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Delayed-onset endophthalmitis associated with *Achromobacter* species developed in acute form several months after cataract surgery: Three case reports

Tae-Hoon Kim, Sang-Joon Lee, Ki-Yup Nam

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Abstract

BACKGROUND

Achromobacter species-associated endophthalmitis is rare and may present as either acute or chronic postoperative endophthalmitis. Delayed-onset *Achromobacter* species endophthalmitis appearing in acute presentation that develops more than several months after cataract surgery is very rare. Intraocular lens (IOL) removal is commonly recommended to treat *Achromobacter* species endophthalmitis, which is based on previous studies. Here, we report the results of surgery without IOL removal when treating patients with delayed-onset postoperative *Achromobacter* species endophthalmitis that developed in an acute form.

CASE SUMMARY

Three patients visited our ophthalmology clinic due to visual impairment that began 2-3 d earlier. They had undergone cataract surgery 5-18 mo prior. Best-corrected visual acuity of the diseased eye was between counting fingers at 30 cm to non-light perception. They showed conjunctival injection, inflammation in the anterior chamber (cell reaction 4+) and hypopyon formation. The patients were diagnosed with infectious endophthalmitis and immediately underwent pars plana vitrectomy, anterior chamber irrigation and intravitreal injection of ceftazidime and vancomycin. Before fluid infusion, a vitreous specimen was

obtained. In all cases, the IOLs were not removed. *Achromobacter* species was detected on vitreous specimen culture. After surgery, the vitreous opacity decreased gradually and there was little retinal damage. At 1 mo after treatment, the best-corrected visual acuity had improved to 20/50 and 20/40.

CONCLUSION

Delayed onset postoperative endophthalmitis caused by *Achromobacter* species can appear in an acute form. All patients responded well to early vitrectomy and administration of empirical antibiotics including ceftazidime. There was no need for IOL removal during surgery.

Key Words: *Achromobacter* species; Chronic endophthalmitis; Postoperative endophthalmitis; Case report

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Core Tip: Postoperative *Achromobacter* species endophthalmitis is rare, and it was reported that surgical treatment with intraocular lens (IOL) removal was necessary for the treatment. We experienced three cases of a very rare and unique form of *Achromobacter* species endophthalmitis which appeared in an acute presentation and developed more than several months after cataract surgery. Early vitrectomy with antibiotics treatment including ceftazidime resulted in a favorable prognosis. There was no need to remove the IOL unlike in previous reports. In cases of delayed onset of postoperative endophthalmitis in the acute form, *Achromobacter* species has to be considered as the causative strain. In these cases, the IOL removal may not be needed.

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INTRODUCTION

Endophthalmitis is sight-threatening intraocular inflammation that may be caused by an infectious organism. Postoperative endophthalmitis is generally classified as acute or chronic (with delayed-onset specification). Acute endophthalmitis is defined as infection within 6 wk after surgery whereas chronic endophthalmitis is defined as infection 6 wk or more after surgery[1]. Chronic endophthalmitis has been reported in approximately 16.7% to 33.3% of all endophthalmitis cases[2]. Approximately 41% to 63% of postoperative chronic infectious endophthalmitis cases are associated with *Propionibacterium* species[3]. Generally, chronic endophthalmitis shows an indolent form of inflammation.

Achromobacter species are aerobic Gram-negative rods that are distributed widely in nature; some of these species are associated with opportunistic infection[4]. *Achromobacter* species-associated endophthalmitis is uncommon and may present as either acute or chronic postoperative endophthalmitis. The chronic form has been reported relatively more frequently than acute endophthalmitis[5]. Delayed-onset *Achromobacter* species endophthalmitis appearing in acute presentation that develops more than several months after cataract surgery is very rare. Here, we report on three cases of delayed postoperative infectious endophthalmitis caused by *Achromobacter* species appearing in an acute form and the surgical results.

CASE PRESENTATION

Chief complaints

Three patients visited our ophthalmology clinic due to a visual impairment and pain.

History of present illness

Case 1: The patient is a 52-year-old female and the symptoms had begun 2-3 d earlier.

Case 2: The patient is a 72-year-old female and the symptoms had begun 2-3 d earlier.

Case 3: The patient is an 86-year-old female and the symptoms had begun 2-3 d earlier.

History of past illness

Case 1: The patient had undergone cataract surgery 18 mo prior.

