

Acute Post-cataract Surgery Endophthalmitis and Corneal Ulcer with *Acinetobacter* Managed with Colistin: A Case Report

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ABSTRACT

Postoperative endophthalmitis is a rare but severe complication of phacoemulsification cataract surgery (PCS). *Acinetobacter baumannii* is an uncommon pathogen, often associated with multidrug resistance and poor outcomes. In this report, a 73-year-old male who developed endophthalmitis following PCS is introduced, who, despite intensive empirical therapy, experienced no clinical improvement. Following a vitreous sample analysis with polymerase chain reaction, *A. baumannii* infection was diagnosed. The patient was treated with fortified topical colistin, amikacin, and subconjunctival and intravitreal colistin, which responded with the resolution of intraocular inflammation. This case emphasizes the therapeutic challenges of *A. baumannii* endophthalmitis. It highlights colistin as an effective treatment option in cases resistant to conventional regimens.

KEYWORDS: *Acinetobacter*; cataract extraction, colistin, endophthalmitis, phacoemulsification

INTRODUCTION

Postoperative endophthalmitis is considered a rare yet devastating complication associated with cataract surgeries.^[1,2] Recent pooled analyses indicate an occurrence of nearly 0.1% over the past years following phacoemulsification cataract surgery (PCS).^[2-5]

A wide variety of microorganisms could contribute to the development of postoperative endophthalmitis, including Gram-positive cocci, particularly *Staphylococcus epidermidis*, *Bacillus* species, *Pseudomonas aeruginosa*, *Escherichia coli*, and fungi.^[6] *Acinetobacter baumannii* is an uncommon pathogen that could lead to endophthalmitis.^[4] It is gaining clinical importance, particularly since many infections caused by *Acinetobacter* are predominantly linked to *A. baumannii* that often causes hospital-acquired infections and can also be associated with community-acquired infections.^[4] The increasing number of documented cases highlights the troubling rise in infections associated with multidrug-resistant (MDR) *Acinetobacter*.^[7] Predisposing factors associated with *Acinetobacter* endophthalmitis include demographic factors such as older age, male gender, rural residence, and immune suppression,

diabetes mellitus, environmental factors such as temperature and humidity, intraoperative rupture of the posterior capsule, and absence of antibiotic prophylaxis.^[4,8]

In this case report, we report a 73-year-old male with post-PCS endophthalmitis infected with *Acinetobacter*, highlighting its unique pathogenic characteristics and strategies for successful clinical management.

CASE REPORT

A 73-year-old male with a medical history of diabetes mellitus, hypertension, and benign prostate hyperplasia underwent PCS at another center.

On the first post-PCS day, iris prolapse was noted at the main surgical wound, and the patient was returned to the operating room. The iris was repositioned, and the phacoemulsification incision was secured with sutures. The patient's hemoglobin A1C level was 7%, reflecting

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adequate long-term glycemic control, and other laboratory data were within normal range. Three days after the secondary intervention, the patient was referred to our tertiary ophthalmic centre with a presumptive diagnosis of post-PCS endophthalmitis.

At the presentation, he complained of blurry vision and ocular pain in the left eye. The left eye corrected distance visual acuity (CDVA) was limited to hand motion. The slit-lamp examination revealed a diffuse corneal haze, a 2-mm hypopyon in the anterior chamber, dense fibrin covering the intraocular lens, and eyelid edema. The intraocular pressure was measured at 18 mmHg in the right eye and 19 mmHg in the left eye. The fundus could not be visualized owing to the dense corneal opacity.

An urgent pars plana vitrectomy was performed, and a vitreous sample was obtained for polymerase chain reaction (PCR) analysis. On the first postoperative day following vitrectomy, a new stromal infiltrate measuring approximately 2 mm × 3 mm developed at the temporal surgical wound, associated with a persistent 1.5-mm hypopyon [Figure 1]. The patient was started on intensive topical fortified vancomycin (50 mg/mL, hourly)^[9] and fortified ceftazidime (50 mg/mL, hourly),^[9] in addition to topical homatropine^[10] and betamethasone (every 6 h).^[11] Intravenous vancomycin and ceftazidime were also administered. In addition, the patient received subconjunctival injections of vancomycin (25 mg/0.5 mL)^[12] and ceftazidime (100 mg/0.5 mL).^[12] This regimen was administered for 5 days.

In the following days, corneal infiltration progressed circumferentially despite this regimen, and CDVA remained hand motion. Five days after vitrectomy, PCR of the vitreous sample returned positive for *A. baumannii*. Consequently, topical fortified colistin 1%^[13] and fortified amikacin (20 mg/mL)^[14] were administered hourly into the regimen. On the same day, subconjunctival injections of colistin (20 mg/0.5 mL) were administered adjacent to the temporal corneal infiltrate.^[13,15] In addition, the patient received an

intravitreal injection of colistin (0.1 mg/0.1 mL),^[13] which was repeated in 3 days.

