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Critical care medicine ocular emergency presentation: *Can you see it?*

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Abstract

***Introduction*: Ocular emergencies are not a common presentation in the intensive care unit. Intensivists should have a broad differential for the "red eye" and involve ophthalmology appropriately for ocular emergencies.**

***Background*: Ocular emergencies can lead to permanent vision loss if not identified in a timely fashion.**

***Case description*: A patient with hyponatremia and bacteremia admitted to the intensive care unit (ICU) developed an acute painful red eye. Physical exam findings and images are shared.**

***Conclusion*: Due to an acute ocular emergency, this critically-ill patient required transfer to a higher level of care and subspecialty management.**

***Clinical significance*: Education about ocular emergencies is provided for the intensivist; including diagnosis, management, and complications.**

Key words: Ocular emergencies, endophthalmitis, medical education, "red eye."

A 43-year-old male with a history of alcohol abuse, alcoholic pancreatitis, and hypertension initially presented to the Emergency Department with generalized weakness, frequent falls, and abdominal pain. He was found to be severely hyponatremic related to poor nutritional intake, labs were consistent with alcoholic hepatitis, and he was admitted to the intensive care unit (ICU) for hyponatremia management. During the ensuing days, he developed worsening encephalopathy and severe alcohol withdrawal, as well as intermittent fevers. Blood cultures resulted with the growth of methicillin-susceptible Staphylococcus aureus (MSSA) and he was subsequently started on IV cefazolin.

While in the ICU (hospital day #5), the patient developed rapidly progressive right-sided ocular symptoms including eye pain and scleral injection. This was evaluated on daily rounds and the patient was prescribed re-wetting ocular drops. Overnight, his symptoms progressed to chemosis, corneal clouding, vision loss, and a fixed pupil (**Figure 1**). The night intensivist examined the patient. The patient was found to have light perception visual acuity only in the right eye, eyelid edema, proptosis, restricted ocular movements, increased intraocular pressure (33 mmHg), significant chemosis, stromal edema, hypopyon, fixed and mid-position pupil, hazy anterior chamber with significant cells, and unable to see the fundus related to the hazy anterior chamber. Ophthalmology was emergently consulted and the patient subsequently transferred to an academic medical center. What was the ocular emergency?

Endophthalmitis is a bacterial or fungal infection

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involving the vitreous and/or aqueous humors of the eye and is an ophthalmologic emergency that can lead to permanent blindness. (1) In panophthalmitis, infection spreads from the eye into the adjacent soft tissues of the orbit. (1) Endogenous endophthalmitis arises secondary to hematogenous spread from a blood stream infection and occurs much less commonly than exogenous causes (secondary to ocular surgery, penetrating trauma, or extension from corneal infection). (1,2) Risk factors for endogenous endophthalmitis include recent hospitalization, diabetes, urinary tract infection, immunosuppression, indwelling catheters, liver abscess, endocarditis, and intravenous drug abuse. (3)

Approximately 40% of endogenous endophthalmitis cases in the United States are secondary to endocarditis, and blood cultures are positive in about 75% of patients, but even transient bacteremia can lead to endophthalmitis. (1) Conversely, endophthalmitis does not serve as a source of blood stream infection. (1) Symptoms can include pain, photophobia, the presence of floaters, and vision loss. (3) Signs can include eyelid edema, conjunctival injection, circumcorneal congestion, scleritis, corneal edema, corneal ulcer, corneal exudate, iris nodules, pupillary distortion secondary to synechiae formation, and an afferent pupillary defect. Additionally optic neuritis, anterior chamber inflammation with hypopyon, vitreous cells, haze, and retinal lesions can be seen. (3) Fundal exam may be limited due to the presence of exudates and vitreous haze. (3)

Bacterial endogenous endophthalmitis typically presents within hours to days of symptom onset. (1) Approximately half of patients present with ocular symptoms as opposed to symptoms relating to their underlying infection. (1) Clinicians must maintain a high index of suspicion in any patient presenting with eye pain or vision loss with either known or possible bacteremia, or with a history of recent IV drug abuse.

