

CASE REPORT

**LATE-ONSET, BLEB-ASSOCIATED ENDOPHTHALMITIS
CAUSED BY STAPHYLOCOCCUS AUREUS****Riskha Pangestika¹, Fifi Luthfia Rahmi², Maharani²**¹Resident of Ophthalmology Department of Diponegoro University, Kariadi Hospital, Semarang, Indonesia²Staff of Glaucoma Subdivision, Ophthalmology Department of Diponegoro University, Kariadi Hospital, Semarang, Indonesia

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ABSTRACT

Introduction: Bleb-associated endophthalmitis (BAE) is a potentially sight-threatening complications of trabeculectomy and is associated with poor visual outcome. BAE denotes an ocular infection with involvement of the vitreous, which usually develops months or years after glaucoma filtering surgery. The purpose of this case report was to present a case about late onset BAE caused by *Staphylococcus aureus*.

Methods: A 55-year-old male presented with a 3-days history of left eye pain, redness, hypopyon decreased visual acuity and hypotony with Seidel test positive. He had a history of primary open angle glaucoma that was treated with a combined procedure of cataract surgery and trabeculectomy in the left eye ten years earlier. His visual acuity had decreased from 6/20 to light perception. This patient showed signs of hypotony, endophthalmitis, leak, and pain but no previous history of using anti-fibrotic agents. BAE causative organisms cultures grew the *S.aureus*, that frequent cause of acute-onset endophthalmitis. The patient underwent treatment with pars plana vitrectomy, vitreous taps, administered intravitreal antibiotic, and prescribed hourly topical antibiotic. Six months after his last treatment, his left eye shows no residual infection, and visual acuity increase to 1/60.

Results: One case of late onset BAE with visual improvement after early vitrectomy, intravitreal, oral and topical antibiotic treatment.

Conclusion: Despite the poor prognosis of BAE caused by *S.aureus* infection, after proper treatment can yield an adequate result, as demonstrated in this case.

INTRODUCTION

Bleb-associated endophthalmitis (BAE) is an uncommon infection that can occur following trabeculectomy. BAE has a poor visual prognosis that can occur long after surgery. The incidence of postoperative endophthalmitis associated with glaucoma filtering surgery with or without antimetabolites has been reported to range from 0.061% to 13.2%.¹

Bleb-related infections are classified into blebitis and bleb-associated endophthalmitis. The classification system of bleb-related infection: stage I for blebitis, stage II for endophthalmitis mainly involving the anterior chamber, and stage III for endophthalmitis involving the vitreous. The Japan Glaucoma Society further subdivided stage III into stage IIIa

(mild vitreous involvement) and stage IIIb (marked vitreous involvement). The subclassification is helpful in determining the initial therapy for stage III infection.²

Delayed-onset endophthalmitis associated with conjunctival filtering blebs is caused by a different spectrum of organisms than those in acute-onset, post cataract surgery endophthalmitis. Filtering blebs are openings to intraocular spaces and permit microbial spread of superficial infections. BAE is often caused by *Streptococcus* species, which have greater virulence and worse prognosis than organisms typically involved in other causes of endophthalmitis. The recommended intravitreal antibiotics are similar to those used in acute-onset postoperative endophthalmitis. Even with prompt treatment, the visual outcomes in bleb-associated endophthalmitis are generally worse than for acute-onset endophthalmitis after cataract surgery.^{3,4}

METHODS/RESULTS

A 55-year-old male consulted for acute pain and redness of 3 days' duration and sudden loss of vision in left eye, associated with increased tearing and mucoid discharge. The patient had been diagnosed with primary open angle glaucoma in both eyes in 2008 and initially maintained on antiglaucoma medications but with poor treatment compliance. The patient had undergone combined procedure of cataract extraction/posterior-chamber intraocular lens (PCIOL) and trabeculectomy without antifibrotic agents. There were no other risk factors such as a blepharitis, nasolacrimal duct obstruction, diseased ocular surface, and systemic immunosuppression. Absence of systemic diseases such as diabetes and hypertension. Previous follow up before bleb infection there is no avascular bleb, superiorly located blebs and no history of leakage, no history using contact lens, no history of prolonged use of antibiotics, and presence of intraocular lens. The risk factor in this case is only a positive Seidel test.

