

CASE REPORT

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Unilateral Visual Loss after a Nasal Airway Surgery

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Abstract: Septoplasty and turbinoplasty are common ear, nose, throat (ENT) operations which generally have low complication rates. A 45-year-old man had a septoplasty operation and a right turbinoplasty operation under a combined general and local anesthetic. He woke from the procedure with a reduced visual acuity in the right eye and substantial inferior visual field loss. A review of the current literature focuses on the vasospasm effects of local anesthetic, in combination with epinephrine on the intricately linked nasal and orbital vascular supply.

Keywords: septoplasty, turbinoplasty, vision loss, vasospasm

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Introduction

Septoplasty and turbinoplasty are common ear, nose, throat (ENT) procedures, which aim to straighten the nasal septum and reduce nasal obstruction. The procedures are routinely completed as a day case procedure due to its low complication rates.¹ The operation can either be performed under general anesthetic, local anesthetic, or a combined general and local anesthetic. ENT surgeons are able to provide appropriate pain relief and homeostasis by infiltrating the nasal septum and the inferior turbinates.²

Here, we report a case of unilateral visual loss post septoplasty and turbinoplasty, and discuss the current evidence available in this rare complication.

Case Report

A man in his 40s presented to ophthalmology with reduced vision in his right eye. The patient was initially referred under ENT after complaining of nasal congestion and postnasal drip. He was found to have a deviated nasal septum to the right and hypertrophied turbinates. There was no deviation of the caudal septum, only a bony septal deviation. The patient did not, however, have any noticeable deviation of the nose externally. There was no hyposmia. There was the presence of a vomer spur.

A week prior, the patient had had an elective septoplasty and right turbinoplasty for a nose fracture, which had been manipulated under anesthesia 13 years earlier. The patient was under a general anesthetic for the more recent procedure, and local infiltration of the nasal septum and tissue surrounding the inferior turbinate was completed with 6.6 mL of Lidocaine hydrochloride 2% and 1:80000 epinephrine. The septoplasty and turbinate reduction were performed through hemitransfixion incision by an ENT specialist trainee in their third year. The caudal part of the perpendicular plate was dissected. No cautery was used during the surgery. The surgery lasted a total of 1 hour. The nose was packed postoperatively using merocel packing.

The operation appeared to have no intraoperative complications; however, on waking the patient had reduced vision in the right eye. The following day the patient was noted to have right periorbital bruising. The patient complained of visual blurring and reduced vision directly following the procedure in the right eye. However, the patient was non-descriptive about

his visual loss at the time and was not concerned. An informal assessment of vision was done by one of the junior colleagues in ENT. It was documented that there was full eye movements on examination and no evidence of diplopia, but no formal assessment of vision was done. The visual blurring was thought to be due to the Lacrilube eye drops given to the patient preoperatively. The extent of visual loss of the patient was not fully appreciated at the time. The patient was discharged to continue his recovery. He returned to A&E after 1 week complaining of loss of lower field of vision in the right eye and was reviewed by ophthalmology for a formal examination of his vision including a visual field test.

He had no previous medical history. Upon examination, the vision in the right eye had the ability to count fingers up to a distance of one meter, and 6/5 in the left eye. There was top lid bruising and associated swelling with 2 mm of non-pulsatile proptosis in the right eye. Unfortunately, there were no measurements regarding presence of proptosis documented preoperatively. However, 1–2 mm proptosis can be totally normal in this case. The patient had afferent pupillary defect in the right eye and a normal anterior segment. Visual fields showed a large arcuate field defect with substantial inferior visual field loss in the right eye and a normal left eye (Fig. 1). Dilated fundoscopy revealed bilateral healthy discs and macula. In view of the periorbital bruising, a high resolution CT scan was done which showed no evidence of trauma to the orbit.

MRI scan was subsequently performed which confirmed there was no evidence of acute brain infarction with both occipital cortex's appearing unremarkable. The report confirmed no evidence of orbital cellulitis or orbital fracture and there was a left hemisinus present. There were no radiological features to explain the loss of vision.

A fluorescein angiogram was also completed which revealed a delayed appearance of fluorescein at 28 seconds implying a poor or reduced blood supply to the right eye.

