Bilateral Cavernous Sinus Syndrome, Pituitary Macroadenoma, and Postoperative Loss of Vision: A Case Report

Matthew M. Moldan, MD, Thomas M. Stewart, MD, Todd M. Kor, MD, and Michael J. Brown, MD

Postoperative vision loss is a rare complication. When visual loss does occur, it is rarely associated with ophthalmoplegia. We report a case of postoperative bilateral visual field deficits with concomitant complete bilateral ophthalmoplegia in a patient with a known pituitary macroadenoma after surgical excision of a small cell carcinoma of the bladder. Emergency postoperative imaging showed that the macroadenoma had increased in size and was associated with new right optic nerve edema. The patient underwent urgent excision of the macroadenoma 5 days after the onset of symptoms. Visual field deficits and associated ophthalmoplegia had completely resolved at 3-month follow-up. (A&A Practice. 2019;13:350–1.)

GLOSSARY

ASA = American Society of Anesthesiologists; **CT** = computed tomography; **ION** = ischemic optic neuropathy; **MAP** = mean arterial pressure; **MRI** = magnetic resonance imaging; **PACU** = postanesthesia care unit

Visual loss is a rare, unexpected, and devastating postoperative complication. Spine and cardiac surgical interventions are most commonly associated with postoperative visual loss. Ischemic optic neuropathy (ION), retinal ischemia, and cortical infarction are the most common etiologies.¹ Postoperative visual loss associated with concurrent ophthalmoplegia occurs infrequently with only a few case reports previously published.^{2–5} We report an unusual case of postoperative visual loss in a patient with a known pituitary macroadenoma who underwent a prolonged urologic surgery in the Trendelenburg position. Written informed patient consent was obtained.

CASE DESCRIPTION

A 50-year-old, previously healthy man (height, 182 cm; weight, 80 kg; body mass index, 24.4 kg/m²) presented with hematuria and was diagnosed with invasive small cell carcinoma of the bladder. The oncologic staging process included magnetic resonance imaging (MRI) of the brain that incidentally revealed a nonfunctioning pituitary macroadenoma measuring 5.2 × 3.6 × 5.0 cm (Figure). The macroadenoma extended through the clivus, sphenoid sinus, and posterior nasal cavity with substantial compression of the optic chiasm and mild mass effect on the pons. Neurosurgery was consulted. The patient had no visual or neurological deficits. Due to the aggressive squamous cell

carcinoma of the bladder, resection of the pituitary mass was deferred until after the planned urologic intervention. The patient was scheduled for a robotic radical cystoprostatectomy, extended pelvic lymphadenectomy, and ileal conduit neobladder creation.

The patient received general endotracheal anesthesia with intravenous induction. Anesthesia was maintained with a volatile anesthetic and intravenous opioids. American Society of Anesthesiologists (ASA) standard monitors and a radial arterial catheter were used.

Surgery lasted 8 hours 32 minutes with the majority performed in the Trendelenburg position. Notably, the first 4 hours 32 minutes of the operation were performed in steep Trendelenburg position. Mean arterial pressure (MAP) was maintained above 60 mm Hg throughout the operation and was <65 mm Hg for a total of 22 minutes. Intermittent vasopressors totaling 1200 µg of phenylephrine and 10 mg of ephedrine were given. The patient received 4.8 L of lactated Ringers solution, 1 L of 5% albumin, and 1 unit of packed red blood cells. After the procedure, the patient was extubated and transferred to the postanesthesia care unit (PACU) in stable condition.

Shortly before discharge from the PACU, he complained of difficulty seeing and difficulty opening his eyelids. Ophthalmological examination revealed ptosis with bilateral palpebral edema, bilateral fixed and dilated pupils, bilateral hemianopsia, and complete bilateral ophthalmoplegia. Computed tomography (CT) and MRI examinations revealed a slight increase in size of the pituitary macroadenoma with new edema of the optic chiasm and proximal right optic nerve without intraocular edema. Neurology and neurosurgery consults were immediately obtained. The patient was subsequently diagnosed with bilateral cavernous sinus syndrome secondary to venous outflow obstruction in the setting of the pituitary mass with resultant injury to bilateral cranial nerves III, IV, and VI. On diagnosis, the head of bed was elevated to >45° and intravenous

From the Department of Anesthesiology and Perioperative Medicine, Mayo Clinic, Rochester, Minnesota.

Accepted for publication July 19, 2019.

Funding: None.

The authors declare no conflicts of interest.

Address correspondence to Thomas M. Stewart, MD, Department of Anesthesiology and Perioperative Medicine, Mayo Clinic, 200 1st St SW, Rochester, MN 55902. Address e-mail to stewart.thomas1@mayo.edu.

