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Klebsiella pneumoniae Endophthalmitis with Associated Hepatic Abscess

Klebsiella pneumoniae liver abscess is known to be associated with metastatic endophthalmitis, with most cases clustered in Taiwan. We report a case of *Klebsiella* liver abscess with metastatic endophthalmitis in a nondiabetic Haitian man without underlying medical problems. *Journal of Hospital Medicine* 2007;2: 442–444. © 2007 Society of Hospital Medicine.

KEYWORDS: *Klebsiella*, hepatic abscess, endophthalmitis.

Klebsiella pneumoniae liver abscess is known to be associated with metastatic endophthalmitis,¹ although most cases have been clustered in Taiwan, with few reports in the United States.² The first reported case of *Klebsiella* liver abscess with endophthalmitis in the United States was in a 38-year-old man with a new diagnosis of diabetes, a known risk factor for hematogenous spread of *Klebsiella* to metastatic sites.³

CASE REPORT

A previously healthy 43-year old Haitian man presented after experiencing 5 days of right eye pain with associated fever and swelling. The patient denied preceding trauma, manipulation of the eye, contact lens use, or illicit drug use and had no significant medical history. He had moved to the United States from Haiti more than 15 years ago and had not traveled out of the state of Florida since that time.

Physical exam showed tachycardia (rate = 110/min), tachypnea (rate = 20/min), and a temperature of 101.5°F. The right eye had injected conjunctiva, a swollen lid, and decreased palpebral fissure, and visual acuity on the left was 20/60, whereas visual acuity on the right was recorded as the ability to count fingers at 3 feet. The remainder of his physical exam was within normal limits including the abdominal exam.

Laboratory data on admission included a white blood cell count of 37,500/ μ L significant for 12% bands, total bilirubin of 2.8 mg/dL, AST of 141 U/L, ALT of 130 U/L, and alkaline phosphatase of 196 U/L. HIV testing was negative, and urine toxicology did not detect the presence of any illicit drugs. Vitreous cultures grew *Klebsiella pneumoniae*.

The initial CT scan of the orbit (Fig. 1) showed periorbital swelling and a preseptal collection anterior to the right globe consistent with an abscess. Because of the abnormal results of the liver panel in the presence of the ophthalmologic infection, an abdominal CT was obtained that showed an 11.5 by 8.0 cm lesion

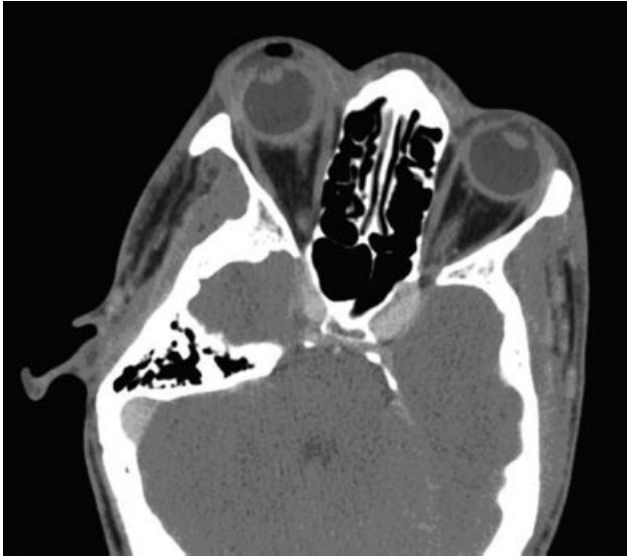


FIGURE 1. CT of the orbit with contrast showing right preseptal and periorbital soft-tissue swelling with fluid collection.

involving all segments of the right lobe of the liver with a 0.9-mm cylindrical extension toward the right hepatic vein.

Percutaneous drainage of the liver abscess was performed, yielding positive cultures for *K. pneumoniae*. The patient was treated with oral gatifloxacin and intravenous ceftriaxone. Gatifloxacin therapy was chosen for its excellent penetrance into the vitreous.⁴ Despite antibiotic therapy, a repeat CT scan of the orbit showed further extension of the collection, and the decision was made to drain the abscess and perform right eye enucleation. The patient was discharged home on oral gatifloxacin. A follow-up abdominal ultrasound 2 weeks after discharge showed complete resolution of the liver abscess.