The patient was reviewed 3 days later where the vision had spontaneously recovered to 6/36, an improvement to the finger counting limit of 1 m. The visual acuity continued to improve on the subsequent follow up and at 8 months after the procedure, the patient had 6/6 vision with glasses. At time

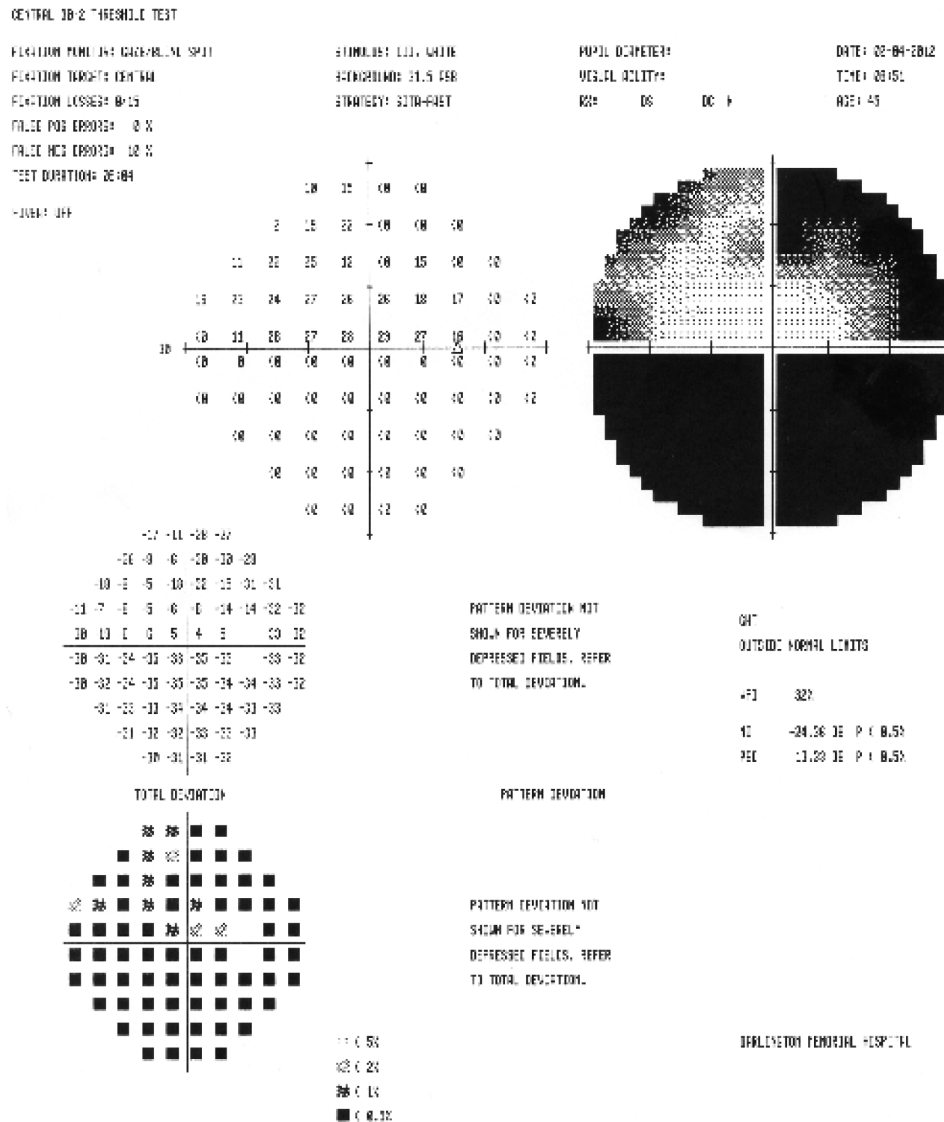


Figure 1. Visual fields testing in the right and left eye. Notes: Right eye showed large arcuate field defects and substantial inferior visual field loss. Left eye—normal visual fields.

of document submission, the patient is still suffering from impairment of the lower half of his vision. A field test showed an inferior field loss for the right eye.

Discussion

Monteiro³ reports a case of unilateral blindness following direct intraoperative trauma to the medial orbital wall. He advises prompt imaging to rule out this possibility given the potential recovery in selected cases. During our case the orbit wall remained undamaged and this was confirmed on MRI scan.

Jaison et al⁴ reports a case of blindness following nasal surgery as part of an orbital apex syndrome. He reports a case where a massive hemorrhage caused

compression of the orbital apex leading to damage of the optic nerve, oculomotor, trochlear, abducens, and ophthalmic portion of the trigeminal nerve.

Although our patient had 2 mm of proptosis in his right eye, there was no evidence of pulsatile proptosis or bruits. An MRI scan revealed no hemosinus present on the right side making this hypothesis highly unlikely.

A further cause of visual loss reported in the literature is embolization involving the retinal, choroidal, or retrobulbar circulation from intranasal anesthetic injection.⁵ Although this cannot be completely ruled out in our case, it is highly unlikely due to the lack of embolic risk factors given the patient’s young age and



absence of underlying hypertension, hypercholesterolemia, and diabetes.

