Culture-proven Streptococcus viridans endophthalmitis in a healthy child: Challenges in determining the source of infection

Derrick Chuah Jun Quan, MD[1,2], Grace Tan Zhen Wen, MBBS[1], Akmal Haliza Zamli, MOphthal[1], Shahidatul-Adha Mohamad, MMed[2]

[1]Department of Ophthalmology, Hospital Tengku Ampuan Afzan, Kuantan, Pahang, Malaysia, [2]Department of Ophthalmology and Visual Science, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, Kubang Kerian, Kelantan, Malaysia

SUMMARY

Endophthalmitis is a vision-threatening intraocular infection requiring urgent diagnosis and treatment. Determining the route of infection may be challenging, particularly in children with limited history and multiple potential sources. A 4-year-old indigenous boy presented with unilateral ocular redness and reduced vision three days after a reported minor ocular injury. Examination of the affected eye revealed mild conjunctival injection, intense anterior chamber inflammation with hypopyon, together with dense vitritis. There was no evidence of a corneal infiltrate or penetrating ocular injury. Imaging excluded an intraocular foreign body. Urgent vitreous tap followed by intravitreal vancomycin, ceftazidime, and amphotericin B was performed. Vitreous culture grew Streptococcus viridans, while blood cultures and systemic investigations were unremarkable. Further assessment identified early childhood caries; however, no other definitive source of infection could be established. The patient demonstrated marked clinical improvement following intravitreal and systemic antimicrobial therapy. This case highlights the challenges of determining the source of infection in paediatric endophthalmitis and emphasizes the importance of prompt microbiological sampling and early treatment, even when the route of infection remains uncertain.

INTRODUCTION

Endophthalmitis is a vision-threatening intraocular infection that constitutes an ophthalmic emergency requiring prompt diagnosis and treatment. It is broadly classified as exogenous, resulting from direct microbial inoculation following trauma or surgery, or endogenous, arising from haematogenous spread from a distant infectious focus.[1] Endogenous endophthalmitis is uncommon in children and is typically associated with an identifiable systemic source of infection.[2] Dental-associated endogenous endophthalmitis is exceedingly rare, with only isolated cases reported in adults.[3-4] We report a case of culture-proven Streptococcus viridans endophthalmitis in a healthy child with dental caries as the only identifiable potential source of infection. The diagnosis was further complicated by a history of minor ocular trauma, which initially raised concern for an exogenous aetiology.

CASE PRESENTATION

A 4-year-old indigenous boy presented with left-eye redness and reduced vision three days after a reported ocular injury. He had no known medical comorbidities, and his immunisations were up to date. According to his caretaker, the incident was witnessed by a teacher, who reported that another child had thrown a pencil; however, it was unclear whether the eye had been directly struck. Following the incident, the child remained systemically well and afebrile. There was no history of toothache, gum swelling, facial pain, or recent dental procedures. The father reported frequent exposure to soil and muddy water, and that the family kept an unvaccinated feral cat.

On examination, visual acuity was 6/9 in the right eye and 6/36 in the left, with no relative afferent pupillary defect. The left eye demonstrated mild conjunctival injection with intense anterior chamber inflammation, including 4+ cells, a 1-mm hypopyon, and a small organised fibrinous exudate (Fig. 1). The cornea was clear, with no epithelial defect, stromal infiltrate, or keratic precipitates. There was no evidence of self-sealed corneal wound or other penetrating ocular injury. The lens was clear with no capsular breach. Fundus examination was limited by dense vitritis. B-scan ultrasonography demonstrated vitreous opacities consistent with vitritis (Fig. 2). The right eye was unremarkable.

Given the presence of hypopyon and vitritis, a diagnosis of endophthalmitis was made and urgent treatment initiated. Intravenous ciprofloxacin was immediately commenced together with intensive topical moxifloxacin and atropine 1%. The child underwent an urgent vitreous tap and aqueous paracentesis for microbiological analysis, followed by intravitreal injection of vancomycin (1 mg/0.1 mL), ceftazidime (2 mg/0.1 mL), and amphotericin B (5 mcg/0.1 mL) under general anaesthesia.

