



LETTER TO THE EDITOR

Streptococcus Dysgalactiae Subspecies Equisimilis Endogenous Endophthalmitis Associated with Aortic Valve Abscess

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ABSTRACT

Purpose: To describe a case of endogenous endophthalmitis from *Streptococcus dysgalactiae* subspecies *equisimilis* in the setting of an aortic valve abscess

Methods: Retrospective case report.

Results: A 72-year-old white male presented with fevers, encephalopathy, and decreased vision in his left eye. His visual acuity was 20/20 in his right eye and finger counting in the left eye. Workup revealed an aortic valve abscess. Examination of his left eye revealed dense anterior chamber fibrin and no view of the retina. B-scan ultrasonography revealed loculated hyperechoic areas consistent with vitreous inflammation. A vitreous tap and injections with vancomycin and ceftazidime were performed. Visual acuity worsened to no-light perception 5 days later. Vitreous and blood cultures grew *Streptococcus dysgalactiae* subspecies *equisimilis*. He received another intravitreal injection of vancomycin with no improvement.

Conclusions: *Streptococcus dysgalactiae* subspecies *equisimilis* is an emerging pathogen and may cause severe intraocular infections with a poor visual outcome.

Keywords: Aortic valve abscess, endogenous endophthalmitis, group C streptococcus, *Streptococcus dysgalactiae*, *Streptococcus dysgalactiae* subspecies *equisimilis*, subacute endocarditis

Acute bacterial endophthalmitis can result in permanent vision loss and most cases are from exogenous insults postoperatively, post-intravitreal injection, or following trauma. Endogenous sources of endophthalmitis can occur from seeding during bacteremia. The most common streptococcal organisms associated with endophthalmitis have been associated with Group A and B streptococci, among the β -hemolytic streptococci.^{1,2} Here, we present a rare case of Group C endogenous endophthalmitis caused by *Streptococcus dysgalactiae* (*S. dysgalactiae*) subspecies *equisimilis* in the setting of an aortic valve abscess.

CASE REPORT

A 72-year-old male presented after being found to have altered mental status and complaining of 3 weeks of decreased vision in the left eye. He had

sustained a mechanical fall a few days prior with injury to his right arm. He denied any history of intravenous drug abuse, preceding history of trauma, or eye surgery. His medical history was notable for hypertension, diabetes, and undergoing chemotherapy and radiation 1 year prior due to stage IV squamous cell carcinoma of the tongue with metastases to the head and neck lymph nodes. Chest X-ray was notable for possible pneumonia on admission and computed tomography imaging of the head and spine were unremarkable

On arrival, he was noted to be hypertensive, febrile, and tachycardic. He had altered mental status and blood cultures and urine cultures were obtained. On ophthalmic exam, his best corrected visual acuity was 20/20 in the right eye and counting fingers without light projection in the left eye. His IOP was 21 and 37 mm Hg in the right and left eye, respectively. He

Received 16 May 2018; accepted 11 June 2018.

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had a relative afferent pupillary defect of the left eye with marked conjunctival injection, and an anterior chamber with a 1.5-mm hypopyon and dense fibrin obscuring a view of the iris details and any view of the posterior segment. The fundoscopic exam was normal in the right eye. B-scan ultrasonography of the left eye revealed marked vitreous consolidation, extensive stranding and membrane formation, and choroidal effusions (Figure 1).

The patient underwent vitreous tap for culture and injection with vancomycin 1 mg/0.1 ml and ceftazidime 2.25 mg/0.1 ml on initial presentation. He was started on intravenous vancomycin, piperacillin-tazobactam, and topical drops including prednisolone acetate 1% every 4 h, timolol/dorzolamide combination drops twice daily and polymyxin B and trimethoprim antibiotic drops 1 mg/mL every 6 h.

Further workup was notable for positive blood cultures revealing the growth of *Streptococcus dysgalactiae* subspecies *equisimilis*, susceptible to both penicillin and vancomycin and resistance to clindamycin, fluoroquinolones, erythromycin, and linezolid. The intravitreal aspirate also grew *Streptococcus dysgalactiae* subspecies *equisimilis* with same antibiotic susceptibilities as the blood culture. Transthoracic echocardiogram confirmed a nonmobile vegetation on a bicuspid aortic valve measuring 1.5 cm by 2 cm by 1.5 cm with thickening of the aortic root. The patient was switched to intravenous penicillin G 4 million units every 4 h. Given that he was medically unstable from the aortic valve compromise, septicemia, and encephalopathy, he was deemed too unstable by the treating medical team to consider pars plana vitrectomy at presentation.

