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## Local anesthesia toxicity in occipital nerve block: A case of generalized tonic-clonic convulsions

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### Abstract

We present a case of local anesthesia toxicity resulting in generalized tonic-clonic convulsions following an occipital nerve block procedure. A 42-year-old female patient underwent an occipital nerve block procedure for her persistent daily headaches. Shortly after the injection, she experienced an episode of generalized tonic-clonic seizure. Prompt recognition and management led to the resolution of the attack without any residual neurological sequelae. This case highlights the importance of vigilance during occipital nerve blocks, early identification of potential adverse events including seizures albeit rare and appropriate management of local anesthesia toxicity accordingly.

**Keywords:** Local anesthesia toxicity, occipital nerve block, generalized tonic-clonic convulsions, adverse events

### Introduction

Occipital nerve block (ONB) is a commonly performed procedure for various headache disorders including occipital neuralgia<sup>[1]</sup>, chronic migraine, cervicogenic headache, cluster headache as well as for the management of post dural puncture headache (PDPH). ONB is historically considered to be a low-risk procedure and is often performed with the aid of ultrasound guidance<sup>[2]</sup>, even though blind technique is also quite prevalent. ONB is generally considered safe but rare complications such as local anesthesia toxicity can occur as documented in literature.

Our case highlights the occurrence of local anesthesia toxicity resulting in generalized tonic-clonic convulsions following an ONB procedure thereby emphasizing the importance of prompt recognition and management of adverse events associated with this procedure.

### Case Presentation

A 42-year-old female with a history of chronic daily persistent headaches presented for an ONB in the pain clinic. She did not respond to any prophylactic medications for headaches and hence was referred for ONB for symptom relief. She had received an ultrasound-guided procedure with mild improvement in pain scores and hence on her one-month follow-up appointment she requested the procedure to be repeated for symptom relief. She had symptoms of psychological distress and personality disorder, however there was no disclosure of any prior history of epilepsy, cardiac arrhythmias or previous use of psychotropic medications. She denied any other concomitant medical or surgical illnesses. Hence, she was planned for ONB after obtaining an informed consent. The procedure was performed in a prone position without sedation. The greater occipital nerve was targeted between the semi-spinalis and inferior oblique capitis muscle plane. The needle was constantly monitored during the procedure, and 3 ml of 1% lidocaine with 8 mg of dexamethasone was injected on both sides. The injection was given gradually with each 0.5ml of injectate being carefully aspirated and the needle tip being closely observed. She was shifted to the post-procedure area and 2% lidocaine soaked on a cotton tip applicator was inserted in bilateral nostrils to perform a sphenopalatine ganglion block. After the procedure, the patient initially reported feeling comfortable. However, within 15 minutes, she experienced a brief 3-5 minutes episode of generalized tonic-clonic seizures. She was administered a dose of 2 mg of midazolam intravenously with measures taken to safeguard her airway and circulation.

She remained to be hemodynamically stable despite being unconscious during the incident. She regained consciousness over the next 30 minutes without any residual neurological deficits. She underwent both EEG and Computerized Tomographic scan of the brain, both of which were within normal limits. Her blood investigations including a comprehensive metabolic panel including blood glucose was within normal limits.

Retrospective historical evaluation with a close family member revealed similar episodes of loss of consciousness in the past for the patient, who apparently never underwent evaluation for the same and was not on any active medications for the same. She was advised on a detailed evaluation from Neurology services for further evaluation and management of these episodes of loss of consciousness, which could potentially point towards the possibility of an underlying seizure disorder.

### Discussion

Even though considered to be a safe procedure, ONB can occasionally cause serious complications, such as the generalized tonic clonic seizure, which was apparently attributed to local anesthesia toxicity especially in those with epilepsy. In our index case, the prior history of possible epilepsy was not disclosed by the patient and she was not evaluated for the same in the past.

Afridi *et al.* [3] performed a total of 116 greater occipital nerve injections in 101 patients with primary headache syndromes. The study documented adverse effects post procedure which included vaso-vagal syncopal attack during the procedure in one instance, temporary dizziness after the injection in three cases, hair loss around the injection site in two cases, and typical headaches immediately after injection in three cases. It is worth mentioning that there were no reports of local anesthesia toxicity in occipital nerve blocks which was possibly due to the small amount of the anesthetic agent used. On the other hand there has documented evidence of sudden loss of consciousness again pointing towards a syncope in those with bone defects who received a lesser occipital nerve block as a result of subarachnoid injection (OKUDA *et al.*) [4]. However, there has been an isolated case report in literature of a generalized seizure induced by inadvertent injection of local anesthetic agent into the brain during scalp blocks (Woo Kyung Lee *et al.*) [5]. This case serves as a stark reminder of the risks associated in those with cranial defects.

In a review by Francesco *et al.*, The adverse effects of different psychotropic drugs were studied which were mainly dose-dependent [6]. In addition to drug-related factors, presence of underlying epilepsy, brain damage and inherent seizure threshold influences the likelihood of seizure precipitation during psychotropic drug administration. Timely recognition and management of local anesthesia toxicity are imperative to prevent severe complications during a seemingly straightforward medical procedure such as occipital nerve blocks. The treating team must be vigilant about the signs and symptoms of local anesthesia toxicity, distinguishing it from vasovagal episodes. The presence of intra-lipids and swift action from the rapid response team is crucial, with prompt management of an epileptic attack.

The take home message from our index case was the history of recurrent episodes of loss of consciousness potentially suggestive of a primary generalized epilepsy, which was not

disclosed by the patient during historical evaluation to the consulting team. In our case the event was a generalized tonic clonic seizure as evidenced clinically and most likely attributed to local anesthesia toxicity in the setting of underlying epilepsy. There is no likelihood of intra-cerebral or subarachnoid injection since there was a 15-minute interval between the injection and the occurrence of seizures along with no focal neurological symptoms upon recovery of the episode. Similarly, the possibility of vertebral arterial injection was ruled out for the same reason, even though injecting as little as 0.5 ml of local anesthetic into the vertebral artery could result in immediate seizures. We can still speculate delayed onset of seizures due to slow intravenous absorption as the dose was very small. Hence the only plausible explanation for the symptoms was local anesthetic toxicity even though the dose of medication administered was too low to cause it. This could be possibly explained by the lowering of seizure threshold in our index patient secondary to background history of untreated epilepsy as well as psychosocial stressors.

### Conclusions

Our case highlights a case of local anesthesia toxicity that resulted in a generalized tonic clonic seizure after an occipital nerve block. Healthcare providers who perform occipital nerve blocks should be aware of potential adverse events, even though rare and be prepared to identify as well as manage local anesthesia toxicity effectively. It is also prudent to take a detailed history including any possible history of seizures or epilepsy and psychotropic drug use in the past, thereby potentially identifying those who are at risk for developing this hitherto rare complication attributed by local anesthesia toxicity.

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### Conflict of Interest

Not available

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Not available

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