



Endogenous endophthalmitis caused by *Staphylococcus capitis*

Abdelrahman M. Elhusseiny, Muhammad M. Shamim, Riley N. Sanders, Ahmed B. Sallam*

Department of Ophthalmology, Bernice and Harvey Jones Eye Institute, University of Arkansas for Medical Sciences, Little Rock, AR, USA

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ABSTRACT

Purpose: To report a rare case of endogenous endophthalmitis caused by *Staphylococcus capitis*.

Observation: A 34-year-old male patient with a history of gonococcal urethritis and arthritis presented with right endogenous endophthalmitis. Vitreous biopsy culture confirmed *Staphylococcus capitis* involvement. The patient was treated with pars plana vitrectomy, intravitreal vancomycin, and ceftazidime injections and systemic antibiotics.

Conclusion and importance: *Staphylococcus capitis*-related endogenous endophthalmitis has rarely been reported in the literature. None of the published reports specifically describe its clinical course and management.

1. Introduction

Staphylococcus capitis is an opportunistic gram-positive coagulase-negative *Staphylococcus*. It is part of normal skin flora especially on the head, and has been implicated in some skin and soft tissue infections.¹ Systemic infection caused by *Staphylococcus capitis* is rare and includes infective endocarditis, cellulitis, hospital acquired meningitis and prosthetic joint infection; however the pathogenesis of causing infection by this organism remains unclear.² Endophthalmitis is a severe type of intraocular inflammation that can be exogenous following penetrating trauma or intraocular surgery, or endogenous due to hematogenous spread.³ Endogenous endophthalmitis is a rare vision-threatening condition representing 2%–15% of all cases of endophthalmitis.³ Risk factors for endogenous endophthalmitis include immunosuppression due to different causes including diabetes mellitus, malignant tumors, and immunosuppressive therapy, as well intravenous drug use.⁴ Endogenous endophthalmitis is mainly caused by bacteria, particularly *Staphylococci* and *Streptococci*. Fungal endogenous endophthalmitis is more prevalent in intravenous drug users.^{4,5} *Staphylococcus capitis* is a rare cause of endophthalmitis, with only a few cases of exogenous endophthalmitis reported to date.^{6–9} We herein present a unique case of endogenous endophthalmitis caused by *Staphylococcus capitis* and describe its clinical course and management.

2. Case report

A 34-year-old male patient was referred to the uveitis service at our institution with rapidly progressive diminution of vision in the right eye

(OD) from 20/20 to 20/400 over 13 days. Six weeks prior to presentation, he was admitted for evaluation of penile discharge, blurred vision in the left eye (OS), and left knee pain of one-week duration. There was no history of ocular trauma or surgery. His work up was significant for *Neisseria gonorrhoea* isolated from penile discharge. Synovial fluid aspirate was unrevealing, and it was presumed that his joint inflammation was reactive in nature. Ocular evaluation disclosed a corneal ulcer OS with best corrected visual acuity (BCVA) of counting fingers (CF) at 1 foot. Corneal scrapings of the ulcer, prior to the initiation of systemic antibiotics, were negative for bacteria or fungi. Slit lamp examination was unremarkable OD with BCVA of 20/20. Dilated fundus examination revealed normal optic discs, macula, retinal vessels, and periphery in both eyes (OU). Intensive topical treatment with moxifloxacin and natamycin every 4 hours resulted in healing of the corneal ulcer. A month later, the patient started to develop rapid progressive diminution of vision OD and was referred to the uveitis service. BCVA was 20/400 OD and 20/60 OS. Slit lamp examination OD revealed inferior keratic precipitates, intense anterior chamber inflammation with a 1-mm hypopyon, dispersed pigment on the anterior lens capsule, posterior subcapsular cataract, and 4+ vitreous haze with no fundus view. B scan revealed significant vitreous opacities with a flat retina. Slit lamp examination OS showed a healed corneal ulcer with large central scarring and no epithelial defect. Fundus examination OS was unremarkable. Serum testing was negative for syphilis, angiotensin converting enzyme, lysozyme, tuberculosis (T spot), and human immunodeficiency virus. Based on the clinical appearance of the right eye, the diagnosis of infective endophthalmitis was suspected and the patient was scheduled for urgent vitreous biopsy and pars plana

* Corresponding author. FRCOphth. Jones Eye Institute, University of Arkansas for Medical Sciences. 4301 W. Markham Street, Little Rock, AR, 72207, USA
E-mail address: ahmedsallam11@yahoo.com (A.B. Sallam).

