

Case report

Atypical Outcome of *Klebsiella pneumoniae* Endogenous Endophthalmitis

Saloua Ben Amor, Safa Ben Aoun*^{ID}, Mouna Rekik, Amina Amouri, Amira Trigui

Department of Ophthalmology, Habib Bourguiba University Hospital, Sfax, Tunisia

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Corresponding Email. safa.bn.aoun@gmail.com

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ABSTRACT

Background and aim. *Klebsiella pneumoniae* (KP) can enter the bloodstream from initial infection sites and causes metastatic infections. Ocular infection is called endogenous endophthalmitis. It is considered as a sight-threatening emergency with a poor prognosis and permanent impairment. Our aim is to report a case of endogenous *Klebsiella pneumoniae* endophthalmitis (EKE) with an unexpected fortunate outcome. **Observation.** A 41-year-old patient with no significant past medical history presented with multiple liver abscesses and left endogenous endophthalmitis caused by KP. The diagnosis of hypervirulent KP was presumed. The patient was treated with systemic antibiotics and four intravitreal injections of antibiotics and corticosteroids. Immediate follow-up was marked by the occurring of a total retinal detachment. The patient had been lost to follow-up for six months in which he had taken oral and local antibiotics for two weeks and then presented to our department with total remission. **Conclusion.** This is a rare case reporting a good outcome of EKE presumably caused by hypervirulent KP and treated with four intravitreal injections of antibiotics, systemic and local antibiotics without vitrectomy.

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INTRODUCTION

Klebsiella pneumoniae (KP) is a gram-negative bacterium normally present in the gastrointestinal tract. It can enter the bloodstream from initial infection sites and causes metastatic infections [1]. Endogenous KP endophthalmitis (EKE) is more common in East Asian countries, especially among diabetic patients but has been increasingly prevalent in the USA, Australia, and European countries during the last two decades [2]. It is considered a sight-threatening emergency with a poor prognosis and permanent impairment.

We herein describe an atypical case of EKE with the resolution of the infection despite the initial presence of poor prognosis factors and the loss of follow-up during COVID-19's first Tunisian lockdown.

CASE PRESENTATION

The patient was hospitalized, treated and monitored in department of ophthalmology, Habib Bourguiba University Hospital. Multimodal imaging was performed at the onset and throughout the follow-up, including anterior segment photographs, ocular echography, fundus imaging, and optical coherence tomography.

RESULTS

This observation was reported according the Care guideline [3]. A 41-year-old patient with no significant past medical history was admitted to the visceral surgery department for a two-week history of fever and deterioration of general condition revealed to be related to multiple liver abscesses. Furthermore, the patient reported blurred vision in the left eye (LE), concomitant with the general symptoms. The ophthalmologic examination was normal in the right eye. Best-corrected-visual acuity (BCVA) of the LE was limited to light perception. Slit-Lamp examination revealed 4+ cell anterior chamber inflammation associated with fibrin, 360° posterior synechiae, and 4+ vitreous cells. The fundus examination was inaccessible (figure 1A). Ocular ultrasonography revealed multiple vitreous opacities due to the vitritis

without evident subretinal abscesses (figure 1A').

Hemocultures and culture of the puncture of the liver abscesses identified KP. Further investigations for concomitant comorbidities including human immunodeficiency virus, hepatitis B and C serology, white cell counting, blood glucose test, and internal medicine examination revealed no abnormalities. The patient was treated with intravenous imipenem-cilastatin (2.0g /day) and levofloxacin (1.0g /day) with surgical drainage of the liver abscesses. The endogenous EKE was treated with four intravitreal injections of ceftazidime (2 mg/0.1 mL)-vancomycin (1 mg/0.1 mL), 48 hours apart. The third intravitreal injection was associated with dexamethasone (400 µg/0.1 mL). The evolution after the three first injections was marked by an initial clinical improvement of the visual acuity to 20/63 with regression of the inflammation of the anterior segment (figure 1B/C). However, the fourth intravitreal injection was followed by an acute worsening of the visual acuity, which became limited to counting fingers. Ultrasonography revealed a total retinal detachment (figure 1C'). During the first COVID-19 pandemic national lockdown, the patient was discharged from the hospital before scheduling a vitrectomy. He received oral treatment with levofloxacin (500 mg x 2/day for one week), ciprofloxacin, corticosteroid, and mydriatic eye drops for two weeks.

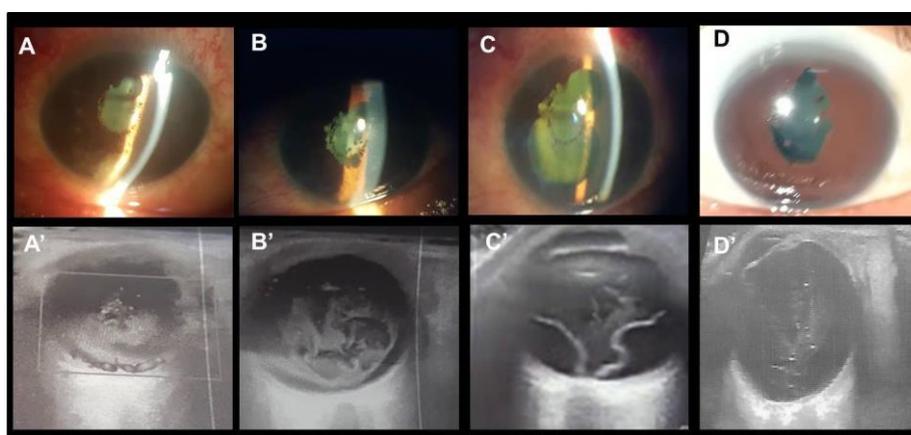


Figure 1. A, B, C, D. Left anterior segment photographs on the first presentation, three days, ten days, and six months after treatment respectively, revealing improvement of the inflammation. A', B', C', D'. Simultaneous ultrasonography showing dense vitreous echogenicity, the appearance of retinal detachment (C'), and its reapplication (D').

