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Case Report

Atypical Presentation of Disseminated *Klebsiella Pneumonia* Endophthalmitis with Pyogenic Liver Abscess

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Abstract

Purpose: To report a unique case of *Klebsiella pneumonia* endophthlamitis in which the patient's ocular cultures were vital in identifying a liver abscess despite negative blood cultures and minimal abdominal symptomology.

Observations: The patient presented with pain and vision loss with a concern for endogenous endophthalmitis. Computerized Tomography (CT) scan of her orbits did not demonstrate significant intraocular or orbital pathology. Blood cultures did not grow any organism. Vitreous cultures grew *Klebsiella pneumonia*. A CT of her abdomen identified a liver abscess, which was biopsied and grew *Klebsiella pneumonia*. The patient ultimately required enucleation of the affected eye and was treated with systemic antibiotics and surgical drainage of her liver abscess.

Conclusions and Importance: This case highlights the previously well-noted association of endogenous *Klebsiella* endophthalmitis (EKE) with liver abscesses. Most reported cases present with systemic symptoms related to the infectious dissemination of *Klebsiella*, and or positive blood cultures. Our case is atypical in that our patient was referred to us for an eye issue without any suspected systemic problem identified. A positive vitreous culture and a high degree of suspicion despite a lack of significant abdominal symptomatology led us to pursue abdominal imaging identifying her liver abscess and potentially preventing further life-threatening complications.

Keywords: *Klebsiella Pneumonia*; Endophthalmitis; Liver Abscess; Blood Culture

Abbreviations

EKE: Endogenous klebsiella Endophthalmitis; IVDU: Intravenous Drug Use; CT: Computed Tomography; PRP: Pan Retinal Photocoagulation; WBC: White Blood Count

Introduction

Endogenous *Klebsiella* endophthalmitis (EKE) is a rare complication of gram-negative bacteremia with a well-established association to diabetes, intravenous drug use (IVDU), immunosuppression and liver abscesses. Amongst patient with *Klebsiella* related liver abscesses, the incidence of endogenous endophthalmitis has been found to be as high as 3% [1]. Previous reports indicate that patients with EKE are more likely to have positive cultures from blood than vitreous [2].

Klebsiella pneumonia infections have a fulminant course and necessitate systemic therapy to treat the source of the infection. Differential should remain broad and includes non-infectious uveitis, fungal endophthalmitis, orbital infections including mucormycosis, and cavernous sinus thrombosis. Previous case reports have discussed the morbidity and mortality of *Klebsiella pneumonia* liver abscess and metastatic endophthalmitis [3,12].

In this paper, we describe a middle-aged woman presenting with acute unilateral eye pain and vision loss in conjunction with a history for fever and chills. An expedited vitreous biopsy yielded *Klebsiella pneumonia*. Despite negative blood cultures or significant abdominal complaints, further systemic workup was completed with an abdominal computed tomography (CT) demonstrating an otherwise inconspicuous liver abscess. An ensuing percutaneous drainage of the abscess and extended course of systemic antibiotics successfully prevented further systemic morbidity or mortality. This aggressive treatment in conjunction with intravitreal injections was not successful however in preventing expedited scleral perforation and eventual enucleation of the involved eye.

Case Report

A 50-year-old Caucasian woman presented from an outside hospital with the diagnosis of angle closure glaucoma and a 5-day history of left sided blurred vision, headache, fever, chills, dizziness and constipation. The patient's past medical history was pertinent for hypertension, type II diabetes with proliferative diabetic retinopathy status post pan retinal photocoagulation three years prior to presentation. Her history was also positive for multiple episodes of shingles, all which reportedly sparing the periocular region. She denied a history of IVDU or excessive alcohol consumption. Her surgical history was limited to a cholecystectomy many years prior. Her chief complaint related to her left eye pain and her accelerated vision loss over the last few days. Upon presentation she was experiencing extreme eye pain, which in turn limited her ability to interact with the medical staff. Much of her history was gained solely from family members.