Four days after the initial intravitreal injections, the hypopyon had contracted to <1 mm, but there was significant fibrin and vitreous debris. An additional intravitreal injection of vancomycin 1 mg/0.1cc was

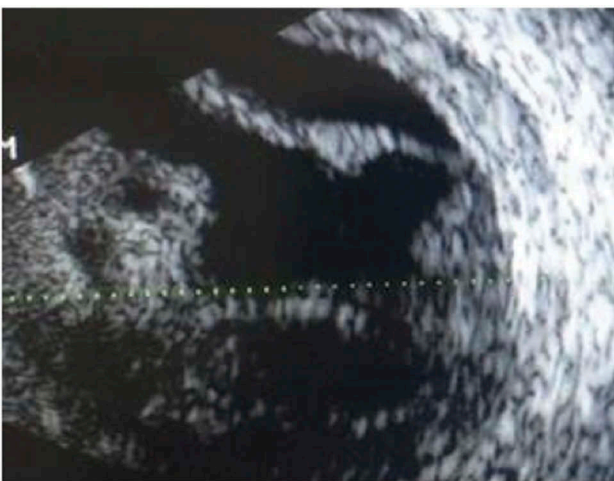


FIGURE 1. B-scan ultrasonography of the left eye demonstrating choroidal effusions, loculated vitreous debris, and vitreal membranes on the initial day of presentation.

given to the patient, with continuation of the current treatment regimen as above. The patient eventually underwent an aortic valve replacement and debridement of aortic valve abscess. The patient elected to not pursue any more intravitreal injections or surgery, given the limited visual potential in the affected eye. The patient's vision worsened to no-light perception in the affected eye 5 days after initial presentation. He was later discharged on IV ceftriaxone 2 g every 24 h. At last follow-up, 4 weeks after presentation, his vision remained at no-light perception with the hypopyon resolved. Subsequent B-scans after initial injection revealed lingering vitreous debris, choroidal and retinal detachment with poor view to the posterior segment.

DISCUSSION

Herein, we present a case of delayed presentation of endogenous endophthalmitis secondary to *Streptococcus dysgalactiae* subspecies *equisimilis* in the setting of subacute endocarditis. The patient presented with several weeks of symptoms before receiving care, severely limited vision, and extensive anterior and posterior segment fibrin stranding. Given the myriad of acute multiple medical comorbidities at the time of presentation, only conservative medical measures were employed. Collectively, the delayed time to treatment, poorly understood virulence of the inciting bacteria given the rarity of this organism as a cause of endophthalmitis, and conservative management may have all contributed to this patient progressing to no-light perception.

Streptococcus dysgalactiae is a Lancefield Group C or G streptococcal organism. This micro-organism has been associated with soft-tissue and skin infections primarily, including abscesses, erysipelas and necrotizing fasciitis. It has been known to cause other invasive infections, such as meningitis, septic arthritis, and rarely, endocarditis.^{1,2} This organism can be divided into five distinct subtypes, with systemic diseases in humans being mostly associated with *Streptococcus dysgalactiae* subspecies *equisimilis* (SDSE).³

Recent literature has suggested that SDSE has been implicated in many invasive conditions worldwide, such as streptococcal toxic shock syndrome, necrotizing soft tissue infections, and endocarditis. In particular, Opeegard et al. reported the recent emergence of a novel and virulent genotype SDSE, *stG62647*, which has emerged in Norway and is associated with invasive conditions, such as endocarditis. This species has been reported to be three times more common epidemiologically in Norway than *Streptococcus pyogenes*.⁴

Some studies have sought to characterize the clinical characteristics and incidence of infective endocarditis in patients with SDSE bacteremia. A retrospective study reported 83 cases of documented SDSE bacteremia with

nearly 7% of cases having infectious endocarditis. In those cases with infective endocarditis, many patients were bacteremic from an unexplained source with a mortality of 8% in those cases of bacteremia.⁵ Lother et al., reporting on 209 bacteremic events secondary to SDS, noted that 6% of cases had suspected or confirmed endocarditis according to the Duke criteria. No clinical source of bacteremia was found in 90% of patients with SDSE bacteremia and over 40% of the patients with endocarditis had aortic valve involvement. Sixty four percent of the cases with endocarditis in this study had complications with septic embolization and seeding primarily to the lungs and central nervous system.⁶

