

Bilateral panophthalmitis with orbital cellulitis due to *Klebsiella pneumoniae* causing bilateral blindness in a diabetic patient: a rare case report

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ABSTRACT

A 60-year-old diabetic female patient was referred to the clinic with decreased vision and pain in both eyes. The patient had eyelid and conjunctival edema in both eyes and no sense of light projection. Globe movements were restricted in all directions. The anterior and posterior chambers could not be visualized. Magnetic resonance imaging showed findings consistent with orbital cellulitis and panophthalmitis. *Klebsiella pneumoniae* (*K. pneumoniae*) was identified as the causative agent. Systemic and topical treatments were applied to the patient. The patient was discharged after her symptoms and complaints regressed. However, despite the clinical response to treatment, the patient developed bilateral phthisis bulbi. In conclusion, when proptosis, decreased vision, and pain complaints develop in diabetic patients, treatment should be started quickly, and it should be kept in mind that *K. pneumoniae* may be the cause.

Keywords: Bilateral blindness, *Klebsiella pneumoniae*, orbital cellulitis, panophthalmitis

INTRODUCTION

Klebsiella species are facultatively anaerobic gram-negative bacilli that are part of the human gastrointestinal flora. They are very common causative organisms for endogenous endophthalmitis in Asia and are often associated with immunosuppressive diseases such as diabetes mellitus and pyogenic liver abscesses.¹ *Klebsiella pneumoniae* (*K. pneumoniae*) is also a notable member of this family. Endophthalmitis caused by *K. pneumoniae* has a poor prognosis despite intravenous (IV) and intravitreal antibiotic therapy.² The concurrent presentation of orbital cellulitis is a particularly severe and rare manifestation of *Klebsiella* endophthalmitis.³ In this case report, a diabetic patient presenting with bilateral *K. pneumoniae* endogenous panophthalmitis accompanied by orbital cellulitis is examined.

CASE

A 60-year-old diabetic patient was referred to the clinic with swelling in both eyelids, pain, and decreased vision. It was learned that the patient had been hospitalized in the internal medicine department of an external center for about 10 days with a diagnosis of diabetic ketoacidosis. During this period, the patient's blood sugar was regulated, and she was referred

to a tertiary healthcare institution due to a sudden decrease in vision, swelling of the eyelids, and the development of pain in the eyes. Her clinical history was unremarkable except for uncontrolled diabetes. There was no light perception in both eyes at presentation. Both eyelids were highly edematous and erythematous, and conjunctival edema was present. Fibrin membrane was observed in the anterior chamber and on the overlying on the chemotic conjunctiva. The right cornea was minimally edematous, but there was a large ulceration in the central part of left cornea (Figure 1). The posterior segment could not be evaluated. Globe motility was limited in all directions in both eyes. The patient was admitted, and a sample was sent to microbiology from the membranes overlying on the chemotic conjunctiva. A blood culture was taken from the patient, but no growth occurred. B-scan ultrasonography was performed by radiology, and it was reported in writing that there were widespread echogenicities in both globes and under the skin, but the image was not submitted. Magnetic resonance imaging (MRI) and MRI-angiography (MRI-A) were performed. There were diffuse edematous signal increases in bilateral cutaneous and subcutaneous tissues, more prominent on the left. An abscess was observed adjacent to the superior bulbus oculi on the left, and a loss of integrity was observed in the bulbus oculi

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at this level (Figure 2). No cavernous sinus involvement was observed in MRI-A. There was leukocytosis in blood tests (white blood cells (WBC): 19100, neutrophil (NE): 82%), and C-reactive protein (CRP) was 143 mg/L (n: 0-5 mg/L). The patient was evaluated by different specialties for multisystem involvement. In the otolaryngology consultation, it was learned that there was no sinusitis. Neurology consultation did not recommend any additional treatment as there was no cavernous sinus involvement. In the internal medicine consultation, blood sugar regulation was achieved, and there was no liver abscess in the imaging. A cyst was seen in her kidney; she was consulted with urology, but it was thought not to be infective.