DISCUSSION

Bacterial endophthalmitis is a rare infection involving the vitreous humor and other deep intraocular structures. It is most commonly exogenous in origin, caused by intraocular surgery, penetrating injury, a corneal ulcer, or periocular infection. Endogenous endophthalmitis occurs when organisms reach the eye hematogenously and accounts for fewer than 6% of all cases of endophthalmitis.⁵

Klebsiella liver abscesses have been increasing in incidence worldwide and since the mid-1990s have become a common cause of liver abscess in the United States, along with *Escherichia coli*. The

association with endophthalmitis was first reported in a series of 7 cases from Taiwan in 1986,¹ and subsequent East Asian cases have been reported, usually in diabetic patients.^{6,7} The association of *Klebsiella* liver abscesses with endogenous endophthalmitis has been rarely reported in the United States, with review of the literature from 1966 to 2003 revealing only 3 reported cases.² One of these patients had diabetes, whereas another had beta-thalassemia with previous splenectomy. Another study looking at only pyogenic liver abscess found biliary disease, hypertension, intraabdominal infection, and diabetes to be the most common underlying or concurrent conditions.⁸ Our patient did not appear to have any of these risk factors.

Our patient had no known risk factors to promote metastatic spread of the causative organisms. The patient was HIV negative, had no personal or family history of diabetes, and was not found to have elevated glucose levels at any point during admission. Although the ultimate etiology may never be determined, the possibility of undetected malignancy or cardiovascular or inflammatory disease cannot be excluded.

Physicians need to be aware of the global emergence of a hypervirulent strain of *K. pneumoniae* causing liver abscesses and metastatic complications, especially endophthalmitis.⁹ Mucoviscosity associated gene A (*magA*) has been found in some liver isolates of *K. pneumoniae*.¹⁰ It has been suggested that as many as one-third of patients infected with hyperviscous strains of *K. pneumoniae* will develop an invasive infection.¹¹ Although it is unclear why metastatic endophthalmitis from *Klebsiella* liver abscess would be more common in East Asia, the *magA* gene may account for the observed difference. It was not possible to determine if the infectious organism that had infected our patient had the *magA* gene, although the clinical use of this information may not have changed management because the patient presented with metastatic infection. If this patient's particular organism had tested positive for the *magA* gene, it might explain why an apparently immunocompetent patient developed metastatic endophthalmitis not simply a liver abscess.

Patients with evidence of endogenous endophthalmitis without clear risk factors should be covered for *K. pneumoniae*, and extraocular sources should be sought, particularly the liver, even in the absence of diabetes. Early recognition and prompt

initiation of antimicrobial therapy is essential if the patient's vision is to be preserved.

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REFERENCES

1. Liu YC, Cheng DL, Lin CL. *Klebsiella pneumoniae* liver abscess associated with septic endophthalmitis. *Arch Intern Med.* 1986;146:1913-1916.
2. Lederman ER, Crum NF. Pyogenic liver abscess with a focus on *Klebsiella pneumoniae* as a primary pathogen: an emerging disease with unique clinical characteristics. *Am J Gastroenterol.* 2005;100:322-331.
3. Saccente M. *Klebsiella pneumoniae* liver abscess, endophthalmitis, and meningitis in a man with newly recognized diabetes mellitus. *Clin Infect Dis.* 1999;29:1570-1571.
4. Hariprasad SM, Mieler WF, Holz ER. Vitreous and aqueous penetration of orally administered gatifloxacin in humans. *Arch Ophthalmol.* 2003;121:345-350.
5. Jackson TL, Eykyn SJ, Graham EM, Stanford MR. Endogenous bacterial endophthalmitis: a 17-year prospective series and review of 267 reported cases. *Surv Ophthalmol.* 2003;48:403-423.
6. Wang JH, Liu YC, Lee SS, et al. Primary liver abscess due to *Klebsiella pneumoniae* in Taiwan. *Clin Infect Dis.* 1998;26:1434-1438.
7. Cheng DL, Liu YC, Yen MY, Liu CY, Wang RS. Septic metastatic lesions of pyogenic liver abscess. Their association with *Klebsiella pneumoniae* bacteremia in diabetic patients. *Arch Intern Med.* 1991;151:1557-1559.
8. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends in etiology and mortality. *Clin Infect Dis.* 2004;39:1654-1659.
9. Fung CP, Chang FY, Lee SC, et al. A global emerging disease of *Klebsiella pneumoniae* liver abscess: is serotype K1 an important factor for complicated endophthalmitis? *Gut.* 2002;50:420-424.
10. Fang FC, Sandler N, Libby SJ. Liver abscess caused by magA+ *Klebsiella pneumoniae* in North America. *J Clin Microbiol.* 2005;43:991-992.
11. Lee HC, Chuang YC, Yu WL, et al. Clinical implications of hypermucoviscosity phenotype in *Klebsiella pneumoniae* isolates: association with invasive syndrome in patients with community-acquired bacteraemia. *J Intern Med.* 2006;259:606-614.