

Chronic postoperative *Cutibacterium acnes* endophthalmitis with implantable collamer lens

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ARTICLE INFO

Keywords:

Implantable collamer lens
Post-operative endophthalmitis
Chronic endophthalmitis
Cutibacterium acnes
Propionibacterium acnes

ABSTRACT

Purpose: We report a case of chronic post-operative endophthalmitis secondary to *Cutibacterium acnes* (*C. acnes*) in a patient with an implantable collamer lens (ICL).

Observations: A 45-year-old male presented three months after ICL implantation of the right eye with blurry vision, redness, and ocular pain in the setting of prolonged post-operative anterior chamber (AC) cell. Reduced visual acuity (VA) at 20/30-1, keratic precipitates, 1+ AC cell, and white ICL precipitates were concerning for chronic post-operative endophthalmitis. Anaerobic cultures from a vitreous tap grew *C. acnes*. Multiple intravitreal and intracameral injections with topical steroids were required to maintain a stable VA at 20/30; however, inflammation persisted and removal of the ICL and his native lens was ultimately required.

Conclusions and importance: Chronic post-operative inflammation and white plaque after ICL implantation should raise high suspicion for endophthalmitis secondary to *C. acnes*. Anaerobic vitreous cultures can confirm the diagnosis. Removal of the ICL implant is often necessary for treatment. More research is needed to best manage this vision threatening condition.

1. Introduction

Endophthalmitis is a rare vision-threatening intraocular inflammation, most commonly due to exogenous organisms introduced via ocular surgery, intravitreal injections, or trauma.¹ According to the Endophthalmitis Vitrectomy Study, post-operative endophthalmitis can be divided into acute or chronic, with chronic post-operative endophthalmitis occurring 6 weeks after surgery.² The majority of cases are due to *Cutibacterium acnes* (*C. acnes*, formerly known as *Propionibacterium acnes*).³ *C. acnes* is a gram-positive anaerobic bacillus that is associated with chronic infections of the skin and prosthetic devices due to its ability to evade the immunological response. It has been frequently implicated in post-cataract chronic infectious endophthalmitis; however, we report the second case of *C. acnes* causing chronic post-implantable collamer lens (ICL) infection.

2. Case report

A 45-year-old male was referred to uveitis clinic for possible chronic endophthalmitis of the right eye (OD) 3 months following bilateral posterior-chamber, phakic, implantable collamer lens (Visian, STAAR

Surgical Co, California, USA) surgery. One-month post-operatively the patient complained of floaters with associated blurry vision, redness, and ocular pain OD. He was noted to have prolonged anterior chamber (AC) cell despite topical steroids. Just prior to presentation deposits on the ICL were noted concerning for *C. acnes* infection.

The patient presented to uveitis clinic on prednisolone 1% QID, as well as brimonidine tartrate 0.2%/timolol maleate 0.5% BID OD for a history of steroid response up to the 50s. He reported intermittent achy ocular pain status post ICL placement and blurry vision. Visual acuity (VA) was 20/30-1 OD and 20/20-1 OS with intraocular pressure (IOP) of 16 and 17 mm Hg, respectively. Slit lamp exam showed fine keratic precipitates (KP) and 1+ AC cell OD; the left eye was unremarkable. The ICL was in good position with white round deposits between the ICL and the native lens (Fig. 1A). Dilated fundus exam (DFE) showed 0.5+ vitreous cell. Given concern for chronic post-operative endophthalmitis OD, a vitreous tap and injection of vancomycin 1 mg/0.1 mL and ceftazidime 2 mg/0.1 mL was performed. The sample was sent for aerobic and anaerobic culture and gram stain.

Optical coherence tomography (OCT) of the macula was notable for mild vitreous cell OD, but no cystoid macular edema (Fig. 1B). Anaerobic vitreous culture grew *C. acnes* and an intravitreal and intracameral

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injection of vancomycin 1 mg/0.1 mL (dose divided) and intravitreal dexamethasone 0.4 mg/0.1 mL OD were performed.

