

Case Report

# Chronic Endophthalmitis Caused by *Pseudomonas stutzeri*

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## Keywords

Endophthalmitis · *Pseudomonas stutzeri* · Pars plana vitrectomy

## Abstract

A patient presented with complaints of a sudden decrease in vision, ocular redness, and pain in the right eye. The patient had a history of clear lens extraction with intraocular lens (IOL) implantation for myopia 2 years previously. He had been prescribed topical steroids for episodes of inflammation that occurred repeatedly every 1–2 months. With a presumptive diagnosis of chronic endophthalmitis, a 23-G transconjunctival sutureless pars plana vitrectomy (PPV) with delivery of intravitreal antibiotics was performed the next day. Culture sensitivity testing of the vitreous sample indicated *Pseudomonas stutzeri* that was sensitive to ceftazidime and gentamicin. Two weeks later, the patient presented with sudden loss of vision and all the signs of recurrent endophthalmitis. 23-G transconjunctival sutureless PPV was performed along with removal of the posterior chamber IOL through a corneal incision. Complete resolution was only achieved after removal of the IOL, resulting in excellent visual recovery. Due to its chronic and fulminating nature, *P. stutzeri* can induce endophthalmitis and should be considered in the differential diagnosis. Aseptic measures are the best prevention.

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## Introduction

*Pseudomonas stutzeri* is a nonfluorescent, denitrifying bacterium that is found in soil and water. It is also an opportunistic pathogen in humans. Compared with the human pathogen *Pseudomonas aeruginosa*, which produces nitrous oxide, *P. stutzeri* only produces dinitrogen [1, 2]. In humans, *P. stutzeri* causes wound infections, postoperative infections, and peritonitis following dialysis [3–5]. In the eye, it has been identified in rare cases of endophthalmitis and corneal ulcers [6, 7].

To the best of our knowledge, we report the first case of *P. stutzeri*-induced chronic endophthalmitis that mimicked chronic uveitis in an Arab patient.

## Case Report

A 26-year-old male Arab patient presented to the emergency unit of a tertiary eye hospital with complaints of a sudden decrease in vision with pain and redness in the right eye. The patient reported a history of periodic redness which was managed with prednisolone eye drops. However, in this episode, the eye was unresponsive to prednisolone.

The patient had a history of clear lens extraction with intraocular lens (IOL) implantation for myopia 2 years previously. Three months postoperatively, he was diagnosed with anterior nongranulomatous uveitis. The patient had an extensive workup that was unsuccessful in determining the cause of uveitis. His medical history was unremarkable, and he was not immunocompromised. He was prescribed topical steroids for episodes of redness, decreased vision, and pain that occurred repeatedly every 1–2 months.

Examination at the emergency unit indicated that the best corrected visual acuity (BCVA) was 20/200 in the right eye and 20/30 in the left eye. Slit-lamp biomicroscopy (Topcon Corp., Tokyo, Japan) revealed corneal edema, 4+ cells in the anterior chamber, keratic precipitates on the posterior corneal surface, and a 1-mm hypopyon. A posterior chamber IOL was located in the capsular bag, but there was a white capsular plaque. The intraocular pressure was 16 mm Hg. The posterior segment was obscured by severe vitritis. A B-scan ultrasound of the right eye revealed moderate but diffuse vitreous opacities. The left eye was normal and did not show any evidence of inflammation.

The patient underwent surgery the next day under local anesthesia. Three-port 23-G transconjunctival sutureless pars plana vitrectomy (PPV) was performed. A vitreous sample was sent for cytology, culture, and sensitivity tests. Core vitrectomy and partial capsulotomy were performed, and the plaques on the capsule were removed. There was no attempt to detach the posterior hyaloid. Ceftazidime (2.25 mg/0.1 mL) and vancomycin (1 mg/0.1 mL) were injected into the vitreous cavity.

