

Seizures during Pars Plana Vitrectomy Surgery with Retrobulbar Anesthesia: A Case Report

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Abstract

We are presenting a patient who experienced generalized tonic-clonic seizures after retrobulbar injection of 2% lidocaine and 0.75% bupivacaine before pars plana vitrectomy surgery. Airway control was achieved and oxygen was given manually via a face mask. He recovered spontaneous ventilation five minutes later but did not remember experiencing the seizures. The patient had no personal or family antecedents of epilepsy. A computed tomography scan of brain was normal. As seizures are rare and serious complications which can occur during locoregional anesthesia, the mechanisms involved in this complication and possible methods of prevention should be discussed clinically.

Keywords: Seizures; Retrobulbar anesthesia; Lidocaine; Bupivacaine

Introduction

Locoregional anesthesia techniques are generally applied in ophthalmic surgery [1]. Retrobulbar anesthesia is successfully used in vitrectomy surgery for its effectiveness and safety; however, various complications during the administration of retrobulbar anesthesia have been described [2-5]. Of these, seizures are a serious complication [6]. In the case of seizures during retrobulbar anesthesia, we will discuss the mechanisms involved in this complication and possible methods of prevention. Written consent to discuss this case was obtained from the patient.

Case Report

A 60 y old man diagnosed with retinal detachment after proliferative diabetic retinopathy was scheduled for pars plana vitrectomy surgery on his left eye. His medical history included diabetes mellitus, hypertension and an old cerebral infarction. His medications included insulin to decrease blood glucose. There were no personal or family antecedents of allergy, epilepsy or toxic drugs.

The anesthetic mixture contained 2% lidocaine and 0.75% bupivacaine (1:1). The needle used was 25 GA, with a length of 35 millimeters (mm). There was no return of blood upon aspiration before the injection, but the patient was extremely nervous and had a blood pressure of 160/100 millimeters of mercury (mmHg). When the injection was performed with 3 milliliters (ml) of mixture in his lower temporal retrobulbar space, he experienced generalized tonic-clonic seizures with respiratory obstruction and loss of consciousness. The operator immediately withdrew the needle. We used a spatula to keep the airway unobstructed and gave oxygen manually via a face mask. He recovered spontaneous ventilation five minutes later but did not remember experiencing the seizures. Because the patient had no personal or family antecedents of epilepsy, a computed tomography (CT) scan of his brain was used to exclude secondary causes such as a subarachnoid hemorrhage (Figure 1). Fortunately, the scan was

normal. A neurologist evaluated the patient and finally diagnosed him with primary seizures. A subconjunctival hemorrhage in the left eye of this patient was found. The patient was kept in the hospital for three days to ensure that there would be no recurrence of the seizures and then the patient went home. The eye surgery was postponed.

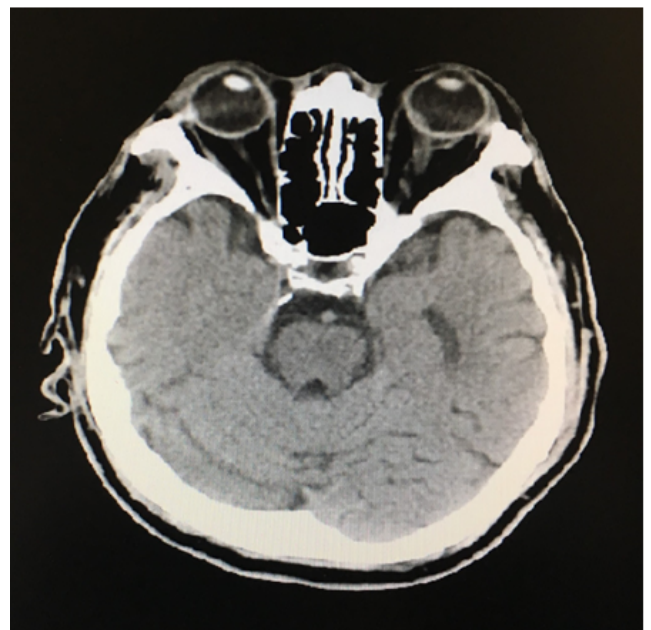


Figure 1: Cranial Computed Tomography.

There was no subarachnoid hemorrhage or large infarction; there was old infarction of the lateral ventricle. Local soft tissue was thickened in the posterior wall of the left eyeball.

Discussion

The differential diagnosis we first evaluated was hypersensitivity to anesthesia drugs. When we were ready to inject the epinephrine, we found that the patient's blood pressure was high, so we excluded it. Then the neurologist examined the patient and diagnosed him with seizures. The condition of this patient demonstrates the rare occurrence of seizures during retrobulbar anesthesia. Because the patient had no history of seizures, we suggested that the occurrence of the seizures was multifactorial. The main mechanism may have been an inadvertent intra-arterial injection in the ophthalmic artery or its branches. The ophthalmic artery springs from the internal carotid artery and usually traverses the orbit above the optic nerve. Because the patient had a subconjunctival hemorrhage, we speculated that the needle punctured the vessel, leading to anesthesia pouring into the bloodstream and resulting in toxicity. The inadvertent injection of local anesthetic directly into the central nervous system (CNS) via a puncture of the optic nerve or its sheath may be the other possible cause. The optic nerve is surrounded by three envelopes which are the extension of the cerebral meninges. Kobet showed that there is communication between the central cerebral structures and the optic nerve [7]. A long needle may damage the optic nerve through these envelopes if the direction of the needle is deflected. The medicine may diffuse under the arachnoid or subdural space and reach the brain structures, causing a direct intoxication of the brain, though this is a rare occurrence. A steeply angled, deeply situated ophthalmic block needle is more likely to reach critical structures than a shallowly placed, shorter needle. Therefore, the shorter needle may be safer [8].

Stress may be another factor for this patient. Before retrobulbar anesthesia, the patient was nervous, and his blood pressure was 160/100 mmHg even though he had taken diazepam orally 30 minutes before going into the operating room. Although the patient had no history or family history of seizures, stress convulsions cannot be ruled out [9]. Though the true cause of the seizures in this case is unclear, we still speculate that the toxicity of the anesthesia medications is the direct trigger.

The case report suggested that seizures are a rare complication during locoregional anesthesia, especially for ophthalmologic surgery, with a rate of about 0.1% [6]. A previous study indicated that seizures during locoregional anesthesia with bupivacaine and procaine may be more common than with lidocaine [6]. The patient received a mixture of lidocaine and bupivacaine and probably experienced direct toxicity. Some patients may feel dizzy or sleepy before seizures. The patient was nervous and felt no dizziness or sleepiness. One study suggested that patients who experience seizures because of locoregional anesthesia may have cardiovascular anomalies [6]. Bensghir found that one

patient who had pre-existing high blood pressure experienced seizures after peribulbar anesthesia for cataract surgery [10]. Our hypertensive patient was extremely nervous, and his blood pressure was high before the injection. When seizures occurred, the patient's blood pressure was not any higher than it had been prior to the injection, and his heartbeat was no more than 100 beats per minute (bpm), which is similar to the previous study [6].

Conclusion

In order to improve the safety of retrobulbar anesthesia, we suggest that shorter needles with accurate direction be used by experienced physicians. This case is both helpful and cautionary for ophthalmologists that operate using retrobulbar anesthesia. When abnormal conditions occur, ophthalmologists need to evaluate them quickly and make exact diagnoses, taking emergency measures as soon as possible. Once the seizures have resolved, physicians need to examine their patients to determine the possible causes.

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