

Case Report

Keeping an Eye Out for Klebsiella Endophthalmitis: Klebsiella Pneumoniae Invasive Liver Abscess Syndrome

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Abstract

Hypervirulent *Klebsiella pneumoniae* strain is a major cause of liver abscess and this bacteria has metastatic properties. This distinct liver abscess syndrome has been increasingly reported in Asia over the past two decades, but is emerging as a global disease. We described an 81-year-old lady, who presented to the emergency department with 1-week prior duration of fever and right eye swelling. She had been admitted for recurrent liver abscess prior to this. Hence, she was initially treated as sepsis secondary to recurrent liver abscess. Meanwhile, she was managed concurrently by ophthalmology team for endophthalmitis. Despite the initiation of treatment with antibiotics, she did not show any improvement and required right eye evisceration to treat the sepsis. Invasive liver abscess syndrome with metastatic endophthalmitis should be screened in patient with *Klebsiella* liver abscess. They should be monitored for ocular symptoms as early recognition can prohibit delays in treatment, which has debilitating consequences.

Keywords: *Klebsiella pneumoniae*, pyogenic liver abscess, endophthalmitis, invasive liver abscess syndrome, ophthalmology

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Introduction

Klebsiella species are an encapsulated gram-negative rod bacterium, commonly found along with human gastrointestinal tracts as normal flora. They can also behave as opportunistic human pathogens, especially in patients with impaired host defenses. Among the pathogenic *Klebsiella* species, *Klebsiella pneumoniae* is the most prevalent (1). It has a hypervirulent strain that can cause a distinct syndrome consisting of liver abscess with extrahepatic complications (2). Here, we discussed a patient with *Klebsiella* liver abscess who presented few weeks later with septic shock from endophthalmitis.

Case Report

An 81-year-old lady presented with a chief complaint of 1-week history of painful right eye swelling and

concomitant symptoms including weakness, lethargy, fever and intermittent right upper quadrant pain. Three months prior to the incident she was admitted for liver abscess. An ultrasound performed showed a multiloculated liver abscess in segment VII / VIII and features of chronic cholecystitis. Percutaneous drainage of the liver was done, and culture grew *Klebsiella* species. She completed 6 weeks of antibiotics and subsequently scheduled for cholecystectomy.

During the surgery, the gallbladder was found contracted and the duodenum was adhered densely to cystic plate. Subsequently, common bile duct exploration was performed following the finding of common bile duct stone during on table cholangiogram. T-tube was inserted in the common bile duct during the exploration. Post-operatively was uneventful and she was discharged home with the T-



Figure 1: Right eye on presentation: Klebsiella endophthalmitis

tube. One week later, she re-presented with pus discharge from the T-tube. An ERCP was performed and internal biliary stent was inserted. She remained well after the procedure and was discharged after three days. Two weeks later, she developed recurrent episodes of sepsis from new liver abscesses at segment II/III and also segment V. A percutaneous drainage of the liver abscess and intravenous antibiotics were prescribed for 2 weeks and subsequently she was discharged. The liver abscess pus culture grew *Klebsiella pneumoniae*.

Presently she presented with mentioned chief complaints one month after the last admission. At presentation, she appeared septic and had a temperature of 38°C. Her blood pressure was 110/90 mmHg, with heart rate of 100 beats/min. On examination, her right eye was swollen, erythematous and tender (Fig. 1). The abdominal examination did not reveal any tenderness suggestive of recurrent liver abscess. The ophthalmology team reviewed the patient and made a diagnosis of endophthalmitis secondary to *Klebsiella pneumoniae* infection. She was treated with intravenous meropenem, intravitreal ceftazidime and vancomycin, with ceftazidime and vancomycin eye drops.

While receiving the treatment for the endophthalmitis, she developed septic shock which requires management in the high dependency unit. Her right eye did not improve and was persistently swollen associated with purulent discharge. In view of the ongoing sepsis in which the ophthalmology team believed to be due to the endophthalmitis and the eye was no longer salvageable the decision to perform right eye evisceration as means of treatment was made. The intraoperative findings revealed a total corneal melting, with exposed ocular contents and pus (Fig. 2).