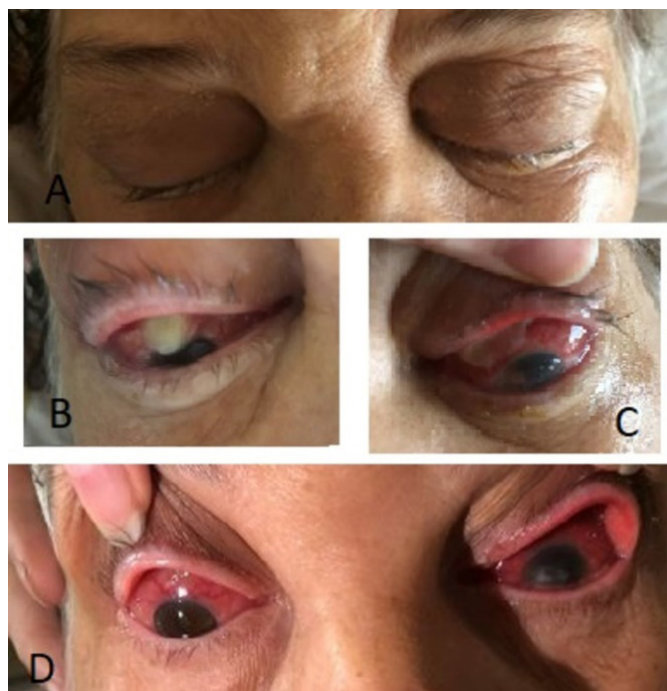


Figure 1. Clinical image of the patient, A) When the patient first applied, eyelid edema was present, B) Prominent fibrin membrane overlying on the chemotic conjunctiva of the patient's right eye was available. Conjunctival edema was seen, C) Fibrin membrane was present overlying on the chemotic conjunctiva and anterior chamber of the patient's left eye. Conjunctival edema was more prominent, D) In the first week of IV antibiotic treatment, a decrease in fibrin membranes and eyelid edema was observed. The right cornea was minimally edematous, but there was a large ulceration in the central part of left cornea

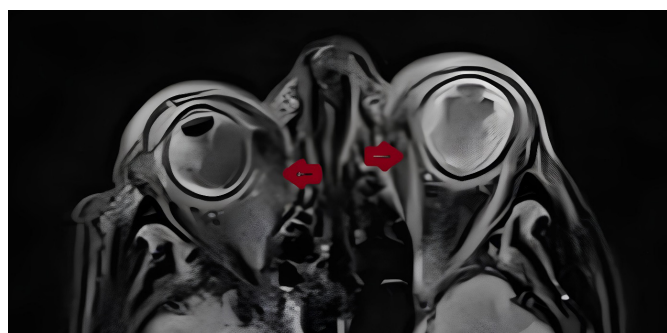


Figure 2. Orbital magnetic resonance imaging of the patient. There were diffuse edematous signal increases in bilateral cutaneous and subcutaneous tissues, more prominent on the left. An abscess was observed adjacent to the superior bulbous oculi on the left. There was an increase in signal in the intraconal area of the right eye (T2 sequence)

The patient was thought to have orbital cellulitis with significant panophthalmitis. Empiric topical moxifloxacin 8x1 treatment was started rapidly for the anterior segment findings and topical dexamethasone 4x1 was added to the treatment because of the fibrin reaction. The patient was

informed that empiric intravitreal antibiotic application and sample collection were required, but the patient did not accept any procedure requiring surgical intervention. The necessity of vitrectomy was explained to stop the disease progression and gain vision, and the patient insisted on not undergoing surgical intervention. Informed consent was obtained from the patient on this issue. Empiric ceftriaxone 2x1 gram IV was started until the result of the sample that could be taken from the conjunctiva surface was obtained. Since *K. pneumoniae* grew in the sample, the patient was asked for an infectious diseases consultation. Since the antibiogram showed carbapenem resistance but meropenem and linezolid sensitivity, systemic antibiotic treatment was changed to meropenem 3x2 grams IV and linezolid 2x600 mg orally with the recommendation of infectious diseases.

At the end of the 3rd week, the eyelid edema of the patient regressed, and the conjunctival edema had disappeared. The pain was lessened. Although her globe motility was limited in all directions, her movement was improved compared to the admission examination. There was no light perception in both eyes, and since there was no light perception at the time of first presentation and the patient could not undergo a surgical procedure, it was interpreted as not being a progression of the disease. The globes were hypotonous. The fibrin reaction in the anterior chamber had regressed. There was no leukocytosis in blood tests (WBC: 7000, NE: 40%), and CRP regressed to 0.64 mg/L (n: 0-5 mg/L). Her diabetes was under control. The patient's infection was controlled with medical treatment, and no further surgical intervention was required. However, phthisis bulbi developed in both eyes.