Table 1. Patient presentation and treatment course

Gender	Male
Age	55 yo
Symptoms	Left eye pain Redness Decreased vision Swelling
Onset	3 days prior to presentation 10 years after combine surgery (phaco-trabeculectomy)
Visual acuity	Light perception
Baseline visual acuity	6/20
Intra-ocular pressure	OD 23,1 mmHg; OS 4 mmHg
Signs	Eyelid margin redness (-) crust (-)

	Hazy cornea and edematous, with 4+ cells and flares
	Mixed Injection
	Opaque, elevated, thin avascular yellowish bleb with infiltrate visible within the bleb (Figure 1a). The bleb had a positive Seidel test.
	3+ cells in anterior chamber
	2 mm hypopion
Diagnosis	Hazy vitreous
Treatment	Bleb associated endophthalmitis
	Pars plana vitrectomy
	Vitreous taps
	Once intravitreal antibiotic (vancomycin and ceftazidime)
Cultures	Hourly topical antibiotic (moxifloxacin)
	<i>Staphylococcus aureus</i>
	Resistant to gentamycin
	Sensitive to vancomycin
	Sensitive to moxifloxacin
Visual outcome	1/60

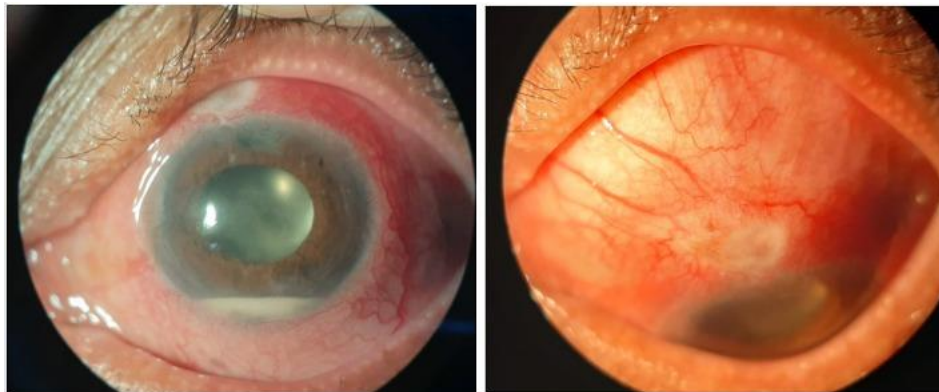
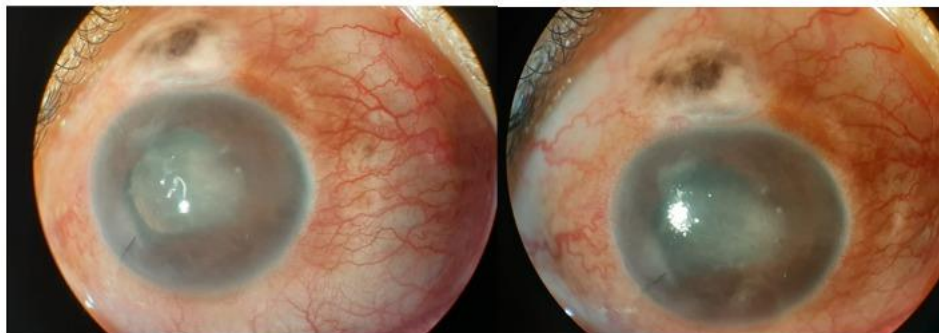
Figure 1a.**Figure 1b.**

Figure 1a. Slitlamp photography of the affected eye. Day 1 shows conjunctival hyperaemia, an opaque, avascular bleb, corneal oedema, hypopion and anterior segment inflammation. **1b.** Follow-up appearance at 6 months, the eye was treated surgically (pars plana vitrectomy, intravitreal antibiotics but no bleb repair) final visual acuity was 1/60 after treatment. Endophthalmitis resolved and there was a thin bleb, but no bleb leak, IOP was 14,7 mmHg. Comparative follow-up photography demonstrates gradual resolution.

DISCUSSION

In early reports, the incidence of late-onset endophthalmitis following trabeculectomy with no antimetabolites ranged from 0.2% to 1.5% and the risk of infectious complications is life-long. The time interval from surgery to infection varied from several weeks to 22 years.⁵ In this case the patient had history of primary open angle glaucoma that was treated with a combined procedure of cataract surgery and trabeculectomy without antimetabolites ten years earlier.

Identifiable risk factors for infection status-post trabeculectomy are low IOP, use of mitomycin C during surgery, presence or history of a wound leak, an inferiorly placed bleb and blepharitis caused by *S.aureus*.^{4,5} However, there is no risk factors in this patient.

Bleb infections can occur suddenly years postoperatively and vary in severity from blebitis to BAE, depending on the extent of intraocular involvement. BAE symptoms include redness, discharge, aching, photophobia and decreased visual acuity.⁴ In this case, blebs appear opaque and possibly purulent with surrounding conjunctival hyperaemia. Intraocular inflammation is present. The presenting intraocular pressure (IOP) dropped in blebitis but almost doubled in BAE compared to average pre infective IOP. The left eye had an elevated, thin avascular bleb with infiltrate visible within the bleb (Figure 1b). The IOP in this patients were hypotony and had a positive Seidel test, but in USG examination there was no choroidal detachment associated with hypotony in this patient.

The presentation of 5-fluorouracil (5-FU) or mitomycin C (MMC) notably improved the careful achievement rates in eyes. A considerable lot of these patients likewise gripe of visual torment or inconvenience identified with the presence of a huge or raised bleb, a condition known as bleb dysesthesia. This patient showed signs of hypotony, endophthalmitis, leak, and pain however no past history of utilizing to antifibrotic agent.