On initial examination the visual acuity was 20/20 in the right eye and 20/200 in her left eye. Tonometry showed a normal pressure in the right eye and an elevated intraocular pressure at 45 mmHg in the left. There was no proptosis by Hertel examination. Her extraocular motility was full but was accompanied with mild to moderate pain in all directions. Examination of the right eye was unremarkable with peripheral PRP scars. The left upper eyelid was minimally erythematous and edematous with mild conjunctival chemosis and no scleral icterus or ectasia. The cornea was moderately edematous without epithelial defect. The anterior chamber showed a layered hypopyon and 360 anterior synechial closure. She had a nuclear sclerotic cataract in both eyes. There was no view to the posterior pole. B-scan ultrasonography identified the evidence of mild vitritis without concomitant retinal detachment or choroidal mass (Figure 1).

Figure 1: B-scan ultrasonography of the left eye demonstrating loculated vitritis.

The patient was afebrile on admission but did have an elevated white blood count (WBC) of 24.4 (ref range 4.8 - 10.8 x10^3/uL) and elevated C Reactive Protein of 239.9 (ref range < = 8.0mg/ml) with a lactic acidosis. Her liver function panel was largely normal with an alanine aminotransferase of 31 U/l (ref range 3 - 45 U/L), alkaline phosphatase 135 U/l (ref range 38 - 126 U/L and a bilirubin of 1.1 U/L (0.2 - 1.3 mg/dL). A negative comprehensive infectious and inflammatory workup included testing for HIV, Lyme, Sarcoid, Tuberculosis, HLA-B27, rheumatoid factor, Toxoplasmosis, antineutrophil cytoplasmic antibodies panel, blood cultures, urine cultures, urine drug screen, chest x-ray, and CT scan of the head and orbits. Prior exposure to herpetic viruses was evidenced with +IgG/-IgM panel for HSV and VZV. A transthoracic echo was also performed and found to be normal.

She was immediately started on intravenous Vancomycin and Cefepime and within 24 hours underwent a vitreous tap with injection of 1 mg Vancomycin, 2mg Ceftazidime, 50mcg Voriconazole, 400 mcg Dexamethasone. The vitreous cultures grew gram-negative rods speciating to *Klebsiella pneumonia* sensitive to Amoxicillin/Clavulanate, Cefepime, Ciprofloxacin, Gentamycin, Tetracycline, Tobramycin, and Trimethoprim/Sulfamethoxazole but resistant to Ampicillin.

At this point a review of the literature confirmed the potential association between *Klebsiella pneumonia* and liver abscesses. Despite the lack of abdominal tenderness or pain, A CT abdomen was obtained and identified a 4.2x6.0x5.2 cm mass located between the inferior margin of the right hepatic lobe and upper lobe of the kidney (Figure 2). The liver abscess was drained by interventional

radiology. Cultures from the liver abscess confirmed metastatic spread of the *Klebsiella pneumonia*. The patient was kept on intravenous antibodies and her mental status improved over the next few days. Her eye pain improved some but her vision decreased to no light perception by Day 2. Subsequent MRI testing revealed acute inflammatory changes involving the superior temporal aspect of the left orbit with involvement of the lacrimal gland and extension into the periorbital soft tissues compatible with localized abscess formation versus perforation of the globe (Figure 3). The patient's left eye was enucleated on Day 3. Cultures again grew *Klebsiella*. Inspection in the operating room did in fact identify scleral perforation of the globe in the superior temporal quadrant (Figure 4).

Figure 2: CT abdomen/pelvis demonstrating 4.2 x 6.0 x 5.2 cm mass (white arrow) between the inferior edge of the right hepatic lobe and the right adrenal gland and upper pole of the right kidney.

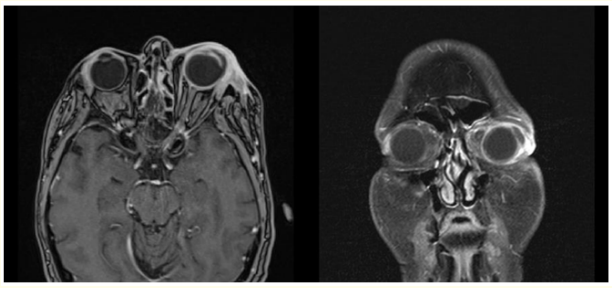

Figure 3: T1 MRI orbits demonstrating perforation of left globe superotemporally.

