

# Chapter 7

## Unusual Orbital Complications of Endoscopic Sinus Surgery



Meha G. Fox and Alexander Chiu

### Clinical Pearls

1. Avoid forceful irrigation in the case of extensive disease that may have thinned bony partitions.
2. In a patient with a known bony dehiscence, discuss avoidance of positive pressure mask ventilation with anesthesia colleagues.

### Case Presentations

A 56-year-old female presented to the Otolaryngology clinic with symptoms of chronic sinusitis. She was found to have nasal polyposis and purulent secretions draining from the middle meatus. After a course of medical therapy, she elected to proceed with surgical treatment of her disease. Computed tomography (CT) prior to surgery showed a thin lamina papyracea, but no obvious dehiscence on the left side. The patient underwent bilateral maxillary antrostomy, total ethmoidectomy, sphenoidotomy, and frontal sinusotomy. At the end of the procedure, all of the sinuses were irrigated. The frontal sinuses were irrigated with normal saline using a 60 cc syringe connected to a malleable, curved suction. Immediately following irrigation of the left frontal sinus, the patient was noted to have left-sided chemosis (Fig. 7.1).

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M. G. Fox (✉)

Department of Otolaryngology-Head and Neck Surgery, Baylor College of Medicine,  
Houston, TX, USA

e-mail: [mgoyal@bcm.edu](mailto:mgoyal@bcm.edu)

A. Chiu

Department of Otolaryngology-Head and Neck Surgery, University of Kansas Medical  
Center, Kansas City, KS, USA

e-mail: [achiu@kumc.edu](mailto:achiu@kumc.edu)

**Fig. 7.1** Case 1. Chemosis following endoscopic sinus surgery



Manual massage of the orbit ensued and saline slowly emitted back into the superior ethmoid cavity through a small break in the lamina papyracea. Postoperatively, the patient denied vision changes or orbital pain. She was admitted for overnight observation. Her chemosis completely resolved 3 h postoperatively. She was discharged home the day after surgery and had no long-term sequelae of this complication.

The second case is of a 66-year-old female with chronic rhinosinusitis with nasal polyposis. The patient had undergone prior endoscopic sinus surgery (ESS) and now presented with recurrence of obstructive polyps. Preoperative CT scan showed a small right-sided lamina papyracea dehiscence. She underwent revision bilateral maxillary antrostomy, total ethmoidectomy, sphenoidotomy, and frontal sinusotomy. Intraoperatively, the previous right lamina papyracea defect was identified. Dissection in this area was carried out meticulously in order to avoid further injury to the lamina papyracea and underlying orbital structures. There were no obvious complications during the case. On the first postoperative day, the patient called the clinic due to new-onset diplopia. She was directed to present to the emergency department where a CT scan revealed air in the right orbit (Fig. 7.2). An ophthalmology consult was obtained, and her intra-ocular pressure was within normal limits. She was admitted for observation and her intranasal packing was removed. No additional interventions were pursued. Her diplopia resolved in 48 h. On subsequent postoperative visit, she demonstrated no sequelae of this complication.

## Root Cause Analysis

The first orbital complication likely occurred due to a dehiscence of the lamina papyracea and periorbita not appreciable clinically or on imaging. Irrigation under hydrostatic pressure resulted in conjunctival edema. This responded to orbital massage and eventually self-resolved. Furthermore, the patient remained asymptomatic from the complication.

The second patient had a known lamina papyracea dehiscence. She received positive pressure ventilation via bag-valve mask during induction of general

**Fig. 7.2** Case 2.  
Computed tomography of  
postoperative patient  
complaining of diplopia



anesthesia and may have had positive pressure masking after extubation. This could have led air to track into the orbit, a complication not previously described.

## Lessons Learned

More than 15% of the American population suffers from sinus disease, and approximately 350,000 sinus surgeries are done per year to address this disease process in the United States [1]. Despite the high prevalence of both the disease and its surgical management, the surgeon must remain vigilant for the myriad of complications possible, rather than fall complacent due to the “routine” nature of these procedures. Multiple retrospective database studies of cases done after the year 2000 have reported the rate of major complications of endoscopic sinus surgery at 0.36–1.0% [1, 2]. Major complications include, but are not limited to, hemorrhage, cerebrospinal fluid leak, meningitis, orbital hematoma, optic nerve injury, extraocular muscle injury, and lacrimal duct injury [2–4]. Reported rates of orbital complications of ESS vary from 0.07–0.66% [1, 2, 4], and a vast majority of these complications are due to iatrogenic exposed orbital fat, muscle injury, or hematoma.

The first case illustrates that surgeons should be careful with forceful irrigation in the case of extensive disease that may have thinned bony partitions. Additionally, it highlights that imaging may not reveal all of a patient’s anatomic intricacies.

Knowledge and evaluation of anatomic landmarks intraoperatively are crucial to avoiding complications.

The second case demonstrates the importance of communication with the entire perioperative team. In a patient in whom there is a known bony dehiscence, it is best to warn our anesthesia colleagues so they may avoid positive pressure mask ventilation. Knowledge and careful consideration of all parts of the patient's perioperative management may lead to fewer complications.

While rare, orbital complications of ESS do occur at a rate of less than 1% and a vast majority of these involve hematomas and fat and muscle injury. Presented above are two rare but manageable complications. Otolaryngologists should be aware of potential complications and counsel patients preoperatively. Furthermore, they should be equipped to manage orbital complications of ESS, some of which may simply require observation and self-resolve.

## References

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