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Short Report

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Irreversible Blindness: An Unusual Complication of the Caldwell-Luc Operation*

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Paranasal sinus surgery is frequently used for the management of allergic, infectious and neoplastic sinus diseases by otolaryngologists. Ophthalmic complications are rare but their occurrence may result in morbidity. Optic nerve injury, extraocular muscle injury, intraorbital hemorrhage, periorbital emphysema, and nasolacrimal duct and sac injury are the ophthalmic complications of sinus surgery (1-4).

We present a case with orbital complications following the Caldwell-Luc operation.

Case Report

A 30-year-old male was referred to the Ophthalmology Department of Çukurova University, Medical Faculty, with a complaint of sudden loss of vision in the left eye following a Caldwell-Luc operation. He was given acetozolamide (500mg) and prednisolone (150 mg). The ophthalmologic examination revealed ptosis and ecchymosis of the left eyelid (Figure 1). The eye was hypotropic and exotropic with severe restriction in adduction, and relative limitation in elevation and depression. Visual acuity was characterized by absence of light perception, and intraocular pressure was normal. The pupil was large and fixed to light. Fundus examination revealed retinal edema, pale optic disc and ghost vessels at the peripheral retina. The right eye was entirely normal.

Coronal computed tomography (CT) scans showed a large defect at the posterior medial wall. The orbital floor was intact. The posterior part of the medial rectus was invisible near the bone defect, and the optic nerve was drawing to this defect. The superior rectus, superior oblique and levator palpebralis superior were edematous, and an air density was observed around these muscles. Transection of the optic nerve was visible on the axial CT scan (Figure 2). T1 and T2 weighted magnetic resonance imaging showed the same findings as CT scans.

Extraocular movements other than restriction in adduction improved in the 1st postoperative month. We observed retinal neovascularization and performed panretinal photocoagulation on the 45th postoperative day.

Despite the anatomic proximity of the orbit to the paranasal sinuses, ophthalmic complications of sinus surgery are uncommon (1). The most frequent complication of the Caldwell-Luc operation is known to be the paresthesia or anesthesia of the inferior orbital nerve, which recovers in 3 to 6 months. Rare ophthalmic complications include lacrimal injury, orbital floor trauma resulting in injury of the inferior rectus and inferior oblique muscles and the inferior division of the third nerve, and blindness due to direct trauma to the optic nerve or the pressure effect of orbital hemorrhage (2). Buus and co-workers detected orbital complications in

* This study was presented as a poster at the European Society of Ophthalmic Plastic and Reconstructive Surgery (ESOPRS) 15th meeting in Rome, October 1997.

Figure 1. Ptosis and ecchymosis in the left eyelid.

Figure 2. Transection of the optic nerve and avulsion of the medial rectus.

only 7 of their patients in a period of 10 years. Two of these patients had undergone the Caldwell-Luc operation. Superior oblique injury was observed in one case and inferior rectus injury, infraorbital nerve transection and afferent pupillary defect in the other (1). Kylander reported the development of ophthalmic complications in 2 out of 61 cases, one with infraorbital nerve hypoesthesia and the other with intraocular hemorrhage without blindness (3).

Griffiths and Smith observed blindness and ocular motility disturbance in 2 patients following the Caldwell-Luc procedure. Our case had medial rectus avulsion and ptosis in addition to optic nerve transection (5).

Three topics should be discussed in cases with orbital complications due to paranasal sinus surgery: prevention, recognition and treatment (6). In order to prevent complications, preoperative and perioperative predisposing factors should be considered. Predisposing factors include hypertension, dehiscence of the lamina papyracea, extensive polypoid disease, previous surgery with scarring, perioperative coughing or sneezing, and chronic steroid use (6). Preoperative CT scans may be helpful in assessing the extent of sinus disease and in detecting anatomic variations that may predispose orbital injury (1). Preoperative identification of dehiscence in the bony orbit and prolapse of orbital tissues into the sinus alerts the surgeon that caution is necessary when approaching these areas. Bipolar cauterization of bleeding vessels, application of 4% cocaine and the use of a local rather than a general anesthetic are known to be important measures in avoiding intraoperative and postoperative bleeding (6).

Early recognition of complications is important. Intraoperatively, the eyes should not be closed to allow visualization of any eye movements, ecchymosis, proptosis and pupillary change. Intraoperative hemorrhage is known to be a frequent complication of sinus surgery, which results in blindness if immediate therapy is not applied (6).

Retrobulbar hemorrhage may cause an interruption of ocular perfusion, which results in ischemia and visual loss. Occlusion of the posterior ciliary arteries also has been known to be a cause of blindness in orbital hemorrhage. The elevation of IOP accelerates retinal and optic nerve ischemia. If retinal ischemia persists for more than 100 minutes, recovery of vision is unusual (7). Therefore, maximum effort should be directed in order to improve retinal and optic nerve perfusion. In the presence of elevated IOP, medical therapy may be administered. If, in spite of this management, proptosis progresses or signs of central retinal artery occlusion are evident, lateral canthotomy and inferior cantholysis will permit partial decompression of the orbit. In our patient, decompression was not found to be necessary despite the presence of orbital hemorrhage because IOP was normal, and visual loss was due to the avulsion of the optic nerve.

Ophthalmoplegia is usually evident in the immediate postoperative period and may be caused by either direct

or indirect injury to the muscles or their innervation indirectly. Neural injury may heal spontaneously in 6 to 12 months, whereas direct muscle trauma should be treated immediately. Signs of nasolacrimal duct obstruction develop during postoperative weeks 2 to 3 and may require dacryocystorhinostomy.

The patient presented in this report underwent a Caldwell-Luc operation under general anesthesia for treatment of maxillary sinusitis. Following the operation, exotropia, ptosis, and blindness were found to be due to optic nerve transection, medial rectus avulsion and oculomotor paralysis. Anatomic knowledge, proper preoperative evaluation, early recognition of complications and appropriate management will minimize these rare complications.

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