Given persistent deposits on the anterior lens capsule, repeat intravitreal and intracameral injection of vancomycin 1 mg/0.1 mL (dose divided) was performed two more times over the subsequent weeks. Slit lamp exam was notable for 0.5+ AC cell with more consolidation of whitish opacities and debris on the anterior lens capsule (Fig. 1C). There was ongoing discussion about the need for ICL removal; however, the patient was resistant to additional surgical intervention. Vision remained 20/30 or better, but AC inflammation recurred and the IOL deposits persisted, necessitating removal of the ICL with AC washout, approximately 6 months after the original ICL surgery. Over the subsequent months, inflammation recurred with persistence of a plaque on the anterior capsular surface of the native lens (Fig. 2). Ultimately, the patient underwent phacoemulsification with lens removal without insertion of an intraocular lens (IOL), combined with pars plana vitrectomy and intravitreal injection of vancomycin. After several months without a recurrence of inflammation, a secondary sulcus IOL was placed with resulting uncorrected visual acuity of 20/20.

3. Discussion

C. acnes endophthalmitis commonly presents as delayed or chronic ocular inflammation occurring more than six weeks post-operation. It occurs between 0.01% and 0.367% of post-operative patients.⁴ A meta-analysis of international rates of endophthalmitis after cataract surgery between 1964 and 2003 revealed an increase in incidence of endophthalmitis from the 1990s (0.087%) to the 2000s (0.265%). Taban et al. concluded this increase coincided with rising rates of clear corneal sutureless wound closure.⁵ The incidence of *C. acnes* endophthalmitis is not known; however, rates of delayed-onset endophthalmitis are estimated to be 0.017%.³

C. acnes is a commensal bacterium that makes up the normal flora of the conjunctiva and skin and commonly causes acne vulgaris.⁶ While rare, it is a known cause of exogenous endophthalmitis that typically presents with a more delayed presentation than common causal organisms of endophthalmitis.⁴ This is because *C. acnes* is an anaerobic organism resistant to monocyte and neutrophil mechanisms for killing -

allowing the organism to survive after phagocytosis. It can also form a biofilm on intraocular implantations.⁷ Patients with *C. acnes* endophthalmitis are typically misdiagnosed with non-infectious iritis with recurring symptoms between steroid treatments. Symptoms typically include decreased vision and eye pain, similar to our patient. Findings often include AC cells and posterior, white plaque on the ocular implant as seen in our patient. Diagnosis is aided by aqueous or vitreous aspiration sent for anaerobic culture, or polymerase chain reaction (PCR). Treatment includes vancomycin and, often times, vitrectomy. In some post-cataract cases, patients will require a partial capsulectomy.⁸

ICLs are used in healthy eyes with refractive error. During surgery, the ICL is placed anterior to the natural lens, without disturbing the natural lens. Currently, ICLs are only used to treat myopia in the United States. Patients often have an intolerance to wearing contact lenses or a job requirement of uncorrected vision. These patients may pursue cornea procedures for refractive correction; however, if they are not a candidate for laser assisted in situ keratomileusis or photorefractive keratectomy, they may consider placement of an ICL. Documented complications of ICL implantation include infection, inflammation, glaucoma, endothelial cell loss, iris abnormalities, and retinal detachment.⁹ Allan et al. found the rate of endophthalmitis in post-ICL patients to be approximately 1 in 6000 (0.017%).¹⁰

4. Conclusion

Cases of *C. acnes* endophthalmitis have been reported in post-cataract patients; however, to the authors' knowledge, only one other case of post-ICL *C. acnes* endophthalmitis has been reported, which required removal of the ICL and lensectomy.¹¹ Chronic inflammation in the post-operative period of ICL implantation should raise high suspicion for *C. acnes* endophthalmitis. Similar to post-cataract *C. acnes* endophthalmitis, a white plaque on the posterior aspect of the implant may be seen. Additionally, this case illustrates the importance of anaerobic vitreous culture to confirm diagnosis. Removal of the ICL implant is an important aspect of infection management. As seen in this case, removal of the native lens was also required. Further research to better understand risk factors, epidemiology, prognosis, and management of post-ICL implantation endophthalmitis is needed.

