

Case report

Contralateral amaurosis after a retrobulbar block

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ABSTRACT

Purpose: To describe and discuss the workup and management of a rare complication of retrobulbar anesthesia, as well as CT and MRI findings of this complication.

Observations: The patient underwent uncomplicated pars plana vitrectomy with membrane peel for epiretinal membrane removal. Shortly after completion of surgery, the patient noted that he could not see out of his non-operated eye. Visual acuity was bare hand motion, and physical exam revealed a dilated, non-reactive pupil with normal, well-perfused retina. Imaging revealed an air bubble in the optic nerve of the operated eye, suggesting penetration of the optic nerve sheath during retrobulbar block with posterior spread of anesthetic to the contralateral optic nerve.

Conclusions and importance: After imaging ruled out acute intracranial pathology and confirmed the correct diagnosis, the patient was monitored until vision in the non-operated eye returned to baseline. Excellent visual acuity was attained in the operated eye. Central spread of anesthetic after retrobulbar anesthesia is a rare but potentially life-threatening complication that must be promptly diagnosed and addressed.

1. Introduction

Retrobulbar block is an anesthetic technique frequently used prior to ophthalmic surgery as a means of providing ocular anesthesia, akinesia, and post-operative analgesia. Complications from retrobulbar block occur infrequently and range from mild to life-threatening. These complications include retrobulbar hemorrhage, retinal vascular occlusions, optic nerve injury, ocular perforation, subarachnoid infiltration with spread to the central nervous system (CNS), seizures and cardiorespiratory distress. It is essential that the surgeon providing retrobulbar anesthesia be able to promptly recognize and handle complications associated with this procedure.

We report a case of contralateral amaurosis after retrobulbar block that was performed prior to vitrectomy for epiretinal membrane peel, as well as discuss the differential diagnosis and proposed mechanism.

2. Case report

A 71-year-old male with a visually significant epiretinal membrane in the left eye underwent 23-gauge pars plana vitrectomy with membrane peeling. He reported a medical history of only hypertension and

prostate cancer. He had no other ocular history or previous surgeries.

In the preoperative area, the patient received three sets of 1% cyclopentolate and 2.5% phenylephrine eye drops to dilate the left eye for surgery. The patient was brought to the operating room and, under monitored anesthesia care with propofol, a left retrobulbar block was performed using a 25-gauge, 1.5 inch Atkinson needle injecting 6 cc of a 1:1 mixture of 0.75% bupivacaine and 2.0% lidocaine. The 25-min surgery went well without complication including normal vital signs throughout. The left surgical eye was patched and when the patient sat up he noticed that he could not see out of his right (non-operative) eye. Visual acuity of the right eye was bare hand motion (baseline pre-operative visual acuity was 20/20), and the right pupil was 7 mm and minimally-reactive. The intraocular pressure was normal and extraocular movements were intact. Indirect ophthalmoscopy of the right eye showed a normal fundus exam with well-perfused retina. One drop of 1% pilocarpine was administered in the right eye and constricted to 1.5 mm, ruling out pharmacologic dilation.

At this point a hospital code for stroke was called due to the concerning findings. Initial neurologic exam performed by the neurology team was unremarkable, and immediate CT scan of the brain showed no acute intracranial pathology but revealed an air bubble within the left

