bipolar disorder because of its mood stabilizing properties. There are some studies showing paradoxical increase in seizure activity in patients on oxcarbazepine therapy. This could be possibly explained by its mechanism of action as sodium channel blocker. Here we present a known case of seizure disorder who was on oxcarbazepine therapy developing further increase in seizures secondary to severe hyponatremia.

### II. Case Report:

A 65 years old male patient who is a manual labourer presented with Complaints of one episode of seizures few hours before admission to hospital. It was a generalised tonic clonic seizure lasting for five minutes involving all 4 limbs with frothing from mouth and post ictal confusion present. Patient had two episodes of Seizures previous day. He also had complaints of persistent hiccoughs, headache, giddiness and generalized fatigue for the past 2 days. Patient is a known case of Seizure disorder for the past two years on treatment with tab. Oxcarbazepine 600mg Twice daily. He is also an hypertensive on tab. Amlodipine 5mg OD and had a history of CVA with left hemiparesis 3 years back and gradually improved with antiplatelets.

On examination patient in altered sensorium, afebrile, pulse—90/min. regular; BP-130/70mmHg and SPO2-98% in room air. Cardiac and respiratory system examination were normal. Central nervous system – Patient in altered sensorium, spontaneous eye opening present, responded to pain, moved all limbs, deep tendon reflexes were normal and plantar extensor on left and flexion on right side. No signs of meningeal irritation.

His complete haemogram, renal function tests, thyroid function test and Urine routine examination were normal. His serum electrolytes revealed hyponatremia With sodium –105meq/lit, potassium - 3.0meq/lit, chloride\_73meq/lit and bicarbonate\_19meq/lit. Serum osmolality was 273 mmol/lit and urine osmolality was 153mmol/lit. Urine spot sodium was 37.7meq/lit and spot potassium 16.5meq/lit. A Computed tomography of the brain was done to rule out any lesion in the brain and it Showed age related atrophic changes.

Patient was started on intra venous hypertonic saline ( 3%NaCl) infusion and oral free water restriction for correction of hyponatremia. Patient was continuing the medications which he was taking prior to admission. Patient was later started on tab. Tolvaptan 15mg OD. Despite treatment patient had persistent hyponatremia and developed another episode of seizure on day 2 of admission. On day 3 of admission after stopping tab. oxcarbazepine patient serum sodium level gradually improved and patient sensorium improved and was seizure free. Patient serum sodium level was normal after stopping hypertonic saline infusion and tab. tolvaptan. Patient was started on tab. phenytoin 100mg BD and discharged. After one month of discharge

patient was seizure free and serum sodium level normal.

**TABLE1:** Showing the serum sodium and potassium values of the patient since admission

Day after admission	Day 1	Day 1	Day 2	Day 2	Day 2	Day 3	Day 3	Day 4	Day 5	Day 6
Sr.Sodium (Meq/lit)	105	105	106	109	114	119	124	132	132	134
Sr.Potassium (Meq/lit)	3.0	3.6	4.0	-	-	3.9	-	-	3.7	3.7

### III. Discussion:

Seizure-inducing effects are noted in patients with anti epileptic drugs(AED). The paradoxical increase may occur as a result of different mechanisms and exact mechanism remains unclear. Various anti epileptic drugs are found to increase the incidence of seizures. The paradoxical increase in seizure activity is noted more commonly in children than adults. Before concluding that the increase in seizure is a result of anti epileptics clinicians should reassess the diagnosis of the patient, and patients drug compliance. Also studies have shown that polytherapy is associated with AED induced seizures.

Some of the drugs associated with increasing seizure activity are valproate, carbamazepine and phenytoin. Valproate and carbamazepine has been found to cause encephalopathy and increase in seizures especially in patients with partial seizures.

Phenytoin and carbamazepine is found to provoke generalized seizures as absence or myoclonic seizures in animal models. Vigabatrin is found to increase cerebral gama amino butyric acid which has both excitatory and inhibitory effects.

Oxcarbazepine(OXC) is a keto analog of carbamazepine(CBZ) is used as an antiepileptic in partial seizures and also used in bipolar disorder because of its mood stabilizing properties. It was introduced to improve the side effects of CBZ. The dosage is to start at 600mg/day twice daily oral dose and maximize over weeks to 1.2g to 2.4g/day. Oxcarbazepine is less potent than carbamazepine and Clinical doses of oxcarbazepine needs to be 50% higher than those of carbamazepine to obtain equivalent seizure control. Clinical trials have shown that OXC is a more valuable drug as monotherapy and as an adjuvant drug.

The common side effects include dizziness, vomiting, ataxia, and less commonly vertigo, abdominal disturbances are noted. There are some studies showing paradoxical increase in seizure activity in patients on oxcarbazepine therapy. This could be possibly explained by its mechanism of action as sodium channel blocker. Also recent reports suggest that carbamazepine stimulates GABA in the ventrolateral nucleus of the thalamus causing absence seizure and this mechanism can hold good in oxcarbazepine its analogue. However the seizure inducing effect of oxcarbazepine is less compared with carbamazepine.

The other reason for seizures in patients on oxcarbazepine therapy is hyponatraemia. Studies have shown that hyponatraemia in these patients are usually mild and the results of various studies are variable with about 23 to 73%. However symptomatic hyponatremia was seen in 6.8%. In a study and severe hyponatremia is un common in patients on OXC therapy. In a study severe hyponatremia (with seizures and respiratory distress) was noted in 2.8% of the patients. It has been postulated that oxcarbazepine induces SIADH, but the mechanism by which SIADH occurs has been poorly understood. But recent studies suggest that it acts directly on distal nephrons causing free water restriction and urinary sodium loss

Some studies have shown that the dosage of OXC has impact on development of hyponatremia but some studies failed to show a relationship with dosage. Mostly severe hyponatremia was seen in the older patients. The duration of OXC therapy is also variable in most studies. The use of concomitant drugs also increased the incidence of hyponatremia. The drugs increasing the risk of hyponatremia with concomitant use of diuretics, NSAIDs, aspirin, tricyclic anti depressants and other AED s like valproic acid and lamotrigine along with OXC. Most of the patients can be managed with stopping of oxcarbazepine and fluid restriction and only few patients require admission and sodium correction.

To conclude the patients on oxcarbazepine therapy should be monitored regularly for serum sodium levels. Elderly population on poly therapy should be given drugs accordingly to prevent interactions. These patients need to be switched over to other anti epileptic drugs. Also patients with increasing seizure also rule out paradoxical effect seen with OXC therapy

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