Candida endogenous endophthalmitis typically occurs in hospitalized patients with risk factors for candidemia. (1) While the literature is variable, up to 26% of patients with candidemia can develop candida chorioretinitis, and up to 6% develop endophthalmitis. (1) Ocular seeding typically occurs in the highly vascular choroid, causing choroiditis or chorioretinitis. (1) Infections in this location are often painless, and patients with early candida chorioretinitis are often asymptomatic. For this reason, the Infectious Diseases Society of America (IDSA) recommends a dilated ophthalmologic examination, preferably by an ophthalmologist, for all non-neutropenic patients with candidemia within 1 week of diagnosis (and after neutropenia has resolved in neutropenic patients with candidemia). (2) As the infection spreads to the vitreous and aqueous humor (candida endophthalmitis), patients may develop decreased vision and eye pain. (1)

Mold endogenous ophthalmitis is rare and is typically found in hospitalized patients with severe immunocompromise. (1) Patients at risk include chemotherapy use, organ transplant patients, immunosuppression for hematopoietic stem cell transplantation or hematologic malignancy, or patients with pulmonary aspergillosis. (3) These patients are typically critically ill and may be unable to complain of ocular symptoms. (1) In fact, patients are more often diagnosed post-mortem. (1) Alternatively, IV drug users are at risk related to transient fungemia and may present in good health with only ocular symptoms. (1).

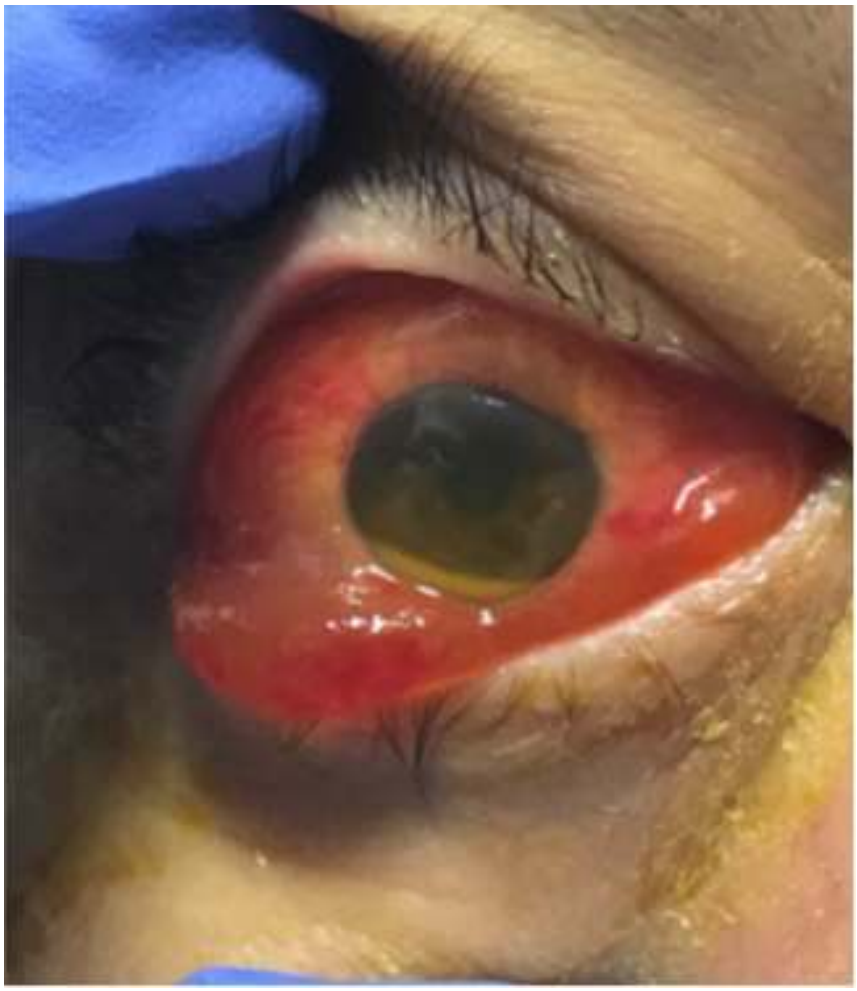
An ophthalmologist should emergently evaluate all patients with suspected endogenous endophthalmitis. Clinicians must maintain a high index of suspicion, specifically in the ICU, as clinical diagnosis alone has a high false negative rate. (3) Treatment of acute endogenous ophthalmitis involves systemic antibiotics to treat the underlying source of blood stream infection, urgent ophthalmologic evaluation, and all patients require intravitreal antibiotics and/or vitrectomy. (1,3) Outcomes depend on the virulence of the organism as well as timing of appropriate therapy; with more patients maintaining some level of visual acuity the more rapidly they are treated. (1,3) Systemic steroids are sometimes used for their anti-inflammatory properties, but data on their use are conflicting and there are no clear guidelines. (3) Endophthalmitis should be managed in a medical center that can offer both intravitreous antibiotics and vitrectomy.

