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## Case Report

# Acute Endophthalmitis Caused by *Leuconostoc* spp. following Intravitreal Bevacizumab Injection

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## Keywords

Endophthalmitis · *Leuconostoc* · Intravitreal injections · Bevacizumab

## Abstract

We present a case of acute endophthalmitis caused by *Leuconostoc* spp. following intravitreal bevacizumab injection. An 86-year-old immunocompetent female developed acute endophthalmitis after intravitreal injection of bevacizumab for neovascular age-related macular degeneration. The patient presented with pain, visual acuity of hand motions, hypopyon, and dense vitritis 96 h after treatment. She was treated with vitreous and anterior chamber tap followed by intravitreal injections of 1 mg vancomycin, 2.25 mg ceftazidime, and 400 µg dexamethasone. Cultures revealed growth of *Leuconostoc* spp., a genus of gram-positive bacteria that is inherently resistant to vancomycin. Due to persistent inflammation, pars plana vitrectomy (PPV) with intravitreal injection of 0.4 mg amikacin was performed 16 days later, followed by resolution of endophthalmitis and return of vision to 20/40. In conclusion, the management of acute endophthalmitis caused by *Leuconostoc* spp., a gram-positive coccobacillus, can be particularly challenging due to its inherent resistance to vancomycin. PPV with intravitreal amikacin led to resolution of endophthalmitis. Our case expands the number of cases of endophthalmitis caused by *Leuconostoc* spp. and highlights the possibility of *Leuconostoc*-related endophthalmitis in an outpatient setting in an immunocompetent host.

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## Introduction

*Leuconostoc* species are catalase-negative, gram-positive, facultatively anaerobic coccobacilli that may be misidentified as *Enterococcus* or *Streptococcus* species by routine biochemical testing [1]. The distinction among these bacteria is important because all clinical isolates of *Leuconostoc* possess a high level of resistance to vancomycin, with a minimal inhibitory concentration >256 µg/mL [2]. *Leuconostoc* spp. are emerging pathogens responsible for a variety of infections including nosocomial outbreaks, particularly in patients immunocompromised due to neutropenia, cancer, or AIDS, those with severe burns, and in patients being treated with vancomycin [3–9]. To our knowledge, only 3 cases of *Leuconostoc* endophthalmitis, 2 acute and 1 chronic, have been reported so far [10–12]. We present a case of *Leuconostoc*-associated acute endophthalmitis in an outpatient setting following an intravitreal injection of bevacizumab in an 86-year-old immunocompetent patient who was successfully managed with pars plana vitrectomy (PPV) and intravitreal amikacin injection following failure of initial tap and inject procedure.

## Case Report

An 86-year-old white female presented with pain, redness, and significant loss of vision in her left eye 4 days after receiving her first intravitreal injection of bevacizumab (1.25 mg/0.05 mL) for neovascular age-related macular degeneration in an outpatient office-based setting. Examination revealed visual acuity of hand motions. Intraocular pressure was 18 mm Hg. Slit lamp examination showed diffuse conjunctival congestion, marked corneal edema, 3-mm hypopyon, and fibrin in the anterior chamber (Fig. 1). Dilated fundus examination revealed dense vitritis with a barely visible optic nerve and no visible details of the retinal vessels or peripheral retina. Her past medical history was significant for gastroesophageal reflux disease, which was mild and longstanding and was not being treated with any medications at the time of presentation. She denied any history of recent hospitalization, antibiotic use, or immune suppression.

A diagnosis of acute endophthalmitis was made and a tap and inject procedure was performed. After we had obtained aqueous and vitreous specimens, the patient received intravitreal injections of vancomycin (1 mg/0.1 mL), ceftazidime (2.25 mg/0.1 mL), and dexamethasone (400 µg/0.1 mL). Culture results revealed growth of *Leuconostoc*. The patient continued to have visual acuity of hand motions and persistent hypopyon, along with dense vitritis. PPV followed by intravitreal injection of amikacin (0.4 mg/0.1 mL) was performed on postoperative day 16. Her endophthalmitis rapidly resolved after vitrectomy and her visual acuity improved to 20/40 at the 3-month postoperative visit, back to her level of vision prior to onset of the infection.