Figure 2: Intra operation, prior to evisceration of eye

Vitreous fluid from the surgery and the blood culture revealed the extended spectrum beta-lactamase (ESBL) *Klebsiella pneumoniae* species and sensitive to carbapenem. Post operatively, she completed two weeks of intravenous carbapenem groups of antimicrobial agents and was discharged with 6 weeks of oral ciprofloxacin.

Discussion

Klebsiella pneumoniae is a well-known human nosocomial pathogen. Prevalence of *Klebsiella pneumoniae* infection has been increasing and is now the main cause of liver abscess reported in Hong Kong, Singapore, South Korea and Taiwan (2).

In the 1980s, a distinct syndrome consisting of *Klebsiella pneumoniae* liver abscess with extrahepatic manifestations was first reported in Taiwan and later in many other Southeast Asia countries (3). This syndrome is named the invasive liver abscess syndrome. It is caused by a hypervirulent strains of *Klebsiella pneumoniae* with K1 or K2 serotype and a hypermucoviscous phenotype (4). It is a devastating rapidly progressive disease with a dismal prognosis. This syndrome has an Asian predominance because of a high faecal carriage rate of *Klebsiella pneumoniae* with either serotype K1 or K2 among healthy Chinese adults, which was reported in a seroepidemiological study, highest in Malaysia (5).

The common sites of metastatic infection are central nervous system and the eyes, but it can also spread to spleen, lungs, psoas muscle, neck and bone. However, only one third of patients will present with metastatic infections on admission (6). Endophthalmitis is one the main metastatic presentation as described in this case which caused severe catastrophic outcome. It can

present days after initiation of treatment for *Klebsiella pneumoniae* bacteraemia (7). Okada et al has reported that only half of the patients were correctly diagnosed at presentation and diagnosis were delay for 4 days or more in 29% of the patients in his 10 years retrospective analysis (8). This setback in establishing a diagnosis of *Klebsiella* endophthalmitis for this patient has led to a delay of treatment and subsequently high morbidity.

Nonetheless, due to its potential devastating effect of metastatic infection particularly the ophthalmic symptoms, the awareness and advice for patients who develops liver abscess due to *Klebsiella pneumoniae* should be done diligently. Conversely, patients with septic endophthalmitis should be investigated for a primary pyogenic liver abscess. In a combination of three series from Taiwan, a total of 524 patients who had *Klebsiella pneumoniae* liver abscess, a total of 6 percent only had endophthalmitis (3, 9, 10). This states how uncommon this presentation may be, but patients' who have been diagnosed with *Klebsiella pneumoniae* liver abscess should be warned of possible symptoms; namely ocular pain, visual blurring and eye redness (11). A delay in diagnosis and subsequent treatment beyond 24 hours results in a permanent loss of vision (12). Chung CY et al had described, 9 out of 19 patients required evisceration, but had initial ocular symptoms for at least 6 days (13). It was unclear in our patient how long she had altered vision, but a simple precaution to patient to detect and report symptoms, may save a patient from undergoing the morbid surgery of eviscerating the eye.

Treatment of invasive liver abscess syndrome includes intravenous antibiotics and drainage in large liver abscess. Third generation cephalosporin remains the mainstay of treatment (2). The choice of antimicrobial therapy should be modified based on its susceptibility. The duration of treatment depends on the clinical response as demonstrated by resolution of fever, inflammatory markers and ultrasound of the abscess. Adequate drainage, preferably percutaneous is recommended (2).

For endophthalmitis, the combination of intravitreal and intravenous antibiotics is advocated. Intravenous antibiotics are crucial for treatment of its origin of infection, thereby preventing emboli of the organisms to the eye. Intravitreal antibiotics overcome the inadequate penetration of systemic antibiotics into the vitreous. The visual prognosis is poor (>85% will have severe visual deficit) despite adequate treatment (14).

Conclusion

Why should a surgeon be aware of this? *Klebsiella* invasive liver abscess syndrome, although constituting a minority, is frequently associated with catastrophic disabilities. This case highlights the importance of early suspicion of metastatic infection in patients with known liver abscess. Prompt diagnosis and treatment can improve survival or visual prognosis. A simple practice of ophthalmic screening when the patient is diagnosed with *Klebsiella* liver abscess is all needed to avoid further near fatal morbidity.

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