There have been rare cases in the literature reported with concurrent endocarditis and endophthalmitis from *Streptococcus dysgalactiae*.⁷⁻¹⁰ One report presented a case of unilateral endophthalmitis where the source of infection was due to a nonhealing ulcer of the foot. The patient presented 5 days after symptom onset with a visual acuity of 20/400 and the patient responded well with intravitreal injections of vancomycin and ceftazidime with corresponding improvement in his/her visual acuity to 20/125.⁷ Another case reported a patient 8 days from of symptoms presenting with visual acuity of light perception in the affected eye and underwent injections of intravitreal and subconjunctival vancomycin and meropenem with no improvement in visual acuity despite improvement in ocular inflammation.⁸ There have been few other cases of endogenous endophthalmitis reported secondary to this organism including in the setting of dental abscesses and facial trauma.¹⁰

There is an association with Group C streptococcal bacteremia and underlying immunosuppressive conditions such as malignancy, diabetes, and chronic alcoholism.^{2,3} In the present case, our patient had history of stage IV squamous carcinoma of the tongue and had undergone multiple rounds of chemotherapy and radiation. He had an extensive workup to identify the source of his bacteremia including consultations from infectious disease, otolaryngology, and dermatology. It was postulated that given his immunocompromised state from metastatic squamous cell cancer, bacterial invasion from an unknown source coupled with a congenital bicuspid aortic valve rendered the patient persistently bacteremic from aortic valve seeding. This eventually progressed to bacterial embolization of his left eye.

In our patient, the SDSE isolate was found to have resistances to a variety of antibiotics including fluoroquinolones and erythromycin. However, as in previous reports, the isolate in our case had sensitivities to penicillin. The patient was initially started on broad-spectrum antibiotics with vancomycin and piperacillin-tazobactam but later switched to intravenous penicillin based on the results of blood cultures.⁷⁻¹⁰ Despite the initial vitreous tap and

injection with intravitreal antibiotics, our patient experienced a progressive decline in visual acuity and proceeded to no-light perception, which is a worse outcome than prior reported cases. Relative to the two other cases, however, the time to presentation was significantly longer. Additionally, our patient began with a poor starting visual acuity (count fingers without projection) which can account for this outcome. Given the rarity of this infection with prior literature limited to just a couple of case reports, the prognosis of patients with Group C Streptococcal endogenous endophthalmitis remains unclear. Additionally, there is a dearth of information to drive management decisions regarding intravitreal culture and antibiotic injections versus earlier vitrectomy in these patients.¹⁰

The value of immediate vitrectomy in cases of endogenous endophthalmitis remains unclear. Theoretical advantages to performing vitrectomy include removal of the causative organism and its toxins, clearing of vitreous debris, collection of large vitreous sample for culture and potentially improved distribution of intravitreal antibiotics for treatment. However, vitrectomy may be technically challenging in these cases given limited visualization and disrupted anatomy (e.g., choroidal detachments) and may be associated with complications, such as cataract or retinal detachment.¹¹

In one reported case, a patient was found to have bilateral endogenous endophthalmitis in the setting of Group C streptococcal bacteremia 5 days into symptom onset, and after treatment with intravitreal vancomycin, gentamycin, and dexamethasone, the patient underwent pars plana vitrectomy in his right eye and developed a retinal detachment postoperatively with final visual acuity of 20/25 at 3 months.¹⁰ Kurniawan et al. demonstrated poor outcome of vitrectomy for streptococcal endogenous endophthalmitis with 20% of patients proceeding to no-light perception, 10.5% undergoing enucleation, and 14% undergoing evisceration.¹²

Our case highlights the challenging nature in the management of endogenous endophthalmitis caused by *Streptococcal dysgalactiae* subspecies *equisimilis*. The clinical course from this organism largely remains unpredictable and even though the patient did well systemically after his cardiac surgery, he suffered a permanent loss of vision. While management of systemic disease is established, further investigation is warranted to determine the most efficacious interventions for maximizing visual outcomes in this challenging patient population.

DECLARATION OF INTEREST

Yasha S. Modi is a consultant for Genentech and Allergan. The authors report no other conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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