Enriquez et al⁶ reported a case of a 42-year-old gentleman who underwent septoplasty under general anesthesia and presented with reduced visual acuity immediately following surgery, which was uneventful. Vision was light perception and a right afferent papillary defect was noted with normal funduscopy findings. A diagnosis of posterior ischemic optic neuropathy was made following appropriate imaging studies revealing the integrity of the optic nerve canal. There was normal choroidal filling demonstrated by fluorescein angiography, however visual evoked potential showed no signal on the right. Although posterior ischemic optic neuropathy (PION) is usually a diagnosis of exclusion, it is very uncommon. Two cases reported in the literature follow perioperative hypo-perfusion or disorders such as giant cell arteritis.

Evans et al⁷ described PION in a case of a 25-year-old woman who had visual loss following intranasal injection. This was thought to be caused by injection of corticosteroid into the inferior turbinate.

Savino et al⁸ and McGrew et al⁹ completed a case series of reduced vision after intranasal surgery. They reviewed multiple cases and felt that the visual disturbance was due to vasospasm induced by the sub-mucosal injection under pressure of anesthetics including epinephrine. The nasal cavity and optic nerve are connected vascularly by the anterior and posterior ethmoidal arteries. These anastomose with the ophthalmic artery, which supplies the short posterior ciliary arteries, the main blood supply to the anterior optic nerve.¹⁰ This connection explains how local anesthetic and epinephrine within the nasal cavity could cause subsequent vasoconstriction to the blood supply of the optic nerve. The patients generalized visual field loss and slow flow of blood represented on fluorescein angiogram supports this hypothesis.

Epinephrine is frequently administered as a vasoconstrictor combined with the local anesthetic used in patients undergoing septoplasty and turbinoplasty.¹¹ Infiltration of lignocaine with epinephrine is used with cocaine in septoplasty, in attempt to improve hemostasis and thereby improve the surgical field.¹²

De Keyzer and Tassignon¹³ report a case of acute and unilateral blindness after local anesthesia combined with adrenaline for the treatment of dental

caries. The blindness was caused by vasospasm of the central retinal artery.¹³

Epinephrine acts mainly on alpha 1 receptors, which are present on blood vessels, and results in vasoconstriction. The mechanism of action by which this occurs is through stimulation of phospholipase C that hydrolyzes phosphatidylinositol bisphosphate (PIP 2). Inositol triphosphate (IP 3) is then released which leads to increased Ca^{2+} which subsequently causes vasoconstriction.¹⁴

Process of elimination and an understanding of the relevant anatomy allow us to conclude that the likely cause of the patient's visual loss was vasospasm induced by the epinephrine containing local anesthetic.

This patient has had a very rare complication of septal surgery and when the epinephrine was injected under pressure into the tissue surrounding the inferior turbinate, there was a retrograde flow through the anterior ethmoidal artery into the ophthalmic artery, which caused likely vasospasm of the end arteries to the optic nerve and retina. This hypo perfusion induced the patient's optic neuropathy and unfortunately there is no treatment available in the late stages with corticosteroids and vasodilators. This case represents an ischemic (not an inflammatory) cause for the patient's visual loss and therefore, corticosteroids would not have helped.

Similarly, there is no documentation in the literature for the use of steroids in the treatment of central retinal artery occlusion, which is an ischemic event. Therefore, patients should not be subjected to the risk of side effects associated high dose steroids in the treatment of these cases particularly when there is no evidence reported in the literature to support this.

Although vasodilators could aid in reversing the likely vasospasm caused by the local anesthetic, there is a risk of bleeding with vasodilators which can in it be a threat to vision and therefore should only be used with caution. However, the patient presented late and vasodilators would not have been successful in his case.

There is very little documentation in the current literature on this rare complication following nasal surgery. This case report raises awareness of this uncommon but devastating complication that undoubtedly leaves great impacts, not only on the patient and relatives but also on the treating



clinician. It is therefore important that both ophthalmologists and otolaryngologists are aware that there is potential for this complication to occur. Patients presenting with visual problems following intranasal surgery need to be identified and investigated at an early stage.

To prevent this rare complication from occurring following septoplasty and turbinate procedure, the anesthetist could do an informal assessment of vision. If the patient has no problems with their vision only then can they be discharged. However, if the patient does have visual problems then they should have a formal assessment of their vision including a visual fields test and any significant loss should be referred urgently to ophthalmology.

We feel that this case highlights the importance of accurate consent and can be used as evidence to create a trial into the necessity of epinephrine combined local anaesthesia for septoplasties and turbinate procedures.

Author Contributions

Conceived and designed the concept: JA, YW, ST. Analysed the data: JA, YW, ST. Wrote the first draft of the manuscript: JA, YW, ST. Contributed to the writing of the manuscript: JA, YW, ST. Agree with manuscript results and conclusions: AA, JA, YW, ST. Jointly developed the structure and arguments for the paper: JA, YW, ST. Made critical revisions and approved final version: AA, JA, YW, ST. All authors reviewed and approved of the final manuscript.

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