## Discussion

Since the first reported human infection in 1985 [13], several cases and outbreaks of *Leuconostoc* infection have been reported, mostly in hospital settings and in immunocompromised patients [3–9]. Rare cases of *Leuconostoc* infection in immunocompetent hosts have been reported, including periprosthetic knee infection [14], and in a healthy infant [15]. To our knowledge, only 3 cases of endophthalmitis caused by *Leuconostoc* spp. have been

reported, 1 after intravitreal injection of ranibizumab [12] and 2 after uncomplicated phacoemulsification [10, 11].

In the report by Damasceno et al. [12], the patient presented 48 h after uncomplicated intravitreal injection of ranibizumab. After vitreous biopsy, intravitreal injections of vancomycin and amikacin were administered. In addition, the patient was started on systemic gatifloxacin. Both cultures of blood and vitreous yielded *Leuconostoc mesenteroides* that was sensitive to ceftazidime, gentamicin, ciprofloxacin, amikacin, gatifloxacin, and moxifloxacin. Two additional intravitreal injections of amikacin, 48 h apart, were also administered. Despite treatment, the patient developed phthisis bulbi 2 months later. The patient had a history of cancer and chemotherapy, risk factors that could have potentially resulted in an increased susceptibility to the infection. As blood culture was also positive for *Leuconostoc*, the possibility of endogenous endophthalmitis cannot be completely ruled out. Furthermore, the injection was administered in a hospital-based setting instead of an office-based setting, a factor that has been related with nearly twice a higher rate of infection after intravitreal injection [16]. By contrast, our patient developed *Leuconostoc*-associated endophthalmitis after receiving an intravitreal injection in an office-based setting, was immunocompetent, and had a good outcome after PPV. The remaining 2 patients with *Leuconostoc*-associated endophthalmitis were immunocompetent and developed infection after uncomplicated phacoemulsification surgery [10, 11]. The patient reported by Kumudhan and Mars [10], a 76-year-old healthy male, developed acute endophthalmitis 2 days after an uncomplicated phacoemulsification. Despite prompt intravitreal vancomycin and amikacin injections, the patient's final visual acuity was only hand motions. The patient reported by Durkin et al. [11] was a 43-year-old healthy male who developed chronic relapsing inflammation following an uncomplicated phacoemulsification that persisted despite a vitreous tap with injection of intravitreal vancomycin and ceftazidime. A vitrectomy procedure with repeat intravitreal injections of vancomycin and ceftazidime 8 months later yielded the growth of *Leuconostoc* and *Olsenella uli* and resulted in resolution of inflammation with return of vision to 6/12. Whether diminished immunity due to aging in our 86-year-old female patient predisposed her to *Leuconostoc* endophthalmitis is a matter of speculation. Our case report along with the 2 previously reported cases suggests the potential for *Leuconostoc* endophthalmitis in immunocompetent hosts.

The scarcity of reported *Leuconostoc*-based infections may also be attributed to the difficulty in isolating and identifying *Leuconostoc* through routine methods. *Leuconostoc* is often misidentified as *Lactobacillus*, *Streptococcus*, *Pediococcus*, *Enterococcus*, or *Lactococcus*, and such misidentification of the species can lead to an underestimation of its true incidence rate [1]. *Leuconostoc* presents unique challenges due to its inherent resistance to vancomycin, the drug of choice for endophthalmitis caused by gram-positive organisms. However, multidrug resistance does not seem to occur in *Leuconostoc*, and most reported cases, including those with endophthalmitis, have been treated with conventional antibiotics. Despite the well-known risk of aminoglycoside-induced retinal toxicity, we elected to treat the patient with intravitreal amikacin, with its relative safety compared to other aminoglycosides such as gentamicin or tobramycin [17]. This case report highlights *Leuconostoc*-associated endophthalmitis following intravitreal injection of bevacizumab and its successful treatment with PPV and intravitreal amikacin injection.

### Statement of Ethics

All procedures were done in accordance with the tenets of the Helsinki Declaration of 1964, as revised in 2013. Institutional review board approval was not required for this retrospective study involving a single case report.

### Disclosure Statement

The authors have no financial disclosures to make or proprietary interests to disclose. There are no conflicts of interest for any of the authors.

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**Fig. 1.** Slit lamp photograph at presentation showing marked corneal edema, hypopyon, and fibrin membrane in the pupil.