

Spontaneous Subconjunctival Abscess Because of *Haemophilus influenzae*

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Purpose: To report a case of a spontaneous subconjunctival abscess in a patient with no previous ocular surgery or trauma.

Method: Case report.

Results: We report a case of a subconjunctival abscess caused by *Haemophilus influenzae* after several days of worsening conjunctivitis. Computed tomography scans of the orbits confirmed an abscess cavity adjacent to the globe without orbital extension. The abscess was spontaneously draining at presentation and resolved completely with topical and oral antibiotic therapy.

Conclusions: To our knowledge, this is the first described case of spontaneous subconjunctival abscess formation in an immunocompetent individual unrelated to preexisting ocular pathology, previous ocular surgery, or trauma. *H. influenzae* species may possess the ability to penetrate an intact conjunctiva and develop subconjunctival abscess. We recommend that patients presenting with bacterial conjunctivitis be closely examined to rule out subconjunctival abscess, which may require additional aggressive medical or surgical management.

Key Words: subconjunctival abscess, ocular infection, conjunctivitis, *Haemophilus influenzae*

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CASE REPORT

A 27-year-old black female presented to our clinic for redness and pain of her left eye, which had progressively worsened over the preceding 6 days. The day before, she had visited a local emergency department where she was diagnosed with conjunctivitis and prescribed erythromycin ophthalmic ointment. Her symptoms worsened overnight, and she returned to the emergency department and was subsequently referred to ophthalmology.

She reported mild blurry vision in that eye, moderate pain, white discharge, and tearing. She had no previous ocular history other than a short-lived episode of matting and redness a couple months

before in 1 eye (the patient could not recall which eye). There was no history of previous ocular surgery, trauma, or foreign body. The patient denied recent illnesses but did have several sick contacts at work (upper respiratory symptoms) and a 3-year-old daughter in the home attending day care. She reported being sexually active with her husband only and denied any recent sexually transmitted diseases, vaginal discharge, or sores. Her past medical history included mild seasonal allergies and no history of thyroid or autoimmune disease.

Examination revealed normal visual acuity, intraocular pressures, pupil, and visual field testing. Extraocular motility was unrestricted in both eyes, but the patient noted mild to moderate pain on left lateral gaze in her left eye. Slit lamp examination of the left eye revealed mild fullness to both upper and lower lids. There were 3+ conjunctival injection with lateral chemosis and an elevated subconjunctival nodule under the lateral canthus draining purulent material from a small central opening (Fig. 1). Her cornea showed an early dellen adjacent to the chemotic conjunctiva. Her anterior chamber was quiet, and posterior segment examination was normal, also without evidence of inflammation. Examination of her right eye was normal.

At this point, cultures were obtained and the patient was sent for immediate computed tomography of the orbits. Imaging showed an abscess cavity lateral to the left globe (Figs. 2A, B). There was no extension to the lacrimal gland or orbit, no sinus disease, and no foreign body seen. The lacrimal gland and remainder of the orbit was normal, with no inflammatory fat stranding, extraocular muscle involvement, or other signs of postseptal inflammation.

With no precedent for treatment of a subconjunctival abscess, broad spectrum topical and systemic antibiotics were started: oral moxifloxacin (Avelox; Bayer HealthCare Pharmaceuticals, Inc, Wayne, NJ) 400 mg daily, with topical moxifloxacin (Vigamox; Alcon Laboratories, Inc, Fort Worth, TX) every 2 hours. For additional pseudomonas and methicillin-resistant *Staphylococcus aureus* (MRSA) coverage, fortified tobramycin (X GEN Pharmaceuticals, Inc, Northport, NJ) and vancomycin (Hospira, Inc, Lake Forest, IL) were also administered in addition to lubricants for the dellen. Given that the abscess was already draining, we elected to withhold immediate surgical treatment. Good patient compliance made close outpatient follow-up possible. By the next morning, the patient was feeling better so treatment was continued. By day 2, the patient felt much better, assays for gonorrhea and chlamydia returned negative, and preliminary conjunctival cultures were growing *Haemophilus influenzae*. Fortified topical antibiotics were tapered off over the next few days, the patient's symptoms resolved, and she completed a 10-day course of topical and oral moxifloxacin.¹ The final culture confirmed a nontypeable strain of *H. influenzae*.

