

# Seizure related to Paclitaxel and Carboplatin infusion in breast cancer patient

*By Rizaldy Taslim Pinzon*

CASE REPORT

**Seizure related to Paclitaxel and Carboplatin infusion in breast cancer patient**

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**ABSTRACT**

<sup>1</sup>  
Seizure is a common symptom of brain tumors, whether they are primary or metastatic. Seizure in patient with breast cancer can sometimes occur for reason unrelated to tumor, such as metabolic encephalopathy, cytotoxic chemotherapy, paraneoplastic syndromes, cranial irradiation and stroke related to cancer. Many chemotherapeutic agents also reported cause seizures (paclitaxel, cisplatin, 5- fluorouracil, methotrexate and cyclosporine). We present a case of 45-years-old female who experienced an acute seizure shortly after receiving an infusion of Paclitaxel and Carboplatin for grade 3 ductal breast cancer. This rare adverse drug reaction should increase the physicians and pharmacist in treating cancer patients.

Keywords: seizure, acute symptomatic, paclitaxel, carboplatin, breast cancer

## INTRODUCTION

<sup>4</sup> Seizures are common in cancer patients, with brain metastases being the leading cause in adults [1]. These metastases often originate from the skin, breast, lungs, kidneys, and colon, with approximately 70% annually coming from the lungs or breast <sup>4</sup> [2]. The incidence of seizures varies depending on the type of brain neoplasm. <sup>1</sup> Cancer patients are at a higher risk of seizures due to various factors <sup>1</sup> unrelated to the tumor itself, such as cytotoxic chemotherapy, metabolic encephalopathy, paraneoplastic syndromes, cranial irradiation, and stroke associated with cancer. Numerous chemotherapeutic agents can also induce seizures [2,3].

Carboplatin and paclitaxel may both induce nerve toxicity as a side effect, often manifesting as axonal sensory peripheral neuropathy. Although neurotoxicity affecting the central nervous system, like acute seizures is uncommon, there have been past reports linking these drugs to seizures, cortical blindness, aphasia, hemiparesis, and coma [4].

<sup>6</sup> We present a case of a 45-year-old woman with ductal breast carcinoma who experienced a seizure shortly after receiving an infusion of paclitaxel and carboplatin. Her laboratory tests returned normal results, and a CT scan of the brain showed no signs of <sup>8</sup> primary metastasis or meningeal carcinomatosis. She had no infection symptoms, history of seizures, fever or medication that might predispose her to such an event. After eliminating other potential causes, the seizure was most likely attributed to the chemotherapy, with carboplatin and paclitaxel being the probable agents due to their temporal association with the adverse event.

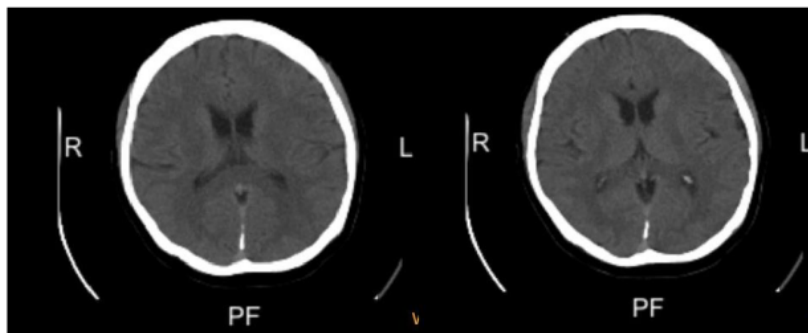
## CASE PRESENTATION

A 45-year-old woman who had received first time chemotherapy after mastectomy for ductal carcinoma of the breast was referred to emergency department. She came with general tonic-clonic seizure after 10 minutes infusion of paclitaxel 210 mg and carboplatin 300 mg. The premedication were ondansetron 8 mg, one ampule of ranitidine, and one ampule of 4 mg Dexamethasone. During the seizure, she exhibited up-rolling of the eyeballs and tongue biting. She was sedated with intravenous

diazepam and started on phenytoin. After the seizure, she showed signs of confusion, drowsiness, and slurred speech.

A neurology examination confirmed a diagnosis of simple partial seizure with secondary generalization. Electroencephalography (EEG) revealed abnormally activity, including sharp waves and a slowing pattern. A computed tomography (CT) scan of the brain showed no focal lesions. Laboratory tests, including complete blood counts, renal function tests, blood sugar levels, liver function tests, and serum electrolytes such as calcium, chloride, kalium, natrium, and magnesium were all within normal limits. Additionally, the chest X-ray, electrocardiography, and two-dimensional echocardiogram were normal. The patient's blood pressure remained stable before, during, and after chemotherapy. There were no complaints of fever or signs of sepsis.

At the times of discharged, she was fully alert, no seizure, and independent. Two weeks later, she reported no neurological complaints. She continued receiving phenytoin injections for three days without any further seizure episodes. Upon discharge, she was prescribed oral phenytoin and levetiracetam.



**FIGURE 1.** The brain CT scan of the patients, rule out brain metastases

## DISCUSSION

Seizures in cancer patient can result from primary and metastatic brain tumors, paraneoplastic syndromes, or treatment-related factors such as radiation therapy, chemotherapy, and other drugs like antibiotics and narcotics. Seizures occur in less than 1% of patients treated with systemic chemotherapy. Chemotherapy, which involves

aggressive biological agents, can have significant adverse effects on the human body. Platinum-based agents are considered first-line cytotoxic treatments for many cancers, but they are known for their neurotoxicity [3,5].

Platinum-based drugs frequently cause peripheral sensory neuropathy because they more readily enter the dorsal root ganglia and peripheral nerves than the brain, due to limited penetration of the blood-brain barrier. Common toxic effects include hypokalemia, hypocalcemia, and hypomagnesemia [5,6].

Several previous reports showed the nervous system toxicity either with paclitaxel or carboplatin. Transient cortical blindness, seizures and posterior reversible encephalopathy syndrome (PRES) have been reported [6,7]. Encephalopathy, both acute and late-onset, has been observed with paclitaxel, although some cases involved underlying brain metastasis, prior radiotherapy to the brain, disruption of the blood-brain barrier, or brain surgery. Seizures shortly after paclitaxel infusion initiation have been reported, with one case describing hypersensitivity symptoms like chest tightness and flushing followed by a generalized tonic-clonic seizure within 5 minutes of infusion. However, in our patient, the paclitaxel infusion proceeded without incident [8,9].

An algorithm for diagnosing chemotherapy-induced seizures was established using the WHO-UMC causality assessment system, considering: (1) onset of encephalopathy shortly after chemotherapy infusion; (2) exclusion of other physical or metabolic factors that could trigger seizures; (3) absence of concurrent administration of other drugs or analgesics; and (4) response to withdrawal [8,9]. In our patients, other causes of encephalopathy were ruled out by neuroimaging and blood serum examination. The strongest evidence for our hypothesis is provided by the fact that a seizure occur shortly after the infusion without any other possible causes. Carboplatin appears to be the more likely culprit based on the temporal relationship between its administration and the seizure. However, we cannot completely dismiss paclitaxel as a potential contributing factor [9].

## CONCLUSION

We present a rare case of seizure induced by carboplatin and paclitaxel infusion. While seizures triggered by chemotherapeutic agents are uncommon, it's crucial for physicians and pharmacists to be aware of this potential adverse drug reaction.

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