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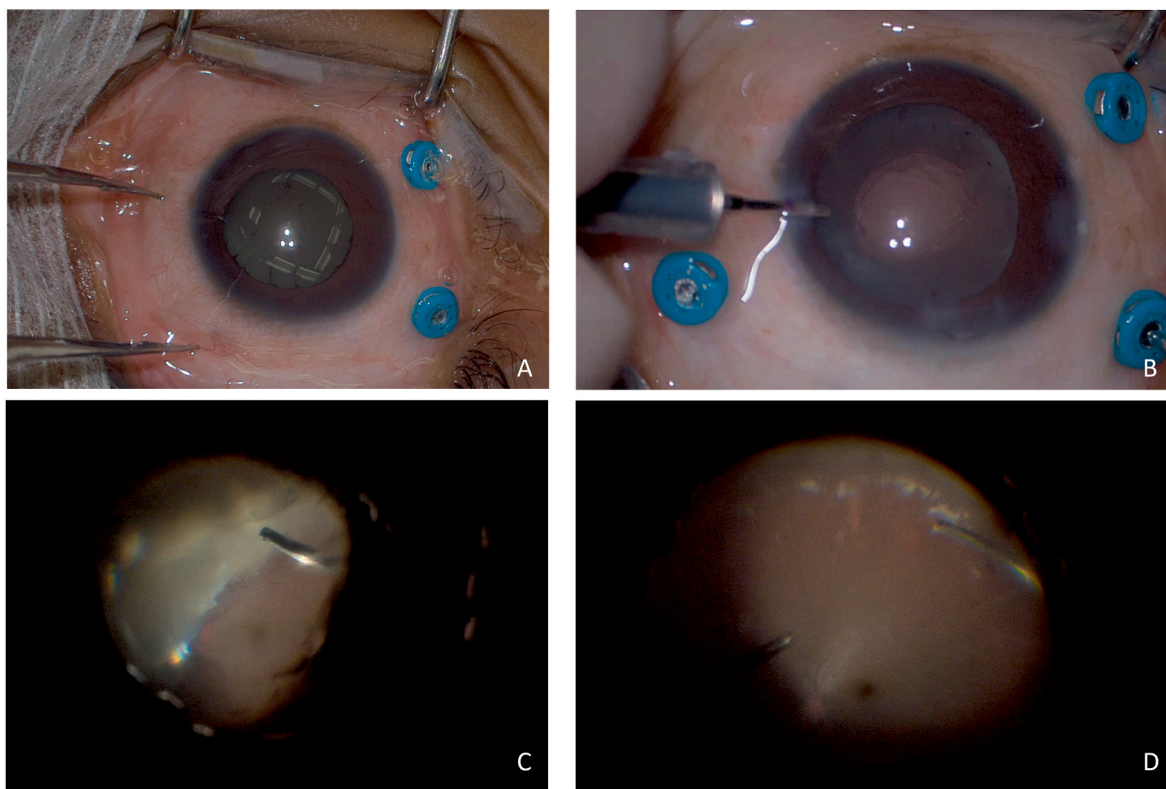


Fig. 1. Intraoperative view A: yellowish fundus reflex present prior to cataract removal. B: peripheral anterior vitreous opacification noted following lens removal. C: Fundus examination during vitrectomy demonstrating dense vitritis. D: Fundus examination during vitrectomy demonstrating peripheral retinitis and vasculitis.

vitrectomy (PPV) OD. Intraoperative fundus examination revealed dense vitreous opacification, peripheral retinitis, and vasculitis (Fig. 1). A localized inferotemporal rhegmatogenous retinal detachment and a retinal tear were also present. Endolaser was applied to the retinal tear after air-fluid exchange. The patient was left aphakic and the vitreous cavity was filled with perfluoropropane (C_3F_8). Intravitreal vancomycin (1mg) and ceftazidime (2.25 mg) were injected at the end of the procedure. Postoperatively, the patient was prescribed topical ofloxacin and prednisolone acetate and was admitted to the infectious diseases service for systemic workup for the infectious source. Oral levofloxacin and doxycycline were started and repeat intravitreal vancomycin (1 mg), ceftazidime (2.25 mg) combined with dexamethasone (0.4 mg) were injected two days later. Results of the vitreous tap and culture were positive for *Staphylococcus capitis* and negative for toxoplasmosis, lymphoma, cytomegalovirus, herpes simplex virus, varicella zoster virus, and fungal agents. Blood cultures were negative. Transthoracic echocardiography was negative for vegetations. Anterior chamber reaction and vitreous haze continued to improve. At the three-week postoperative follow-up, BCVA was CF OD (without aphakic correction) and the vitreous cavity showed minimal vitreous haze, flat retina with no retinitis and 50% gas fill. Four months following the PPV, the patient underwent placement of a sulcus intraocular lens. At the last follow-up visit, BCVA had improved to 20/80 OD and the retina remained flat with no vitreous cavity inflammation.