DISCUSSION

Specific virulence factors play a role in the pathogenicity of *Klebsiella* spp. The organism is an enteric, gram-negative bacillus whose composition is a polysaccharide capsule used to classify various *Klebsiella* serotypes. Capsule serotypes K1 and K2 show increased resistance to intracellular destruction by immune cells. This resistance increases in patients with uncontrolled diabetes mellitus. In addition, these serotypes are dominant especially in cases of ocular involvement and spread to other organs.⁴ Although serotyping was not performed in this case, the pathogen may be one of these serotypes because the patient had uncontrolled diabetes mellitus and ocular involvement.

Orbital cellulitis associated with *K. pneumoniae* endogenous panophthalmitis or endophthalmitis is rare and has a poor visual and anatomical prognosis. Other known poor prognosis factors are immunosuppression, low visual acuity, delayed diagnosis and treatment, presence of hypopyon, and rapid progression of symptoms.⁵ The presented patient had all of these poor prognostic findings.

Fungal infection should be excluded in all diabetic patients with orbital cellulitis because rhinocerebral mucormycosis often presents as orbital cellulitis; uncontrolled diabetic patients are susceptible to fungi and other unusual pathogens.⁶ In this case, mucormycosis was not considered because the culture was negative.

There was only one reported case of concurrent endophthalmitis and orbital cellulitis caused by *K. pneumoniae*, where the patient was found to have a liver

abscess.³ There is only one case of *K. pneumoniae* endogenous endophthalmitis with orbital cellulitis in a patient without liver abscess.⁷ However, unilateral involvement is present in both these cases. Apart from these, a single case of bilateral endogenous endophthalmitis without accompanying orbital cellulitis caused by *K. pneumoniae* has been reported.⁸ This is the first case reported as endophthalmitis/panophthalmitis with bilateral orbital cellulitis due to *K. pneumoniae* in a diabetic patient.

K. pneumoniae endogenous endophthalmitis with concomitant orbital cellulitis can be fatal in general, although the visual prognosis is poor. Early diagnosis and prompt and aggressive treatment are required.⁹ IV antibiotic therapy should be given for at least 3 weeks, especially in cases with orbital cellulitis. In *K. pneumoniae* endophthalmitis, in addition to systemic antibiotics, repeated intravitreal antibiotic applications are required.⁷ There are studies showing that performing vitrectomy in the early period has a positive effect on the prognosis as it reduces the bacterial load. Studies have shown that patients who underwent vitrectomy for endogenous *Klebsiella* endophthalmitis and those who were followed up with repeated intravitreal injections without vitrectomy had greater improvement in visual acuity. There is no information on the course of patients who did not undergo either vitrectomy or intravitreal injection. Early vitrectomy is recommended in patients with endogenous endophthalmitis if initial visual acuity is low, significant vitreous opacity and a highly virulent strain is considered. Intravitreal antibiotics can also be administered and a decision can be made according to the clinical response in 48-72 hours.¹⁰ However, despite all these, *K. pneumoniae* endophthalmitis may require evisceration or enucleation to prevent fatal situations. Surgical intervention was not performed in this patient because the patient refused surgical treatment and clinically regressed with IV antibiotic therapy. It differs from other reported cases in terms of regression of clinical findings and absence of clinical worsening without surgical intervention. Although the disease was controlled with IV antibiotics, the patient's lack of light perception may be due to irreversible damage to the ocular structures.

Limitations

It is unclear if the infection began within the globe and extended outward to the orbital structures or conversely if the infection initially inoculated the orbit and spread inwardly. The authors think that the infection mainly started in the globe and spread outward to the orbit, as the patient first developed poor vision and then globe movement limitation and eyelid edema. However, this remains unclear.

CONCLUSION

As a result, ocular complaints suggesting endophthalmitis and/or orbital cellulitis should be considered, especially in immunosuppressive conditions such as diabetes. *K. pneumoniae* should be kept in mind, and the need for rapid and aggressive treatment should not be forgotten.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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