The possible route of infection was investigated concurrently. In view of the reported ocular trauma, an exogenous source was initially considered. Skull radiography and urgent non-contrast CT orbit excluded an intraocular foreign body. The child was co-managed with the paediatric team for systemic evaluation and investigation of a possible endogenous source of infection. Full blood count, C-reactive protein and other

This article was accepted: 06 August 2026
Corresponding Author: Shahidatul Adha Mohamad
Email: shieda@usm.my

Fig. 1: Slit-lamp examination of the left eye showing mildly injected conjunctiva, hypopyon and a small, organised fibrinous inflammatory exudate within the anterior chamber; the cornea was otherwise clear

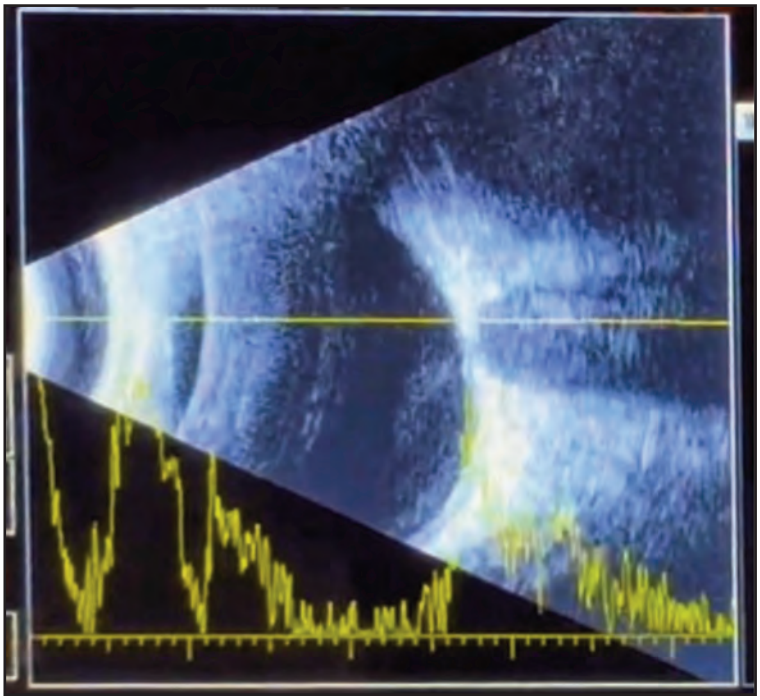

Fig. 2: B-scan of the left eye showing vitreous opacities suggestive of vitritis.

Fig. 3: Intraoral photograph demonstrating caries involving the primary molars

inflammatory markers were within normal limits, while blood, urine and aqueous humour cultures showed no growth. Given the history of cat exposure, empirical coverage for cat-scratch disease was initiated, and intravenous antibiotics were rationalised to ceftazidime. Vitreous culture isolated alpha-haemolytic Streptococcus viridans, which was sensitive to chloramphenicol and cefotaxime. Serological testing for Bartonella henselae and melioidosis subsequently returned negative. Dental assessment identified caries involving the primary molars, although no dental abscess or other focus of infection was identified. Dental treatment comprising caries removal, restoration, and fluoride varnish application was performed (Fig. 3).

The patient demonstrated a favourable clinical response to intravenous ceftazidime, with complete resolution of the hypopyon, anterior chamber inflammation, and vitritis after two weeks of treatment. No repeat intravitreal antibiotic injections or pars plana vitrectomy were required. Visual acuity improved from 6/36 to 6/9 in the affected eye. Fundus examination at discharge demonstrated a clear view of the posterior pole, with a healthy optic disc and retina.

DISCUSSION

Determining the route of infection represented the principal diagnostic challenge in this case. Paediatric endophthalmitis is uncommon and most frequently occurs following penetrating ocular trauma or intraocular surgery, whereas endogenous infection accounts for a relatively small proportion of cases.[1-2,5] In a recent series of paediatric endogenous endophthalmitis, most children had an identifiable systemic focus of infection, including respiratory tract infections, urinary tract infections, sepsis, and septic arthritis.[2,5] Unlike these commonly reported sources, the only identifiable potential source in our patient was dental caries involving the primary molars. Despite extensive investigations, no definitive systemic focus of infection was identified.

The reported history of minor ocular trauma initially raised concern for exogenous endophthalmitis secondary to direct inoculation. However, this explanation became less convincing following clinical examination and imaging. No corneal wound, scleral laceration, lens breach, or other evidence of penetrating ocular injury was identified, while skull radiography and CT orbit excluded an intraocular foreign body. Although a self-sealed occult injury cannot be entirely excluded, the absence of supporting clinical findings reduced the likelihood of a traumatic source.

The isolation of Streptococcus viridans from the vitreous specimen prompted consideration of an endogenous source. Viridans streptococci are common oral commensals frequently associated with dental plaque and dental caries.[6-7] Dental assessment identified caries involving the primary molars, raising suspicion of a possible oral source. Dental-associated endogenous endophthalmitis appears to be exceedingly rare.[8] Published reports have been limited to adults, including a case associated with a dental abscess and another occurring after a mild dental infection in an otherwise healthy individual.[3-4] To our knowledge, previously reported dental-associated endogenous endophthalmitis has been limited to adults.