Case 2: The patient had undergone cataract surgery 5 mo prior.

Case 3: The patient had undergone cataract surgery 6 mo prior.

Personal and family history

Case 1 and case 2 had diabetes mellitus and case 1 had non-proliferative diabetic retinopathy. None of the patients had a trauma history.

Physical examination

Best-corrected visual acuity of the diseased eye was between counting fingers at 30 cm to non-light perception. They all presented with conjunctival injection, inflammation in the anterior chamber (cell reaction 4+) and hypopyon formation. No leaks from a corneal or conjunctival wound were evident. There were no obvious plaques in the capsule. The retina was not visualized due to vitreous opacity (Figure 1). There was no evidence of systemic infection.

Laboratory examinations

There were no special abnormalities except for mild leukocytosis.

Imaging examinations

B-scan ultrasonography showed vitreous opacity.

FINAL DIAGNOSIS

All of the patients were suspected of having infectious endophthalmitis.

TREATMENT

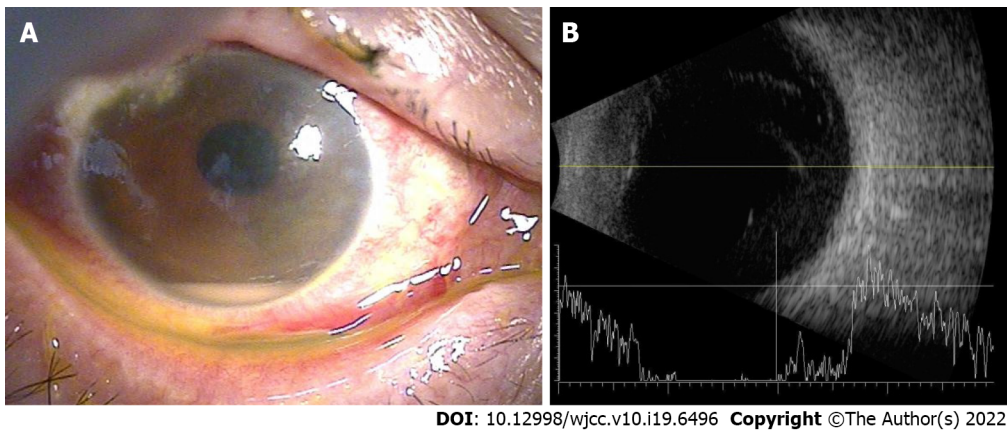
They all underwent immediate pars plana vitrectomy, anterior chamber irrigation and intravitreal injection of ceftazidime (Tazime, Hanmi Pharm. Co., Seoul, South Korea; 2 mg/0.1 mL) and vancomycin (Hanomycin, Samjin Pharm. Co., Seoul, South Korea; 1 mg/0.1 mL). Before fluid infusion, a vitreous specimen was obtained. Cases 2 and 3 also received dexamethasone disodium phosphate (Yuhan dexamethasone disodium phosphate injection; Yuhan Corp., Seoul, South Korea; 500 µg/0.1 mL). In all cases, the intraocular lens (IOL) was not removed. After surgery, moxifloxacin 5% eye solution (Vigamox 0.5%, Novartis, Basel, Switzerland) was administered hourly and fortified topical antibiotics (vancomycin 50 mg/mL, ceftazidime 50 mg/mL) were administered every 2 h. Also, a topical steroid, loteprednol etabonate 5 mg/mL (Lotemax sterile ophthalmic suspension 0.5%, Bausch & Lomb, South Asia Inc., Gangnam-gu, South Korea) or prednisolone acetate 10 mg/mL (Pred-forte eyedrops, Allergan, Korea Ltd., Seoul, South Korea) were administered. Intravenous moxifloxacin hydrochloride 436.8 mg/250 mL (Avelox, Chong Kun Dang Pharm. Co., Seodaemun-gu, South Korea) was administered daily.

OUTCOME AND FOLLOW-UP

Achromobacter species were detected in vitreous specimen cultures. After surgery, hypopyon and vitreous opacity decreased gradually and there was little retinal damage. At 1 mo after treatment, the best-corrected visual acuity had improved to a level between 20/50 and 20/40. There has been no recurrence to date as of 12 mo after the vitrectomy in all cases.