3. Discussion

Staphylococcus capitis is an opportunistic pathogen that usually causes skin and soft tissues infections and is a common pathogen implicated in nosocomial blood infections in intensive care units.^{10,11} In this report, we describe an unusual case of endogenous endophthalmitis caused by *Staphylococcus capitis*. Only very few cases of *Staphylococcus capitis* exogenous endophthalmitis have been reported in the literature

to date.^{6,7} Al-Rashaed and Abu El-Asrar⁶ reviewed the microbiological spectrum of pediatric exogenous endophthalmitis in forty-nine patients with a mean age of 5.7 years and reported one case of posttraumatic *Staphylococcus capitis* endophthalmitis; however, they did not mention the details about the clinical course or the outcomes. In a retrospective study conducted by Blom et al.⁷ including 46 eyes with endophthalmitis, polymicrobial infection by *Staphylococcus epidermidis* and *Staphylococcus capitis* was identified as the causative agent of post cataract endophthalmitis in one eye. Using API Staph Iden method¹² for microbial identification in endophthalmitis cases, Romanowski and colleagues⁸ reported one case of *Staphylococcus capitis*.

To our knowledge, the current case report is the first to describe the clinical course and outcomes of isolated *Staphylococcus capitis* endogenous endophthalmitis as other reports did not report on the outcomes. Mochizuki and colleagues reported a 74-year-old woman with a history of uterine cancer diagnosed with endogenous endophthalmitis secondary to polymicrobial infection by group B *Streptococci* and *Staphylococcus capitis*. The blood cultures and vitreous aspirates were positive for both organisms. They assumed that uterine cancer was the source of group B *Streptococcal* infection. The source of the *Staphylococcus capitis* was not exactly identified; however, they assumed it was from pneumonia based on the patient's previous history of a cold.⁹ In our patient, there was no known history of ocular trauma or surgery. There was no identifiable risk factor or source of infection. However, it may be related to arthritis and urethritis that the patient had six weeks prior to the presentation. Although the culture of the synovial aspirate was negative, septic arthritis could not be excluded given the fact that up to 48% of septic arthritis cases are culture negative.¹³ Of note, although the patient's blood culture was negative, the culture was drawn after systemic antibiotic therapy was administered. Atypical presentation of reactive arthritis may be also a possibility in our patient given the history of urethritis and presumed reactive arthritis. Reactive arthritis usually occurs days or weeks after genitourinary or gastrointestinal

infection caused by salmonella, shigella or chlamydia.^{14,15} However, reactive arthritis-associated uveitis is usually an anterior uveitis and does not cause significant vitreous inflammation, retinitis, or peripheral vasculitis as in our case. Since *Staphylococcus capitis* is a bacterial flora of the skin, there is a possibility that the culture results are due to contamination. However, we think this is very unlikely given that the phenotypic appearance of the inflammation and the response to anti-biotic therapy were consistent with an infectious pathology. Further, because the vitreous sample at the time of PPV, we had a complete isolation of the face and eye lashes with a surgical drape. *Staphylococcus capitis* has been previously identified as a rare cause of infective endocarditis. However, transthoracic echogram in our patient was negative with no cardiac pathology. Although the exact pathogenesis of *Staphylococcus capitis* infection is not well established, genomic studies have demonstrated several genes which help *Staphylococcus capitis* to evade the immune system and generate biofilms.¹⁶

In summary, this is the first report to describe isolation of *Staphylococcus capitis* as a pathogen in endogenous endophthalmitis in a young, apparently healthy patient. Further studies are warranted for better understanding the pathogenesis and virulence of *Staphylococcus capitis*.

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Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Patient consent

Written consent to publish this case has not been obtained. This report does not contain any personal identifying information.

Declaration of competing interest

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