Over the following 4 days, a notable reduction in hypopyon and anterior chamber inflammation was observed. The patient was discharged, continuing intensive topical therapy with daily follow-up in the cornea clinic. Six days later, wound leakage was detected at the primary phacoemulsification incision site corresponding to the infiltrate. The patient was returned to the operating room, where additional sutures were placed, and another subconjunctival injection of colistin was administered.

During follow-up, topical medications were gradually tapered in accordance with the patient's clinical improvement. At the 6-month visit, the eye remained quiet with a clear cornea, and CDVA had improved to 20/50 [Figure 1]. Figure 2 shows the details of surgical and therapeutic interventions of the patient [Figure 2].

DISCUSSION

Here, we described a case of endophthalmitis following PCS contaminated with *A. baumannii*, a rare but increasingly recognized cause of endophthalmitis mediated by hospital-acquired infections.^[4] In managing endophthalmitis due to its therapeutic challenges and its possible contamination with challenging infections, early identification of the causative organism and susceptibility testing are essential. Therefore, in the initial assessment of our case, given the clinical suspicion of endophthalmitis, a vitreous sample was obtained for PCR analysis, which revealed *A. baumannii* infection.

The rising number of reported cases of *A. baumannii*-infected endophthalmitis in the literature reflects the concern of multidrug resistance and its therapeutic challenging nature.^[16] It frequently demonstrates considerable heterogeneity in antibiotic prophylaxis protocols and treatment regimens for endophthalmitis, with evolving trends based on microbial susceptibility patterns and regional practices.^[17] Empirical treatment has traditionally relied on the combination of

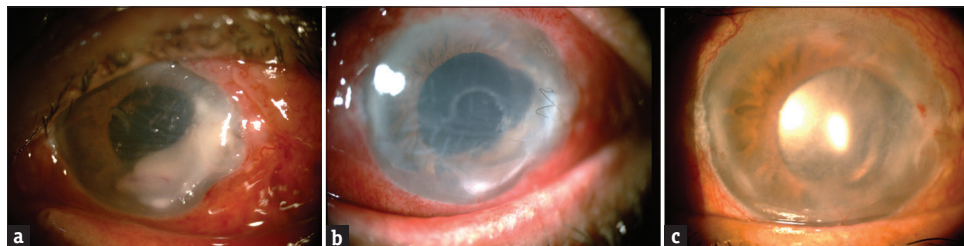


Figure 1: A 73-year-old male with left eye postphacoemulsification endophthalmitis caused by *Acinetobacter baumannii*: (a) A stromal infiltrate measuring approximately 2 mm × 3 mm at the temporal surgical wound, associated with a persistent 1.5-mm hypopyon on the 5th postphacoemulsification and 1st day after vitrectomy, (b) 1-month follow-up, (c) 6-month follow-up