On transfer, vitreous cultures were taken and he was immediately given intravitreous vancomycin and ceftazidime. He was started on timolol, dorzolamide, and brimonidine drops for increased intraocular pressure. Due to developing periorbital edema (**Figure 2**), a computed tomography (CT) scan of the orbits showed pre- and post-septal edema concerning for concurrent orbital cellulitis versus reactionary inflammation and patient was broadened to IV vancomycin, ceftriaxone, and metronidazole. He was also given IV steroids for ocular inflammation as well as a second intravitreous antibiotic injection. His ocular exam continued to improve, but without improvement in his visual acuity. Vitreous cultures remained negative.

He continued to have persistently positive blood cultures. Endocarditis was ruled out as source of

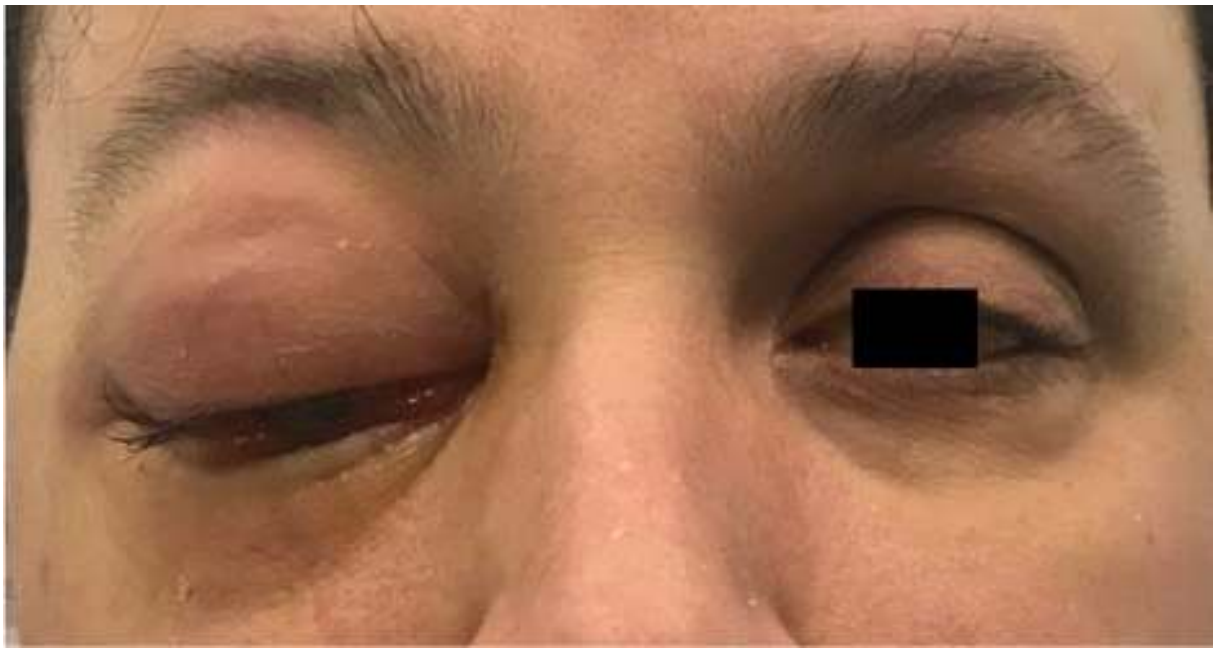
bacteremia via transesophageal echocardiogram. Blood cultures eventually cleared (without a clear source), and he was discharged on IV ceftriaxone and oral linezolid for a 6-week course. He continued to follow up with outpatient ophthalmology. Signs of infection did not return or worsen, but visual acuity did not improve and he developed progressive phthisis bulbi. He eventually underwent enucleation of the right eye.

Figure 1. Overnight exam of right eye



Legend: Note the eyelid edema, corneal clouding, and hypopyon.

Figure 2. Patient exam on transfer



Legend: Note the periorbital edema and discoloration.

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