DISCUSSION

H. influenzae is a small aerobic Gram-negative coccobacillus found mainly in the respiratory tract. There are 6 types generally recognized (types a–f). The encapsulated b strain

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FIGURE 1. Spontaneously draining subconjunctival abscess under the lateral canthus.

accounts for most invasive and bacteremic pneumonia, and this is the type for which children in the United States have been vaccinated beginning in 1988.² With the success of the *H. influenzae* type b (Hib) conjugate vaccine, at least half of invasive *H. influenzae* infections are now caused by the non-encapsulated (thus nontypeable) strains, and Hib meningitis has almost disappeared in the United States and Canada.² Nontypeable strains are less invasive and cause more upper respiratory tract and ocular infections than Hib.^{2,3} Interestingly, the introduction of the Hib vaccine in the United States has coincided with a drop in both culture-positive Hib orbital and periorbital cellulitis cases and the total annual all-cause case rate of orbital and periorbital cellulitis.⁴ Although Hib is not an uncommon cause of periocular cellulitis, it is less commonly an etiology for ocular infection. Alrawi et al³ performed biotyping of 62 *H. influenzae* isolates of ocular infection and found none because of the encapsulated type b strain. Conjunctivitis was the most common ocular infection at 77% by a 6:1 ratio over keratitis, which comprised 13% of infections in their study.

H. influenzae has been implicated among a handful of other bacterial organisms capable of invading intact corneal or conjunctival epithelium.^{5–8} St. Geme and Falkow⁵ performed an in vitro study with a nontypeable strain of *H. influenzae* showing adherence to and invasion of intact human conjunctiva by the organism. Other organisms demonstrated to possess similar ability include *Neisseria gonorrhoeae*,⁹ *Neisseria meningitidis*,¹⁰ *Corynebacterium diphtheriae*,¹¹ *Listeria monocytogenes*,¹² and *Shigella*.¹³

Subconjunctival abscess is a very rare condition and most commonly associated with a history of trauma or surgery.^{14–17} Three cases of infectious scleritis without history of surgery or trauma have been reported elsewhere.^{18–20} Maskin reported a patient with diabetes who developed infectious scleritis presumed because of endogenous inoculation from a diabetic foot ulcer culture-positive for the same organism. Hwang described a patient presenting with infectious scleritis mimicking noninfectious nodular scleritis after

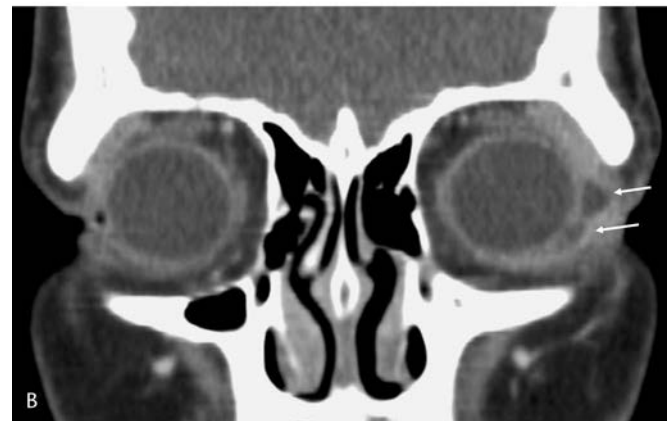


FIGURE 2. (A) Axial and (B) coronal computed tomography orbits with contrast showing an abscess cavity lateral to the left globe.

immunosuppressive chemotherapy, and Reynolds reported a case of infectious scleritis in a patient with acquired immunodeficiency syndrome. Also unrelated to previous surgery or trauma, Yang reported a patient with a subconjunctival abscess that developed under a primary pterygium.²¹ This abscess, like that of our patient, was caused by *H. influenzae*.

Our patient had spontaneous subconjunctival abscess development with no known risk factors or preexisting ocular pathology, which suggests that *H. influenzae* species are capable of invading an intact conjunctiva. We recommend that patients presenting with bacterial conjunctivitis be closely examined to rule out subconjunctival abscess, which may require additional aggressive medical or surgical management.