DISCUSSION

Achromobacter species are aerobic Gram-negative rods that are distributed widely in nature. Some *Achromobacter* species have been associated with opportunistic infections in immunocompromised patients[4]. Our cases had no apparent association with an immunocompromised state despite two of



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Figure 1 Anterior segment photograph and ultrasonogram at the initial disease presentation in a patient with a history of cataract surgery from 18 mo prior. A: Conjunctival injection and hypopyon formation in the anterior chamber; B: Heterogenous vitreous opacity is evident in the B-scan ultrasonogram.

the patients having diabetes mellitus.

Endophthalmitis associated with *Achromobacter* species is rare and may assume an acute form or chronic indolent presentation. The latter has been reported more frequently than the acute form[5]. The acute form of delayed-onset *Achromobacter* species endophthalmitis that develops several months after cataract surgery is very rare with only a few reports[6,7]. For the three cases of *Achromobacter* species-associated endophthalmitis of the current study, the inflammation developed 5-18 mo after cataract surgery and the condition resembled acute postoperative endophthalmitis. Symptoms developed suddenly with severe inflammation in the anterior chamber and hypopyon were observed.

Swart *et al*[7] reported that endophthalmitis caused by *Achromobacter* species is resistant to conservative treatments such as intravitreal antibiotic injection and anterior chamber irrigation and these treatments may result in chronic inflammation. Accordingly, they strongly recommended surgical treatment for *Achromobacter*-associated endophthalmitis.

Emergency vitrectomies were performed for all of our cases and empirical intravitreal vancomycin and ceftazidime, as well as topical and intravenous broad-spectrum antibiotics were administered. In a previous susceptibility study, all *Achromobacter* strains had resistance to aminoglycosides and most had resistance to quinolones. Reddy *et al*[8] suggested that ceftazidime and amikacin are the antibiotics of choice for the management of *Achromobacter xylosoxidans* ocular infection. Our microorganism susceptibility tests showed that the *Achromobacter* species are sensitive to ceftazidime and levofloxacin. The prognosis was favorable and the patients did not relapse. The early surgical approach with ceftazidime injection may be the reason for the favorable results of our cases.

For the chronic post-operative endophthalmitis, IOL removal is usually recommended. The major cause of chronic postoperative endophthalmitis is *Propionibacterium acnes* which is known for its chronic, indolent form of inflammation and a temporary response to corticosteroid therapy. Because *Propionibacterium acnes* endophthalmitis is thought to be caused by sequestration of the organism between the IOL optic and the posterior capsule, many studies have reported the necessity of capsule and IOL removal to ensure eradication of the infection source[9]. For the same reasons, in the previous reports of chronic or delayed onset *Achromobacter* species endophthalmitis, IOLs were removed during the surgical treatments[6,7]. Also, even in a case with acute postoperative *Achromobacter xylosoxidans* endophthalmitis that had developed within several days after cataract surgery, the IOL was ultimately removed due to recurrence after initial surgical treatment without IOL removal[5]. However, we did not remove the IOLs in our three cases. Despite the preservation of IOLs during vitrectomy, endophthalmitis did not recur. Although not clear, differences in the onset or presentation of endophthalmitis (acute, chronic, delayed-onset with acute form) may be related to the bacteria amount or distribution within the eye. The surgical results suggest that IOL removal may be unnecessary in patients with delayed-onset *Achromobacter* endophthalmitis that developed in acute form. However, in order to confirm these results, additional studies may be needed to evaluate the surgical outcome according to whether the IOL is removed and the type of endophthalmitis onset.

CONCLUSION

In conclusion, we report three cases of delayed post-operative infectious endophthalmitis caused by *Achromobacter* species that presented as acute endophthalmitis rather than the chronic indolent form. Early vitrectomy with empirical antibiotics treatment including ceftazidime resulted in a favorable

prognosis. There was no need to remove the IOL, unlike previous reports. In cases of delayed onset postoperative endophthalmitis in the acute form that occurs several months after intraocular surgery, *Achromobacter* species must be considered as the causative strain. In these cases, IOL removal may not be needed. However, prospective studies with more patients are required to elucidate the optimal treatment modality.

FOOTNOTES

Author contributions: Nam KY designed the study; Kim TH and Nam KY contributed to the analysis and interpretation of data; Kim TH, Lee SJ, and Nam KY contributed to the collection of data; Kim TH and Nam KY drafted the manuscript; Lee SJ and Nam KY contributed to the critical review of the article; and all authors issued final approval for the version to be submitted.

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