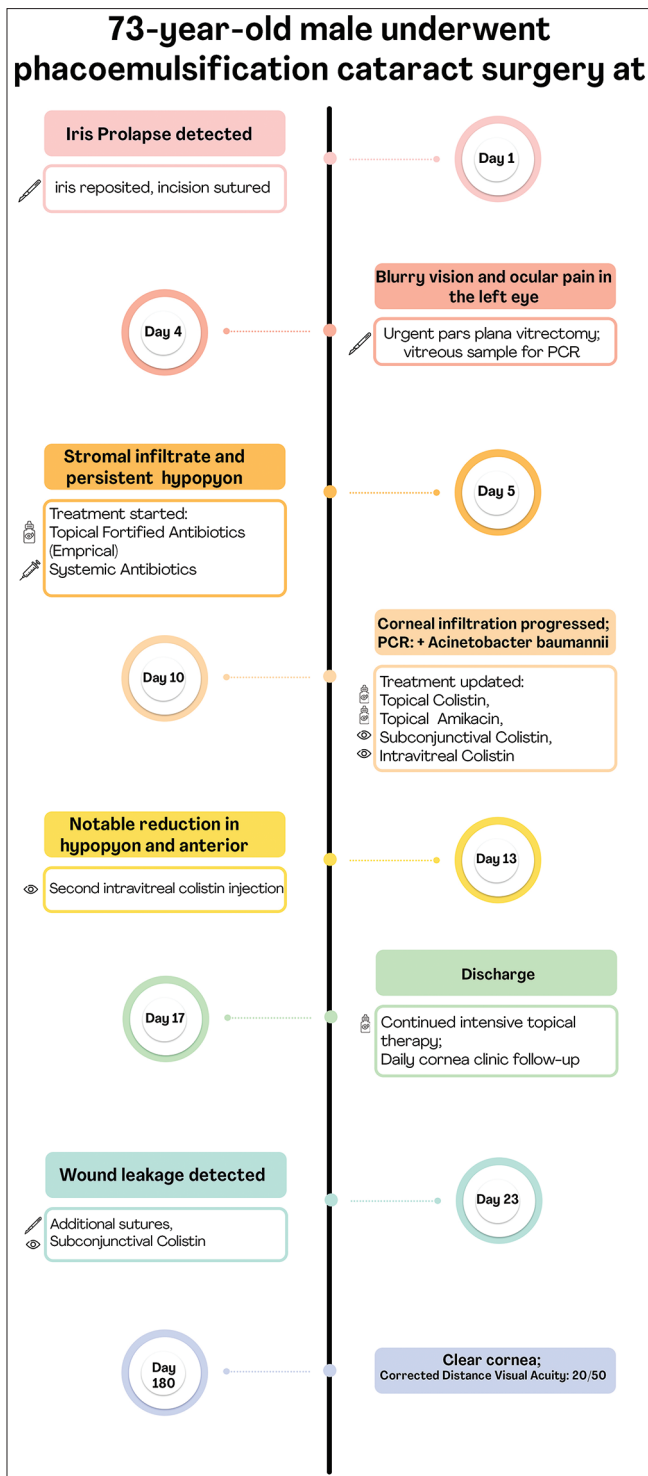


Figure 2: Timeline of clinical course, interventions, and outcome in A 73-year-old male with left eye post-phacoemulsification endophthalmitis caused by *Acinetobacter baumannii*

intravitreal vancomycin and ceftazidime, which offers broad-spectrum coverage against both Gram-positive and Gram-negative organisms. However, several reports highlight that *Acinetobacter* spp. often exhibit resistance to many conventional agents, including ciprofloxacin, amikacin, gentamicin, ceftazidime, imipenem, and

piperacillin–tazobactam, which limits therapeutic options. Notably, susceptibility to colistin has been consistently reported even in MDR isolates, making it a vital agent in such cases.^[4] In our case, despite the administration of standard empirical vancomycin and ceftazidime, no significant clinical improvement was observed.

Clinical studies and case series have documented the use of intravenous and intravitreal colistin for managing MDR *Acinetobacter* endophthalmitis, sometimes in combination with other antibiotics, such as ciprofloxacin, with satisfactory visual outcomes.^[8,18] Colistin has shown superior efficacy compared to ceftazidime against Gram-negative bacteria in susceptibility studies. Conversely, those resistant to colistin were susceptible to ceftazidime, underscoring the importance of targeted therapy.^[8,13,18,19] Notably, *A. baumannii* susceptibility to colistin has been consistently reported even in MDR isolates, making it a critical therapeutic option.^[4,20] In our case, following the lack of clinical response to the aforementioned antibiotics and confirmation by PCR, topical colistin and amikacin, besides subconjunctival and intravitreal colistin, were added, resulting in a successful clinical management. Given the severe intraocular inflammation, topical corticosteroids were used as an adjuvant, as previous studies have shown that severe inflammation can prevent recovery despite appropriate antibiotic therapy.^[21]

The visual outcomes of *A. baumannii*-infected endophthalmitis can range from moderate to poor.^[8,19] Similarly, at the 6-month follow-up visit of our case, the eye remained quiet with a clear cornea, and the CDVA had improved to 20/50. For future preventive strategies, the aforementioned risk factors should be considered to explore potential causes of infection.

This study had a few limitations, one of which was the lack of recent epidemiological data on the *A. baumannii* prevalence in Iran.

In conclusion, this case highlights the potential use of topical and intravitreal colistin and amikacin for *A. baumannii*-infected endophthalmitis, particularly when the disease course shows resistance to conventional therapies. However, in the absence of antibiogram results, these findings should be interpreted with caution.

AUTHORS' CONTRIBUTION

A.P, M.P, and A.D provided the concept of the study and contributed to designing the study. P.S, A.A. and M.P.B assisted in the preparation of the first draft of the manuscript. A.P, M.P, M.P.B have revised the manuscript critically for important intellectual content. All authors have read the final version and approved the content

of the manuscript to be published and confirmed the accuracy or integrity of any parts of the work.

Ethics approval and consent statement

The Ethics Committee of the Isfahan University of Medical Sciences in Isfahan, Iran, approved this report's ethical content. Participation in the study was contingent upon signing a written informed consent form signed by the patient. Written informed consent was obtained from the patient for publication of the details of his medical case and any accompanying images (Ethics Code: IR. ARI. MUI. REC.1404.178).

Declaration of independency to government

We declare that none of the authors are employed by a government agency that has a primary function other than research and/or education. None of the authors have an official representative on behalf of the government.

Declaration of the usage of AI tools

The authors would like to acknowledge the use of ChatGPT (<https://openai.com/chatgpt>), developed by OpenAI, in refining the language and improving the clarity of this manuscript. This tool was particularly helpful given the authors' background as non-native English speakers.

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Conflicts of interest

There are no conflicts of interest.

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