REFERENCES

- Hedlin P, Blondeau JM. Comparative minimal inhibitory and mutant prevention drug concentrations of four fluoroquinolones against ocular isolates of *Haemophilus influenzae*. *Eye Contact Lens: Sci Clin Pract*. 2007;33:161–164.
- Haemophilus influenzae* Infections. Available at: <http://www.emedicine.com/MED/topic936.htm>. Accessed October 15, 2008.
- Alrawi AM, Chern KC, Cevallos V, et al. Biotypes and serotypes of *Haemophilus influenzae* ocular isolates. *Br J Ophthalmol*. 2002;86:276–277.
- Ambati BK, Ambati J, Azar N, et al. Periorbital and orbital cellulitis before and after the advent of *Haemophilus influenzae* type B vaccination. *Ophthalmology*. 2000;107:1450–1453.

5. St. Geme JW III, Falkow S. *Haemophilus influenzae* adheres to and enters cultured human epithelial cells. *Infect Immun*. 1990;58:4036-4044.
6. Holly B, Hindman, Sheel B, et al. Rationale for adjunctive topical corticosteroids in bacterial keratitis. *Arch Ophthalmol*. 2009;127:97-102.
7. O'Brien TP, Hazlett LD. Pathogenesis of ocular infection. In: Pepose JS, Holland GN, Wilhelmus KR, eds. *Ocular Infection and Immunity*. St Louis, MO: Mosby; 1996.
8. Wilhelmus KR. Bacterial keratitis. In: Pepose JS, Holland GN, Wilhelmus KR, eds. *Ocular Infection and Immunity*. St Louis, MO: Mosby; 1996.
9. Tjia KF, van Putten P, Pels E, et al. The interaction between *Neisseria gonorrhoeae* and the human cornea in organ culture: an electron microscopic study. *Graefes Arch Clin Exp Ophthalmol*. 1988;226:341-345.
10. Virji M, Makepeace K, Ferfuson DJ, et al. Expression of Opc protein correlates with invasion of epithelial and endothelial cells by *Neisseria meningitidis*. *Mol Microbiol*. 1992;6:2785-2795.
11. Chandler JW, Milam DF. Diphtheria corneal ulcers. *Arch Ophthalmol*. 1978;96:53-56.
12. Rác P, Tenner K, Szivessy K. Electron microscopic studies in experimental keratoconjunctivitis listeriosa. I. Penetration of *Listeria monocytogenes* into corneal epithelial cells. *Acta Microbiol Acad Sci Hung*. 1970;17:221-236.
13. Labrec EH, Schneider H, Magnani TJ, et al. Epithelial cell penetration as an essential step in the pathogenesis of bacillary dysentery. *J Bacteriol*. 1964;88:1503-1518.
14. Kivlin JD, Wilson ME Jr; and the Periocular Infection Study Group. Periocular infection after strabismus surgery. *J Pediatr Ophthalmol Strabismus*. 1995;32:42-49.
15. Khan AO, Al-Katan H, Al-Baharna I, et al. Infected epithelial inclusion cyst mimicking subconjunctival abscess after strabismus surgery. *J AAPOS*. 2007;11:303-304.
16. Lin CP, Shih MH, Tsai MC. Clinical experiences of infectious scleral ulceration: a complication of pterygium operation. *Br J Ophthalmol*. 1997;81:980-983.
17. Feiz V, Redline DE. Infectious scleritis after pars plana vitrectomy because of methicillin-resistant *Staphylococcus aureus* resistant to fourth-generation fluoroquinolones. *Cornea*. 2007;26:238-240.
18. Maskin SL. Infectious scleritis after a diabetic foot ulcer. *Am J Ophthalmol*. 1993;115:254-255.
19. Hwang YS, Chen YF, Lai CC, et al. Infectious scleritis after immunomodulators. *Arch Ophthalmol*. 2002;120:1093-1094.
20. Reynolds MG, Alfonso E. Treatment of infectious scleritis and keratoscleritis. *Am J Ophthalmol*. 1991;112:543-547.
21. Yang KS, Chen YF, Hwang YS, et al. Idiopathic subconjunctival abscess. *Chang Gung Med J*. 2004;27:555-557.