

Postoperative Posterior Ischemic Optic Neuropathy Following Coronary Artery Bypass Surgery: A Case Report

Robert E. Boyle, M.D.¹, Lieu Nguyen Lowrie, B.S.¹, Jennifer K. Burgoyne, M.D.^{1,2,3}

¹University of Kansas School of Medicine-Wichita, Wichita, KS

²Department of Surgery

³ICT Eye, Wichita, KS

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INTRODUCTION

Loss of vision after non-ocular surgery is most commonly from ischemic optic neuropathy.¹ The highest incidence occurs in cardiac and spinal fusion surgeries. There are numerous risk factors associated with this diagnosis, including carotid artery stenosis, stroke, cerebral small vessel disease, and diabetic retinopathy.^{1,2} We present a case where a patient developed posterior ischemic optic neuropathy post coronary artery bypass and aortic valve replacement surgery. This case was unique due to symptoms suggesting giant cell arteritis. The unique risk factors are underscored, and the outcome of the patient's management are presented.

CASE REPORT

An older adult male with a history of tobacco smoking, diabetes and systemic vascular, coronary artery and cerebral small vessel disease presented to the emergency department due to decreased vision in his left eye. The patient had a coronary artery bypass graft (CABG) and aortic valve replacement surgery seven days prior. The patient had an uncomplicated procedure and five-day hospital stay and had been discharged for two days before returning to the hospital complaining of vision loss. The patient described a slow loss of vision which started with "seeing stars and sparkly lights" in the left eye that progressed into complete loss of vision over the past two days. The patient also complained of a constant left sided headache during the same interval.

The exam showed no light perception in the left eye. The intraocular pressure was within normal limits (11 mmHg in left eye) and a 4+ afferent pupillary defect was present in the right eye. The slit lamp exam showed I+ nuclear sclerosis in the left eye. On dilated exam, the optic disc showed pallor with diffuse edema with tortuous veins but no hemorrhage, no cherry red spots, and no Hollenhorst plaques. The remainder of the left eye and the entire right eye exam was normal.

Computed Tomography (CT) Brain showed no signs of acute hemorrhage or stroke. MRI Magnetic Resonance Imaging (MRI) Brain revealed subacute ischemia in a gyriform pattern involving the anterior frontal lobe and left parietal lobe near the vertex; findings that may represent watershed ischemic changes due to hypotension. Additionally, imaging results from before his surgery revealed a greater than 70% stenosis of the left internal carotid artery.

The working differential for the patient was ischemic optic neuropathy due to intraoperative hypotension, severe carotid occlusive

disease, or giant cell arteritis. Due to the complaint of a persistent left sided headache, neuro-ophthalmology was consulted. The patient was started on IV methylprednisolone and a temporal artery biopsy was performed. Temporal artery biopsy was negative for arteritis, fibrosis, and necrosis and the patient was subsequently discharged.

One week later, the patient followed up in clinic maintaining complete blindness in the left eye. His anterior exam was unchanged from the previous visit. The dilated exam revealed diffuse pallor and disc edema with splinter hemorrhages along the temporal edge of the nerve. Optical coherence tomography (OCT) showed diffuse optic nerve edema and optic nerve atrophy. The vision loss in the left eye was permanent and the patient was scheduled for left carotid endarterectomy the following month.

DISCUSSION

This case emphasized the importance of maintaining a broad differential when evaluating patients with postoperative unilateral vision loss. The main causes of postoperative vision loss are ischemic optic neuropathies, either anterior ischemic optic neuropathy (AION) or posterior ischemic optic neuropathy (PION), central retinal artery occlusion (CRAO), pituitary apoplexy, and occipital infarction.^{3,4} AION is more common with cardiac surgeries, but PION is more common with spinal surgeries when the patient is in a prone position.⁴ This patient's exam was consistent with posterior optic neuropathy, although he did not report vision loss until he was discharged from the hospital five days after surgery. This patient may have had declining visual acuity during his original postoperative hospital stay, however this may have been masked due to drowsiness from pain medications and lack of glasses use while hospitalized. The patient's late presentation and presence of unilateral headache also disconcerted the clinical picture and necessitated treatment and work up for giant cell arteritis.

This case highlights the various risk factors associated with postoperative ischemic neuropathy. This patient had systemic vascular disease, carotid artery stenosis, cerebral small vessel disease, diabetes, and was a current smoker; all factors associated with postoperative vision loss. Additionally, the patient was on amiodarone, which has been associated with ischemic optic neuropathy.³ Furthermore, patients who undergo cardiopulmonary bypass are at increased risk compared to other cardiopulmonary surgeries.⁵

Case reports describing optic neuropathy post major surgery exist,^{6,7} but not much research has been done on treatment or prevention strategies. One case report highlights successful revision of vision loss with steroids and hyperbaric oxygen chamber treatment.⁷ Commonly systemic steroids and antiplatelet therapy are initiated, but with mixed results. In our case, the patient was already on antiplatelet therapy and initiation of steroid therapy did not improve visual acuity.

This report describes an interesting case where the clinical picture of progressive unilateral vision loss after coronary artery and valve replacement surgery was confused by the patient's post discharge presentation and presence of a unilateral headache. While the labs and temporal artery biopsy were negative, the collection of symptoms necessitated ruling out temporal artery arteritis. Most patients, as in this report, undergoing major cardiovascular surgery have the presence of systemic vascular disease and other risk factors for developing

perioperative optic neuropathy and thus patients in this situation should be made aware of this potential surgical complication.

REFERENCES

- ¹ Rubin DS, Matsumoto MM, Moss HE, Joslin CE, Tung A, Roth S. Ischemic optic neuropathy in cardiac surgery: Incidence and risk factors in the United States from the National Inpatient Sample 1998 to 2013. *Anesthesiology* 2017; 126(5):810-821. PMID: 28244936.
- ² Kim MS, Jeong HY, Cho KH, et al. Nonarteritic anterior ischemic optic neuropathy is associated with cerebral small vessel disease. *PLoS One* 2019; 14(11):e0225322. PMID: 31725805.
- ³ Roth S, Moss HE. Update on perioperative ischemic optic neuropathy associated with non-ophthalmic surgery. *Front Neurol* 2018; 9:557. PMID: 30042726.
- ⁴ Maramattom BV, Sundar S, Thomas D, Panikar D. Postoperative posterior ischemic optic neuropathy (PION) following right pterional meningioma surgery. *Ann Indian Acad Neurol* 2016; 19(3):374-376. PMID: 27570391.
- ⁵ Kalyani SD, Miller NR, Dong LM, Baumgartner WA, Alejo DE, Gilbert TB. Incidence of and risk factors for perioperative optic neuropathy after cardiac surgery. *Ann Thorac Surg* 2004; 78(1):34-37. PMID: 15223397.
- ⁶ Dorecka M, Miniewicz-Kurkowska J, Romaniuk D, Gajdzik-Gajdecka U, Wójcik-Niklewska B. Anterior ischemic optic neuropathy after conventional coronary artery bypass graft surgery. *Med Sci Monit* 2011; 17(6):CS70-74. PMID: 21629193.
- ⁷ Allashem HM, Sward DG, Sethuraman K, Matthews MK. Hyperbaric oxygen therapy for perioperative posterior ischemic optic neuropathy: A case report. *Undersea Hyperb Med* 2019; 46(5):701-707. PMID: 31683370.

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