Intra-Optic Nerve Abscess: A Rare Complication of Acute Sinusitis

Akshay Sanan MD1, Gurston Nyquist MD1, Christopher Farrell MD2, Marc Rosen MD1

1Department of Otolaryngology-Head and Neck Surgery, Thomas Jefferson University Hospital, Philadelphia, PA;
2Department of Neurosurgery, Thomas Jefferson University, Philadelphia, PA

INTRODUCTION
Intracranial complications from acute sinusitis are rare. In particular, intracranial nerve abscesses have been reported here to emphasize the extreme rarity of this clinical entity.

METHODS
Case report and literature review. The patient's pertinent history, clinical findings and radiologic studies are examined.

RESULTS
The case of a 33 year old male who was transferred to a tertiary care academic center due to the development of symptoms over several days is presented and reviewed. A computed tomography scan demonstrated panophthalmitis with severe proptosis on the left side. Magnetic resonance imaging revealed a right-sided abscess along the roof of the right sphenoid sinus and the right optic nerve towards the optic chiasm. The patient's clinical exam was consistent with right-sided optic neuropathy. He underwent emergent functional endoscopic sinus surgery and subsequent right-sided craniotomy for drainage of an epidural and intracranial abscess involving the right optic nerve, chiasm, and optic tract. The sinusitis was odontogenic in origin. The patient was treated for six weeks with IV ceftriaxone, penicillin and metronidazole and transitioned to five months of PO amoxicillin. At 3-month follow up, the patient had no evidence of sinus disease, or recurrent abscess.

DISCUSSION
Orbital cellulitis or orbital abscess is almost always secondary to acute sinusitis. Other possible etiologies include spreading of infection from the eyelids, conjunctiva, or dura mater. Infection spreading from odontogenic origin is very rare.1,7,8 Odontogenic infection can spread to the orbit through several routes. First, infection from the maxillary premolar or molar teeth may perforate the maxillary bony plate and spread posteriorly into the pterygoplatine and infratemporal fossae, both finding their way into the orbit via the inferior orbital fissure. Second, infection of the maxillary or infraorbital nerves may spread retrograde after via bone erosion, pre-foveal decompression in the orbital floor, the infraorbital neurovascular canal or via the lamina papyracea. Third, spread of the infection can also be accomplished through the valveless anterior fontanel, angular and ophthalmic veins. The valveless nature of these veins allow the rapid and uninterrupted spread of infection. Finally, the infection can enter through the septal space via infection of the eyelid.

The most common cause of odontogenic sinusitis includes an abscess and periodontal disease. Causes of this perforation include maxillary trauma, dental extraction, maxillary osteotomies or placement of a dental implant.4 In this case, the poor dentition likely served as the bacterial source which then penetrated the maxillary sinus and spread retrogradely causing the intra-optic nerve abscess. This is the first reported case of intra-optic nerve abscess from odontogenic sinusitis.

Odontogenic sinusitis is believed to be a mixed aerobic and anaerobic infection with the number of anaerobes outnumbering the number of aerobes. The common organisms for odontogenic sinusitis are Prevotella intermedia, Porphyromonas gingivalis, and Staphylococcus aureus.2 In our case, the culture of the pus from the maxillary sinus revealed mixed growth. When an orbital infection is suspected, early aggressive broad-spectrum antibiotic therapy should be initiated, including the use of anaerobic coverage.

Surgical intervention is paramount when there is an orbital abscess in order to obtain adequate drainage of pus, release pressure on the orbit and obtain a culture sample. In this case, surgical intervention was accomplished both endoscopically and via a cranioethmoidectomy approach in order to gain exposure and decompression of the optic nerve, optic chiasm, and optic tract. The goal of treatment is to restore visual acuity and to prevent further intracranial complications.

We present the first case of an intra-optic nerve abscess secondary to odontogenic sinusitis. The occurrence of an intra-optic nerve abscess is a rare but possible sequela of acute sinusitis. A multidisciplinary approach involving otolaryngology, neurosurgery, ophthalmology, oral surgery, neuroradiology and infectious diseases is paramount. Surgery and antibiotic therapy are the standard of care.

REFERENCES