Figure 4: External photograph of left eye prior to Enucleation (A) and after Enucleation (B).

She was discharged home on a 6-week course of oral Flagyl and Cefepime. Her drainage catheter was removed upon interval improvement of her abdominal CT. On follow-up with ophthalmology, she had a well-covered conformer and was scheduled for prosthetic fitting. Her right eye remained unaffected and she had no pain.

Discussion

EKE is rare condition with a devastating clinical course. Though rare in the Western hemisphere, it has a higher incidence in East Asia, possibly related to genetic susceptibility, higher incidence of liver abscesses, and higher prevalence of the more virulent serotypes of *Klebsiella pneumonia* (K1 and K2) [4,5]. Typical ophthalmic presentation includes blurred vision, with redness and eye pain. Systemic symptoms include abdominal pain, fever, chills, psychological disturbances and septic shock. One characteristic finding, which was not present in our patient, is a "pupillary hypopyon", in which purulent exudates are present at the pupillary margin, giving the appearance of an opaque cataract [2,6]. Previous reports have indicated final visual acuity of 4/200 or worse in 77.5% to 89% of patients, with 26.8% to 41% requiring enucleation or evisceration [2,8]. The ability of the organism to penetrate intact sclera is yet another uncommon finding, but speaks to the aggressive nature of the organism (Figure 4).

EKE is correlated with diabetes mellitus and hosts with compromised immune defense mechanisms [2,6,7], and its association with pyogenic liver abscesses is reported to be as high as 71% [2,6,8]. Controversy exists as to whether patients with *Klebsiella* liver abscesses and no ocular symptoms should have routine di-

lated ophthalmic examinations. A recent report by Shields, *et al.* advocates for screening dilated fundus examinations in patients with systemic *K. pneumonia* infections [9]. In their experience, early detection and treatment has resulted in better outcomes.

This case report however highlights the flip side of the debate. Should patients with EKE have routine systemic workup. In the author's opinion, all endogenous endophthalmitis merit a basic comprehensive workup including a complete blood count (CBC), blood cultures, and possible cardiac echocardiography. Further workup in this case was deemed necessary and outlined above. The question raised here pertains to abdominal imaging looking for liver pyogenic abscesses. Our patient's extensive workup was essentially negative and her blood cultures did not exhibit microbiological growth. Yet, in the setting of fever, chills and elevated WBC, we felt compelled to explore further, leading to the detection of an abdominal abscess. The intent of this case report is clearly not to attempt to solve this complicated issue. Rather, we join others in raising awareness amongst the ophthalmic community as to the association between EKE and liver abscesses stressing that early detection may well be the best tool to prevent further dissemination.

The article also aims at briefly reviewing the literature debating early vitrectomy for EKE. While some authors have advocated for early vitrectomy [4,10,11], Sheu., *et al.* advocate more aggressive treatment with worse baseline vision or in eyes whose anterior chamber reaction did not respond to intravitreal antibiotics [4]. Yarng., *et al.* reported a case of bilateral EKE in which one eye underwent vitrectomy with preservation of 5/200 vision while the second eye treated with intravitreal injections only progressed to LP [7]. Yoon., *et al.* suggests that observation with ultrasound to monitor for development of a subretinal abscess be performed with early surgical intervention advised if one were to develop [10]. The small sample size of many of these reports makes definitive recommendations difficult if not impossible. Prognosis remains guarded in the vast majority of cases and close follow-up during either treatment regimen appears critical.

Conclusions

This case report underlines the virulent nature of EKE. The authors briefly review the literature debating the potential benefit of early vitrectomy in such instances, acknowledging the need for more studies. The gist of the article underscores a relatively atypical presentation of disseminated EKE presenting with vague systemic symptoms of fever and chills. With minimal abdominal complaints and negative blood cultures contrasted with the confirmation of a life-threatening pyogenic liver abscess. While the authors acknowledge the limit of this publication and caution against extrapolating recommendations for systemic evaluation of suspected disseminated EKE, they would like to stress the importance in maintaining a high level of suspicion for systemic and liver dissemination, even in the absence of significant abdominal findings and negative blood cultures.

Patient Consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Acknowledgements and Disclosures

None.

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