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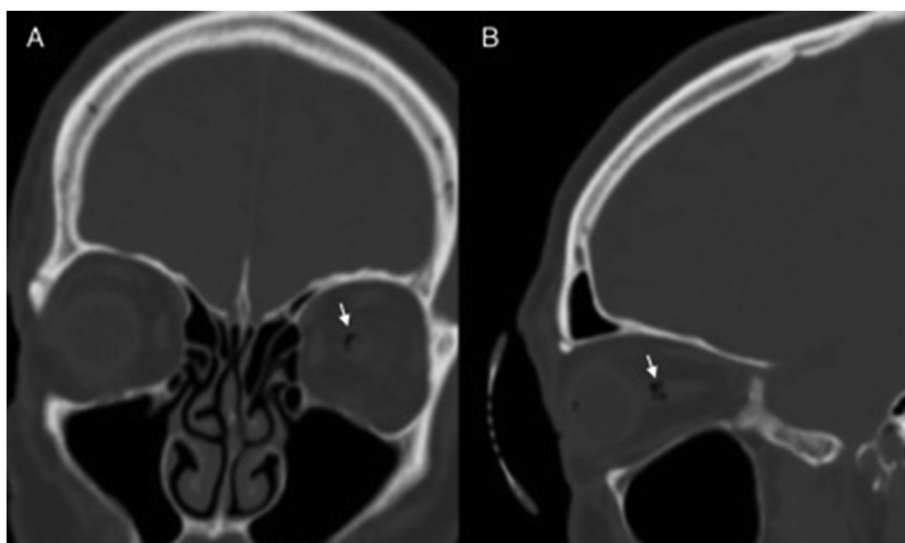


Fig. 1. CT scan of the orbits showing an air bubble (white arrow) in the left optic nerve sheath on both coronal (Fig. 1A) and sagittal (Fig. 1B) cuts.

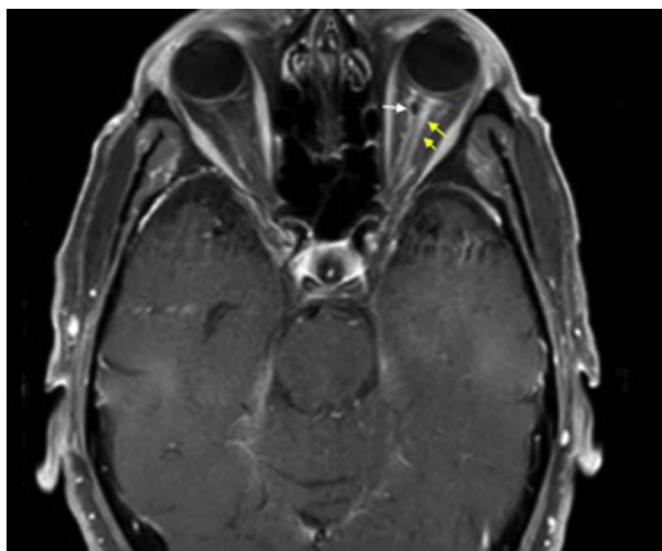


Fig. 2. Axial T1 view of MRI brain showing an air bubble (white arrow) in the left optic nerve sheath and abnormal enhancement along the left optic nerve (yellow arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

optic nerve sheath (Fig. 1). Subsequent MRI/MRA of the brain and orbits showed no intracranial pathology but revealed abnormal enhancements along the left intra-orbital optic nerve along with confirmation of an air bubble within the optic nerve sheath (Fig. 2). The patient's vision in the right eye slowly returned to baseline, testing 20/20 with a near card 90 minutes after the conclusion of surgery. During the post-operative period, the vision remained normal and both fundus exam and macular optical coherence tomography were unremarkable.

3. Discussion

Retrobulbar block is an anesthetic technique frequently used before many ophthalmic surgeries as a means of providing ocular anesthesia, akinesia, and post-operative analgesia. It is known that uncomplicated peribulbar and retrobulbar anesthesia can cause pupillary dilation and a decrease in visual acuity.¹ Complications of retrobulbar anesthesia include retrobulbar hemorrhage, retinal vascular occlusions, optic nerve injury, ocular myotoxicity, ocular perforation, subarachnoid

infiltration with spread to the CNS, seizures and cardiorespiratory distress.² Additionally, anesthetic infiltration of the brainstem, the most serious and life-threatening complication of retrobulbar block, can cause confusion, ophthalmoplegia, respiratory depression, apnea, and contralateral amaurosis.³ The first sign of brainstem anesthesia is often a sudden increase in blood pressure or heart rate,⁴ neither of which occurred during our case.

