Grand Rounds

A 39-year-old man with painful proptosis after dental extraction

Brett Kotlus,^a Veena Kumar,^b Robert Cravens,^c and Robert Dryden^d

Author affiliations: ^aAllure Medical Spa;

^bMaxwell Aesthetic Surgery;

^cTucson Ear Nose and Throat;

^dArizona Centre Plastic Surgery

History

A 39-year-old man presented to the emergency department complaining of decreased vision in the left eye accompanied by pain and swelling of the periocular area. Seven days earlier, he underwent surgical dental extraction of a right mandibular molar for treatment of a dental abscess. Three days after the dental procedure he experienced edema of the left upper and lower eyelids, and was instructed by a primary care physician to discontinue his oral penicillin and initiate oral prednisone 20 milligrams daily for a presumed 'allergic reaction'.

Examination

On physical examination, the patient had a Snellen visual acuity of 20/400 in the left eye with an afferent pupillary defect. Examination of the right eye was unremarkable. There was severe limitation of left extraocular movements and there was marked left axial proptosis, periorbital edema, and erythema. Examination of the oral cavity was performed, and no signs of abscess or infection were noted.

Ancillary Testing

Radiographic Studies

Computed tomography of the head was performed, revealing opacification of the left anterior ethmoid and maxillary sinuses. In addition, an intraconal collection of fluid with an adjacent gas bubble was identified lateral to the optic nerve, exerting mass effect on the posterolateral aspect of the globe.

Figure 1. External photograph demonstrating left proptosis, periorbital edema, and chemosis.

Treatment

Endoscopic left middle meatal antrostomy and complete ethmoidectomy was performed. Lateral orbitotomy with osteotomy was also performed and an intraconal collection of foul-smelling, purulent fluid containing gas bubbles was encountered. This material was evacuated, intraoperative cultures were obtained, and a surgical drain was placed. Intravenous ampicillin sodium/sulbactam sodium (Unasyn, Pfizer, NY, NY) was administered postoperatively.

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Correspondence: Brett Kotlus, MD, MS (email: kotlus@gmail.com).

Figure 2. Axial CT image demonstrating intraconal gas with post-erolateral globe deformation.

Figure 3. Coronal CT image.

Microbiologic cultures obtained intraoperatively revealed growth of group F Streptococcus, coagulase negative Staphylococcus, and mixed anaerobic flora.

Four days after surgical intervention, the patient's visual acuity in the left eye was 20/30, no afferent pupillary defect was evident, the periorbital edema and proptosis had significantly improved, and motility was nearly full.

Differential Diagnosis

The differential diagnosis includes orbital abscess (bacterial), fungal infection, idiopathic orbital inflammation and orbital tumors.

Diagnosis

The most common organisms causing acute orbital and sinus infections in adults include Streptococcus, Haemo-

Figure 4. Intraoperative photograph demonstrating a purulent orbital fluid collection with surfacing gas bubbles.

philus, and Moraxella species. Immunocompromised individuals may harbor unusual organisms.¹ Cases of orbital infections caused by gas-forming bacteria are uncommon and have rarely been well documented.^{2,3} We describe a case of an orbital abscess caused by gas-forming bacteria.

Intraorbital gas due to an infectious agent is an uncommon finding^{2,3} and indicates the need for prompt surgical intervention and/or treatment with broad-spectrum antimicrobial agents. Anaerobic organisms must be considered when choosing an antibiotic in these cases. The patient presented here had undergone a dental extraction, which has been associated with transient bacteremia, including anaerobic species.⁴ The possibility of hematogenous spread cannot be ruled out as the orbital collection in this case was posterolateral to the globe and direct intraorbital extension of an infectious sinus process is more frequently medially located. In patients with this clinical picture, further investigation for other sites of bacteremic seeding may be warranted.

Atypical organisms are potential offending infectious agents in immunocompromised individuals.¹ There should also be high suspicion for fungal infections in this patient population. This patient had been treated with oral steroids without antibiotics for 5 days prior to presentation and this may have contributed to the development of gas-producing bacteria.

The formation of gas has most commonly been linked to *Clostridium perfringens*, but other bacteria including Staphylococci, Streptococci, and other anaerobes have been shown to be capable of causing gas-forming infections.⁵ Initial antibiotic treatment should be guided by

the results of Gram stain and deliberation of possible etiologic agents based on clinical findings. The excellent outcome in the patient presented here can be attributed in part to prompt and aggressive treatment.

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