Nevertheless, direct evidence linking the dental findings to the ocular infection was lacking in our case. Although dental assessment identified caries involving the primary molars, cultures were not obtained from the affected teeth, preventing direct confirmation that the dental lesions harboured the same organism isolated from the vitreous sample. Furthermore, there was no evidence of dental abscess, periodontal infection, or other overt odontogenic sepsis. Consequently, while an endogenous oral origin remained the most plausible explanation, causality could not be definitively established.

Although blood cultures were negative, transient bacteraemia cannot be excluded, as viridans streptococci may enter the bloodstream following disruption of the oral mucosal barrier and such episodes are often brief and may not be captured by routine blood cultures. Endogenous endophthalmitis occurs when microorganisms disseminate via the bloodstream and seed the highly vascular choroidal circulation before extending into the retina and vitreous cavity.[1,8] Therefore, transient haematogenous spread remains the most plausible explanation linking the isolation of Streptococcus viridans to the concurrent dental caries in our patient. Given the patient's frequent exposure to muddy soil and feral cats, atypical infectious causes such as melioidosis and Bartonella henselae infection were also considered; however, investigations for these conditions were negative.

Regardless of the route of infection, management of suspected endophthalmitis should not be delayed while attempting to identify the source. Early vitreous sampling remains essential for microbiological diagnosis and facilitates targeted antimicrobial therapy.[8-9] In our patient, prompt vitreous tap followed by intravitreal broad-spectrum antimicrobial therapy resulted in rapid resolution of intraocular inflammation and favourable clinical recovery. The positive vitreous culture proved particularly valuable, as extensive systemic investigations failed to identify a definitive source of infection.

CONCLUSION

Determining the source of infection in paediatric endophthalmitis may be challenging, particularly when multiple potential aetiologies exist. Regardless of the route of infection, early recognition of endophthalmitis, urgent vitreous sampling with prompt intravitreal antimicrobial therapy, and appropriate systemic antimicrobial treatment remain crucial for achieving favourable visual outcomes.

DECLARATIONS

Written informed consent for publication was obtained from the patient's parent. The authors declare no conflicts of interest. No financial support or funding was received for this work. All authors have read and approved the final manuscript.

REFERENCES

1. Tabatabaei SA, Masoumi A, Mirzaei A, Mirshahi R, Momenaei B, Bijani FM, et al. Infectious endophthalmitis: an overview of clinical features, microbiology profile, and antibiotic sensitivity pattern. J Curr Ophthalmol 2024; 36(3): 284-90.
2. Dorairaja T, Ab Kadir AJ, Rahmat J. Paediatric endophthalmitis: a 10-year retrospective study at Hospital Kuala Lumpur for incidence, risk factors, and outcomes. Malays J Ophthalmol 2022; 4(2): 157-70.
3. Mascali R, Berguiga M, Delhoum S, Le Loir M, Cochard-Marianowski C, Cochener B, et al. Endogenous bacterial endophthalmitis related to dental abscess: case report. J Fr Ophtalmol 2012; 35(1): 35-9.
4. Hoopes H, Cloutier N. A case of endogenous endophthalmitis after a mild dental infection. J Am Coll Emerg Physicians Open 2021; 2(5): e12557.
5. Nanda R, Das T, Padhi TR, Panda KG, Ger M, Padhy SK. Pediatric endogenous endophthalmitis: Clinical features and treatment outcomes. Indian J Ophthalmol 2025; 73(5): 665-71.
6. Santin K, Bispo PJ, Rocchetti TT, Denadai L, Martins WM, Carmo MS, et al. Characterization and distribution of viridans group streptococci isolated from infectious endophthalmitis and keratitis. Arq Bras Oftalmol 2021; 83: 463-72.
7. Ahmed NA, Tariq P, Naim A. Viridans group Streptococci and dental caries: an overview. Int J Biol Biotech 2023; 20(1): 3-16.
8. Xie CA, Singh J, Tyagi M, Androudi S, Dave VP, Arora A, et al. Endogenous endophthalmitis-a major review. Ocul Immunol Inflamm 2023; 31(7): 1362-85.
9. Hu M, Liu M, Jin S, Wang X, Liu X. Clinical features, treatment and prognosis of patients with endogenous infectious endophthalmitis. Int Ophthalmol 2024; 44(1): 321.