Immediately after the patient noted vision loss in the contralateral eye, a broad differential diagnosis was quickly considered given the severity of the situation. Considered were occipital lobe stroke, posterior ischemic optic neuropathy (PION), pharmacologic dilation of the non-operative eye, and complication from retrobulbar anesthesia. In order to cause such severe vision loss, bilateral occipital lobe stroke would be necessary. PION was also considered, but there was no significant blood loss during the surgery and normal blood pressure was maintained throughout the case. Pharmacologic dilation of the contralateral eye would not cause such severe vision loss and administration of pilocarpine resulted in constriction of the pupil, ruling out pharmacologic dilation as a confounding variable in this clinical scenario.

The diagnosis of CNS infiltration of retrobulbar anesthesia was confirmed by CT evidence of an air bubble in the ipsilateral optic nerve (Fig. 1), which showed that the retrobulbar needle had penetrated the optic nerve during administration of anesthetic. We propose that when the anesthetic was injected into the ipsilateral optic nerve sheath, it spread posteriorly to the chiasm and blocked transmission of nerve impulses in the contralateral optic nerve. It has been shown that uncomplicated retrobulbar anesthesia results in a temporary conductivity block in the optic nerve for about 2 hours by comparing visual evoked potential (VEP) before and shortly after administration of the block.⁵ It is therefore unsurprising that when anesthetic is injected into the optic nerve sheath and has access to the optic chiasm, it may result in a temporary but severe loss of vision with a dilated and minimally reactive pupil in the contralateral eye. In addition, this is the first case we are aware of in which MRI findings have been described after penetration of the optic nerve sheath during retrobulbar block. MRI showed abnormal enhancements along the intraorbital optic nerve, mimicking inflammatory conditions such as perineuritis.

Contralateral transient amaurosis is a rare complication of retrobulbar block that has been previously described,^{4,6-8} and conduction of the contralateral optic nerve is affected by spread of the anesthetic through the optic nerve sheath to the optic chiasm. Fortunately, in this case central spread of anesthetic beyond the optic chiasm did not occur

and no systemic problems occurred. Ophthalmologists that perform retrobulbar blocks should be aware of this possible complication of contralateral amaurosis as well as other potential life-threatening complications.

Patient consent

Verbal consent for publication was obtained from the patient at his post-operative visit.

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All authors attest that they meet the current ICMJE criteria for Authorship.

References

1. Talks SJ, Chong NHV, Gibson JM, Francis IR. Visual acuity and pupillary reactions after peribulbar anesthesia. *Br J Ophthalmol*. 1994;78:41–43.
2. McGoldrick KE. Complications of regional anesthesia for ophthalmic surgery. *Yale J Biol Med*. 1993;66:443–445.
3. Ahn JC, Stanley JA. Subarachnoid injection as a complication of retrobulbar anesthesia. *Am J Ophthalmol*. 1987 Feb 15;103(2):225–230.
4. Jericho B, Ulanski L. Contralateral amaurosis after retrobulbar block for vitrectomy presenting solely with hypertension and tachycardia. *Internet J Anesthesiol*. 2009;24 Number 2.
5. Heuermann T, Anders N, Pham DT, Wollensak J. The effect of retrobulbar anesthesia on visual evoked responses. *Klin Monbl Augenheilkd*. 2002 Mar;219(3):101–108.
6. Ghadiali Q, Ghadiali LK, Schiff WM, Odel JG. Contralateral anesthesia in two patients after retrobulbar block. *Retin Cases Brief Rep*. 2018;12(2):97–99 Spring.
7. Bishara SA, Estrin I, Rand WJ. Immediate contralateral amaurosis after retrobulbar anesthesia. *Ann Ophthalmol*. 1990 Feb;22(2):63–65.
8. Friedberg HL, Kline Jr OR. Contralateral amaurosis after retrobulbar injection. *Am J Ophthalmol*. 1986 Jun 15;101(6):688–690.