Copyright © 2019 International Anesthesia Research Society
DOI: 10.1213/XAA.0000000000001083

Figure. Coronal T1 weighted MRI image showing nonfunctioning pituitary macroadenoma (5.2 × 3.6 × 5.0 cm) extending through the clivus, sphenoid sinus, and posterior nasal cavity with substantial compression of the optic chiasm and mild mass effect on the pons. MRI indicates magnetic resonance imaging.

glucocorticoid therapy was administered. The patient had multiple focused neurological evaluations on a daily basis to assess for further worsening of his ophthalmological condition. He had an uncomplicated transsphenoidal resection of his pituitary macroadenoma 5 days later.

At 1-month follow-up, he continued to have bilateral blurred vision with complete ophthalmoplegia. At 3-month follow-up, there was complete resolution of bilateral ophthalmoplegia and ptosis with near-total resolution of the bilateral hemianopsia. His pupils continued to be nonreactive to light. At 10-month follow-up, the patient's pupils had decreased in size but remained nonreactive to light with ongoing light sensitivity.

DISCUSSION

Visual loss secondary to bilateral cavernous sinus syndrome presenting after oncologic urologic surgery in a patient with a preexisting pituitary macroadenoma is a rare cause of postoperative visual loss. The most common etiologies of postoperative visual loss include ION, retinal ischemia, and cortical infarction. Intraoperative prone and steep Trendelenburg positions are known risk factors for the development of postoperative visual loss attributed to ION and retinal ischemia.^{6,7} We hypothesize that prolonged surgical resection, fluid resuscitation, and steep Trendelenburg position in the presence of a known large pituitary macroadenoma led to bilateral cavernous sinus syndrome in this patient. It is plausible that pituitary sella venous drainage was partially impaired by the macroadenoma, and placement in the Trendelenburg position along with over 6 L of intravascular volume replacement resulted

in an increase in cerebral venous pressure that exacerbated the venous obstruction leading to further edema surrounding the cavernous sinus.

In hindsight, the presence of a pituitary tumor should raise awareness to consider the implications of positioning and anesthesia management and should prompt interdisciplinary preoperative planning. The perioperative team could have performed the surgery in a less steep Trendelenburg position. Alternatively, an open abdominal approach could be considered, minimizing the need for Trendelenburg positioning. Finally, the resection of the pituitary macroadenoma could precede the bladder procedure. However, after multispecialty collaboration, the aggressive nature of the patient's bladder cancer was felt to be more time sensitive.

This case report highlights an unusual case of postoperative visual loss. Fortunately, the patient had near-complete return of visual and ocular function. A thorough medical history and review of available central nervous system imaging are important when surgery requires Trendelenburg or prone positioning. The presence of an intracranial mass should alert the surgical and perioperative care teams to consider alternative management plans that may include changes in planned patient positioning, surgical approach, altered intraoperative fluid resuscitation, or surgical sequencing. Bilateral cavernous sinus syndrome should be considered in addition to other more common causes of postoperative visual loss. ■■

DISCLOSURES

Name: Matthew M. Moldan, MD.

Contribution: This author helped write and revise the manuscript.

Name: Thomas M. Stewart, MD.

Contribution: This author helped write and review the manuscript.

Name: Todd M. Kor, MD.

Contribution: This author helped write and review the manuscript.

Name: Michael J. Brown, MD.

Contribution: This author helped write and review the manuscript.

This manuscript was handled by: BobbieJean Sweitzer, MD, FACP.

REFERENCES

1. Halfon MJ, Bonardo P, Valiensi S, et al. Central retinal artery occlusion and ophthalmoplegia following spinal surgery. *Br J Ophthalmol.* 2004;88:1350–1352.
2. Hollenhorst RW, Svien HJ, Benoit CF. Unilateral blindness occurring during anesthesia for neurosurgical operations. *AMA Arch Ophthalmol.* 1954;52:819–830.
3. Kamming D, Clarke S. Postoperative visual loss following prone spinal surgery. *Br J Anaesth.* 2005;95:257–260.
4. West J, Askin G, Clarke M, Vernon SA. Loss of vision in one eye following scoliosis surgery. *Br J Ophthalmol.* 1990;74:243–244.
5. Wolfe SW, Lospinuso ME, Burke SW. Unilateral blindness as a complication of patient positioning for spinal surgery. A case report. *Spine (Phila Pa 1976).* 1992;17:600–605.
6. Arvizo C, Mehta ST, Yunker A. Adverse events related to Trendelenburg position during laparoscopic surgery: recommendations and review of the literature. *Curr Opin Obstet Gynecol.* 2018;30:272–278.
7. Practice advisory for perioperative visual loss associated with spine surgery 2019: an updated report by the American Society of Anesthesiologists task force on perioperative visual loss, the North American Neuro-ophthalmology Society, and the Society for Neuroscience in Anesthesiology and Critical Care. *Anesthesiology.* 2019;130:12–30.