The results of the culture and sensitivity tests were received 48 h later, and they indicated a significant density of *P. stutzeri*. The bacterium was sensitive to ceftazidime and gentamicin but was resistant to vancomycin and cefazolin. Accordingly, the patient was treated with fortified topical gentamicin (14 mg/mL) and ceftazidime (50 mg/mL) every hour. This was in addition to topical prednisone acetate every hour. One week after treatment, the symptoms and signs of uveitis improved. The patient was sent home, because the anterior chamber had no signs of inflammation, the posterior chamber was visible, and BCVA was 20/60. The patient was advised to use topical gentamicin (14 mg/0.1 mL) every 6 h for 2 weeks and a tapering dose of prednisolone acetate.

Two weeks later, the patient presented again with sudden loss of vision and all the signs of recurrent endophthalmitis. A repeat 23-G transconjunctival sutureless PPV was performed combined with posterior chamber IOL explantation (TECNIS® Monofocal 1-Piece IOL; Johnson & Johnson Surgical Vision, Inc., Santa Ana, CA, USA) through a corneal incision. The corneal incision was sutured. The patient was prescribed topical gentamicin (14 mg/0.1 mL) and topical steroids were tapered. After 3 months, the BCVA improved to 20/30. The eye was quiet at the 3-month and 6-month follow-up visits.

## Discussion and Conclusion

In the current patient, *P. stutzeri*, a microbe usually present in soil and polluted water, was found in the eye. This indicates possible contamination of the irrigation solution used during intraocular surgery, or the organism may have been introduced during lens implantation in the capsular bag. *P. stutzeri* is known to cause chronic endophthalmitis following cataract surgery with IOL implantation [8]. A similar chronic inflammation due to *P. stutzeri* was reported by Jirásková and Rozsíval [9] in 1998. In another case, *P. stutzeri* caused endophthalmitis following bleb infection [10].

In our patient, the condition mimicked chronic fulminating uveitis that had previously responded to steroids. The uveitis misguided the attending ophthalmologist, and bacterial endophthalmitis was missed. During the presenting episode of full endophthalmitis, conventional treatments were not effective. While this is difficult to explain, we hypothesize that toxins released from the trapped organisms in the lens capsule could have resulted in previous inflammatory responses in the eye, but the release of organisms during this event and the rapid growth in the vitreous could have been responsible for the presentation and the lack of response to steroid medications. Gupta et al. [11] made a similar observation in their study of *P. aeruginosa* infection. The alternative explanation could be that the organisms could have been sequestered in the capsular bag or in a biofilm covering the IOL, making the organism resistant to appropriate antibiotics.

The need for two PPV procedures in our case serves as a cautionary note to ophthalmologists and suggests that the removal of foreign bodies (e.g., IOL) is crucial for complete recovery from endophthalmitis. It is possible that the organisms could have been lodged in the IOL and proliferated again to cause a second episode of endophthalmitis even after PPV, removal of plaque, and treatment with suitable antibiotics and steroids. Gupta et al. [11] also reported recovery after three rounds of PPV and lens removal.

Chronic endophthalmitis should always be discussed in relation to patients with chronic inflammation following cataract surgery. Timely intervention, along with the removal of intraocular foreign bodies (e.g., lens implants), is recommended for visual recovery and to alleviate symptoms and prevent recurrence of the condition. Aseptic measures are the best prevention.

Due to its chronic and fulminating nature, *P. stutzeri* should be considered in the differential diagnosis of chronic endophthalmitis after cataract surgery, and a thorough aseptic technique is fundamental to reducing the risk of infection. Notably, the Endophthalmitis Vitrectomy Study guidelines are not applicable to chronic endophthalmitis, and more aggressive measures such as early vitrectomy and IOL explantation are often required [12].

## Statement of Ethics

This study adhered to the tenets of the World Medical Association Declaration of Helsinki. The patient gave written informed consent to publish their case (including publication of images). Ethics board approval was not required for this study (Wilmer Eye Institute).

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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## Author Contributions

Both authors were involved in the conception and design of the paper and the analysis and interpretation of data; acquired the data; interpreted the data; drafted the paper; and critically revised the paper. Both authors approved the final version of the paper submitted for publication and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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