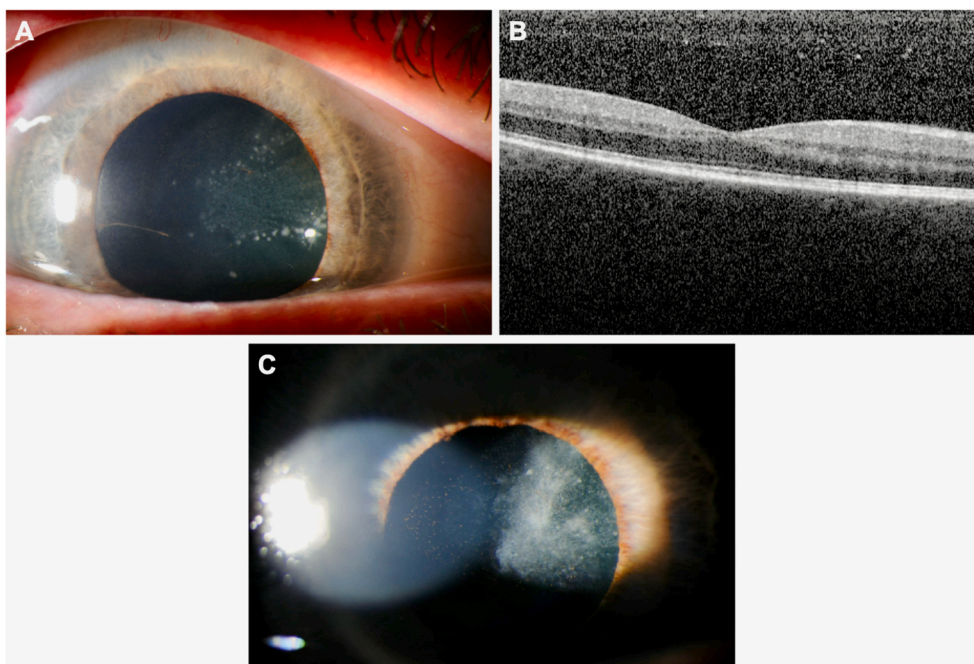


Fig. 1. A) Implantable collamer lens (ICL) with white round deposits between the ICL and the native lens OD. B) Macula optical coherence tomography with mild vitreous cell OD. C) Consolidation of whitish opacities and debris on the anterior lens capsule OD.

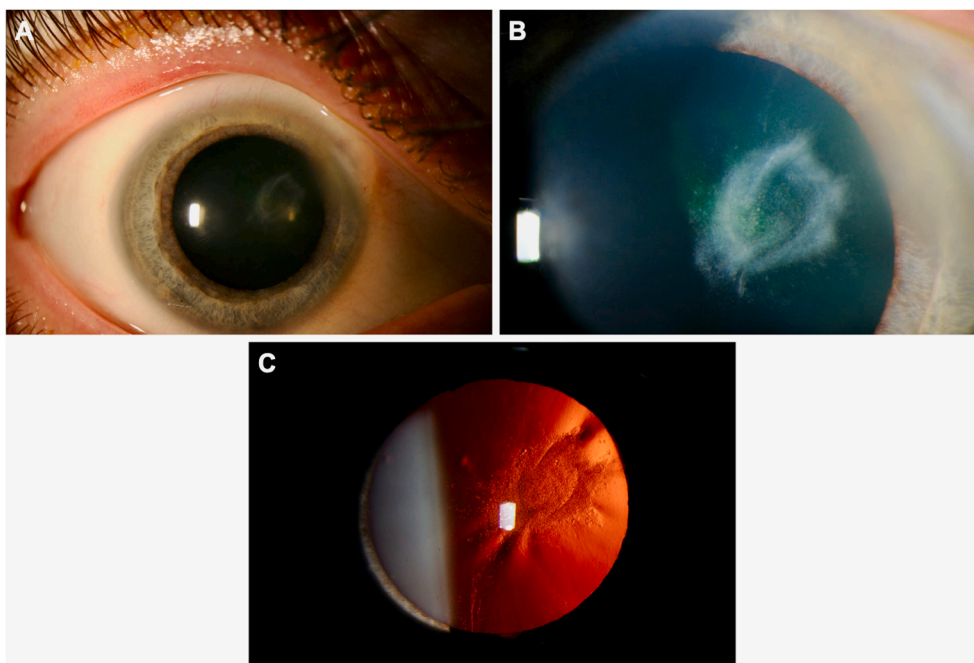


Fig. 2. A) External photograph demonstrating mild opacity on the anterior capsular of the native lens status post removal of the implantable collamer lens (ICL) with anterior chamber washout. B) Native lens opacity shown at higher magnification and C) retro illumination.