He was lost to follow-up. Six months later, the examination revealed an improvement of the visual acuity of the LE to 20/25, with regression of the ocular inflammation (figure 1D) and total reapplication of the retinal detachment (figure 1D'). Fundus examination showed pigmented retinal scar measuring five times the diameter of the optic disc. Swept-source optical coherence tomography (DRI OCT Triton plus, Topcon, Tokyo, Japan) showed integrity of retinal layers with the appearance of an epiretinal membrane in the left eye (figure 2).

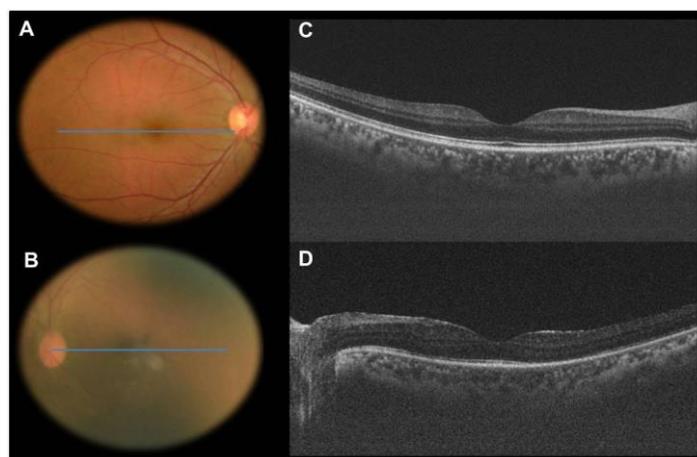


Figure 2: Six months after the first presentation, normal fundus photographs of the right eye (A) and fuzzy aspect of the left eye (B). Optical coherence tomography of both eyes (C and D, respectively) shows the integrity of retinal layers with an epiretinal membrane in the left eye.

DISCUSSION

During KP septicemia, EKE occurs when a septic embolus traverses the posterior vasculature and disseminates into several tissues through the blood-ocular barrier. The microorganism enters the choroid and retina, causing chorioretinitis and subretinal abscesses. It migrates into the vitreous, presenting as vitritis, and finally, it reaches the anterior chamber manifesting as anterior uveitis. Many medical conditions causing a relative immunocompromised state have been reported as predisposing factors, including diabetes mellitus, malignancy, endocarditis, chronic liver diseases, solid-organ transplantation, dialysis, and intravenous drug abuse [4]. In our case, laboratory testing and physical examination of our patient revealed no systemic comorbidity or immunocompromising conditions. Therefore, it has been reported that hypervirulent KP causes severe damage even in immunocompetent patients [5]. EKE, in this case, is associated with a clinical entity called invasive liver abscess syndrome, which can also cause meningitis and necrotizing fasciitis [6]. The serotype identification of KP was not available. Considering the initial presentation, the hypervirulent nature was presumed. However, in the light of the outcome, it remains questionable. For the treatment, some authors reported that empiric broad-spectrum antibiotics should be avoided to preserve the natural “wild-type” phenotype of hypervirulent KP strains for as long as possible [7]. For our patient, empiric broad-spectrum antibiotics were administered, and the treatment was continued for two weeks as the patient responded well. For the intravitreal injections, we performed four intravitreal injections every 48 hours, but the protocol was suspended when the ultrasonography revealed a retinal detachment. Initially, the retinal detachment was considered rhegmatogenous since it is one of the possible complications of EKE described in 12.7% of the cases [8]. However, complete regression after medical treatment was in favor of a serous origin.

For the prognosis, EKE is known for having a generally poor prognosis, especially in cases of diabetes mellitus, unilateral infections, initial visual acuity worse than counting fingers, the presence of a hypopyon, and involvement of all ocular structures [9]. In our case, despite the presence of several poor prognosis factors, we hypothesize that the initial treatment with intravitreal injections of antibiotics and dexamethasone has reduced the intravitreal bacterial load to the point where oral antibiotics were enough to manage the infection explaining the favorable outcome. As in our patient, a case of EKE treated with 13 intravitreal injections of ceftazidime without vitrectomy with excellent outcome has been reported [10].

Besides, the presence of a single retinal pigmented scar after remission is in favor of an initial posterior unifocal infection. It has been demonstrated that intravitreal dexamethasone administration has significantly favorable visual outcomes in endophthalmitis *Klebsiella* patients and that posterior focal types of EKE have a better prognosis [2].

This case has the limitations of not being monthly followed-up during the COVID's lockdown so that we could pursue the remission of the serous retinal detachment. Besides, further prospective studies should be carried out in order to establish a protocol for the treatment of EKE.

CONCLUSION

This case reports a rare fortunate remission of EKE despite the features of the first presentation. We think that in case of many poor prognosis factors, the empiric treatment should be based on broad-spectrum antibiotics covering hypervirulent KP.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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