B- Scan ultrasound needs to be performed if the view precludes posterior segment examination. Ultrasound scan can show low-to-medium density echoes or debris in the vitreous in endophthalmitis. Retinal and/or choroidal detachments can also be ruled out. The large proportion of patients with BAE have bleb leakage and associated hypotony with the possibility of choroidal detachment concurrent with BAE.



Figure 2. Ocular ultrasound (B-mode echography) showed dense vitreous condensations more prominent in the posterior quadrant (Stage III bleb-related infection) There was no choroidal detachment associated with hypotony in this patient.

In the presence of posterior endophthalmitis, intravitreal injection of antibiotics should be done to bypass the blood–retinal barrier and achieve therapeutic levels at the site of infection. Immediate intensive treatment is urgently required for bleb related endophthalmitis. The treating physician performed vitrectomy, vitreous taps, administered intravitreal vancomycin and ceftazidime, and prescribed hourly topical moxifloxacin 0,5%. Fourth-generation fluoroquinolones such as moxifloxacin have broad-spectrum coverage and have better intraocular penetration. At the initiation of treatment, the frequency of topical antibiotics should be every half to 1 h so as to attain adequate therapeutic concentration of the drug.

Bleb associated endophthalmitis causative organisms must be identified through culture, and susceptibility testing should guide antibiotic therapy.⁹ Even though the culture result were not yet available, intravitreal combination of antibiotics injection was performed. This management was carried out according to existing studies. According to Song et al. (2002), the most common causative organisms of the bleb-related endophthalmitis were *Streptococcus* species (31%) and *Staphylococcus* species (22%).¹⁰ According to ESCRS Endophthalmitis Study Group, coagulase-negative *Staphylococcus* was the most commonly cultured organism, while the Endophthalmitis Vitrectomy Study found that 70% of the isolates were coagulase-negative *Staphylococcus* followed by *Staphylococcus aureus* (10%) and *Streptococcus* species (9%). Intravitreal injection of antibiotics (vancomycin and ceftazidime) was the mainstay treatment of postoperative endophthalmitis according ESCRS guideline.¹⁰

Intravitreal vancomycin injection, with its excellent activity against streptococcal strains makes it the drug of choice in the treatment of bleb-related endophthalmitis after filtering surgery. The role of systemic antibiotics is still controversial. Quinolones and imipinem have

much better intravitreal penetration when given systemically and a larger antimicrobial spectrum than ceftazidime and amikacin.³ Intravitreal ceftazidime, a wide spectrum cephem antibiotic, is as effective as aminoglycosides for gram-negative bacteria but has a low risk of causing macular infarction. Intravitreal vancomycin is considered the treatment of choice for gram-positive bacteria while ceftazidime is a broad-spectrum antibiotic frequently used in combination with vancomycin. The antibiotics are warranted that cover for *Streptococcus* and gram-negative organisms (the two most common infecting organisms in late-onset infections).¹¹

In the late stages, (stages IIIa and IIIb), *Streptococcus* species, coagulase-negative *Staphylococcus*, *Haemophilus influenzae*, and *Enterococcus* species were frequently isolated.² But in this case *Staphylococcus aureus*, was grown in culture taken from vitreous tap. *Staphylococcus aureus* was a gram-positive bacteria that important and frequent cause of acute-onset endophthalmitis.¹ This bacterium is most commonly encountered after cataract surgery and often is associated with a poor outcome.⁷ *S. aureus* has a variety of potent virulence factors that allow it to adhere to and penetrate into host tissue, evade immune mechanisms to cause host tissue damage, and resist antimicrobial agents.⁸

The patient responded well to the combination of intravitreal, and topical antibiotics. Additional therapy includes topical cycloplegic agents (atropine 1% eye drop), topical steroid and systemic analgesics. Culture and sensitivity test results revealed *Staphylococcus aureus*. The diagnosis made was bleb-associated endophthalmitis caused by *S.aureus*. This organism was sensitive to vancomycin, moxifloxacin, chloramphenicol, and cefuroxime, so we continue so we continue to use topical moxifloxacin. In our case, we used topical moxifloxacin, a fourth generation quinolone with good coverage for both Gram positive and Gram negative organisms, good vitreous penetration when given systemically, and can be given intracamerally with few side effects.

Patients should be monitored closely. If the ocular condition becomes worse, appropriate treatment should be promptly taken. This includes additional administration of antibiotics, confirmation of the antimicrobial spectrum of the current therapy, a change of the antibiotics if needed, and emergency surgery. Patient education is another important consideration. Information on bleb-related infection reduces the risk of infection by patients changes in habit and patients are more careful with ocular hygiene and are more likely to seek prompt consultation if they notice a sign of infection. Periodical consultation and monitoring with ophthalmologists were also important.

CONCLUSION

Despite the poor prognoses of both BAE and ocular *Staphylococcus aureus* infection, with early diagnosis and prompt treatment can yield an adequate result and better prognosis, as demonstrated in this case.

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