Author Contributions

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

Funding

This work was supported by an Unrestricted Grant from Research to Prevent Blindness, New York, NY, to the Department of Ophthalmology & Visual Sciences, University of Utah.

Patient consent

Verbal consent to publish the case report was obtained.

Declaration of competing interest

The following authors have no financial disclosures: SW, TE, MBL.

Acknowledgements

None.

References

- Durand ML. Bacterial and fungal endophthalmitis. *Clin Microbiol Rev.* 2017;30(3): 597–613. <https://doi.org/10.1128/CMR.00113-16>.
- Johnson MW, Doft BH, Kelsey SF, et al. The endophthalmitis vitrectomy study: relationship between clinical presentation and microbiologic spectrum. *Ophthalmology.* 1997;104(2):261–272. [https://doi.org/10.1016/S0161-6420\(97\)30326-1](https://doi.org/10.1016/S0161-6420(97)30326-1).
- Al-Mezaine HS, Al-Assiri A, Al-Rajhi AA. Incidence, clinical features, causative organisms, and visual outcomes of delayed-onset pseudophakic endophthalmitis. *Eur J Ophthalmol.* 2009;19(5):804–811. <https://doi.org/10.1177/112067210901900519>.
- Maalouf F, Abdulaal M, Hamam RN. Chronic postoperative endophthalmitis: a review of clinical characteristics, microbiology, treatment strategies, and outcomes. *Int J Inflamm.* 2012;2012. <https://doi.org/10.1155/2012/313248>.
- Taban M, Behrens A, Newcomb RL, et al. Acute endophthalmitis following cataract surgery: a systematic review of the literature. *Arch Ophthalmol.* 2005;123(5): 613–620. <https://doi.org/10.1001/archophth.123.5.613>.
- Dréno B, Pécastaings S, Corvec S, Veraldi S, Khammari A, Roques C. Cutibacterium acnes (Propionibacterium acnes) and acne vulgaris: a brief look at the latest updates. *J Eur Acad Dermatol Venereol.* 2018;32:5–14. <https://doi.org/10.1111/jdv.15043>.
- Baillif S, Ecohard R, Casoli E, Frenay J, Burillon C, Kodjikian L. Adherence and kinetics of biofilm formation of Staphylococcus epidermidis to different types of intraocular lenses under dynamic flow conditions. *J Cataract Refract Surg.* 2008;34(1):153–158. <https://doi.org/10.1016/j.jcrs.2007.07.058>.
- Clark WL, Kaiser PK, Flynn HW, Belfort A, Miller D, Meisler DM. Treatment strategies and visual acuity outcomes in chronic postoperative Propionibacterium acnes endophthalmitis. *Ophthalmology.* 1999;106(9):1665–1670. [https://doi.org/10.1016/S0161-6420\(99\)90348-2](https://doi.org/10.1016/S0161-6420(99)90348-2).
- Huang D, Schallhorn SC, Sugar A, et al. Phakic intraocular lens implantation for the correction of myopia. A report by the American academy of Ophthalmology. *Ophthalmology.* 2009;116(11):2244–2258. <https://doi.org/10.1016/j.ophtha.2009.08.018>.
- Allan BD, Argeles-Sabate I, Mamalis N. Endophthalmitis rates after implantation of the intraocular Collamer lens: survey of users between 1998 and 2006. *J Cataract Refract Surg.* 2009;35(4):766–769. <https://doi.org/10.1016/j.jcrs.2008.12.027>.
- Robbins CC, Sobrin L, Ma KK, Brouillette KM, Moore JK. Culture-negative C acnes endophthalmitis following implantation of a phakic implantable collamer lens. *J Vitreoretin Dis.* 2021;5(3):258–260. <https://doi.org/10.1177/2474126420968402>.