

Two cases of *Klebsiella pneumoniae* primary liver abscesses; an emerging clinical entity among diabetics

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Editor's Note:

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Abstract

***Klebsiella pneumoniae** liver abscesses with limited antibiotic resistance have been increasing among diabetics in various geographic regions, most notably in Taiwan. Two cases of Hawaiian diabetic men with **Klebsiella pneumoniae** primary liver abscesses are presented as well as a brief review of the literature.*

Introduction

Pyogenic liver abscesses are common among visceral abscesses and may arise from local spread of intraperitoneal infections or via hematogenous seeding. They are often composed of mixed facultative and anaerobic species, though single organism or amoebic isolates are possible. Clinical manifestations are often nonspecific and may include fever, chills, weight loss, anorexia, nausea or vomiting, right upper quadrant tenderness, hepatomegaly or jaundice. Alkaline phosphatase is frequently elevated, though elevated aminotransferases, hyperbilirubinemia, leukocytosis and anemia or right-sided pleural effusions may be seen. Diagnosis is made radiographically with ultrasound or computed tomography. Treatment consists of diagnostic and therapeutic drainage, as well as appropriate prolonged antibiotic therapy. Presented below are two cases of diabetic men with primary liver abscesses.

Case 1

A 49 year old Hawaiian diabetic man presented to the emergency department with myalgias and shortness of breath. He was diagnosed with atypical community-acquired pneumonia (normal chest radiograph), and returned four days later for persistent symptoms as well as nausea, vomiting, fever and right upper quadrant pain. Pertinent labs revealed an elevated alkaline phosphatase of 201 (normal <126) units/L, an elevated bilirubin of 5.0 mg/dL and a leukocytosis of 14,000/ μ L. A computed tomograph of the abdomen revealed an

eight by six centimeter abscess (see Figure 1) in the right hepatic lobe. He was admitted to the hospital and subsequently developed septic shock and respiratory distress. In the intensive care unit, the abscess was aspirated and drained (revealing ampicillin-resistant *Klebsiella pneumoniae*). Piperacillin/tazobactam was initially begun, then switched to ciprofloxacin and metronidazole with significant radiographic improvement on prolonged oral therapy.

Case 2

A 56 year old Hawaiian insulin-dependent diabetic man presented to a community hospital with fever to 101° Fahrenheit, rigors, nausea, vomiting, diarrhea, hyperglycemia and septic shock. He reported similar symptoms at home one week prior with spontaneous resolution. On presentation, pertinent labs revealed an elevated alkaline phosphatase of 501 units/L, a total bilirubin of 1.6 mg/dL and a leukocytosis of 17,000/ μ L. Computed tomography demonstrated a ten by six centimeter bilobed liver abscess (see Figure 2) which was aspirated, revealing ampicillin-resistant *Klebsiella pneumoniae*. Cefotaxime and vancomycin were begun intravenously and he was transferred to Tripler Army Medical Center one week later after stabilization. At Tripler, the abscess was drained and antibiotics were switched to ceftriaxone and metronidazole. The abscess decreased in size on computed tomography scan and after continued clinical improvement, his antibiotics were switched to amoxicillin/clavulanate. The drain was removed three days after oral therapy began, and due to local inflammation at the drainage site, the drain was replaced. Due to negative culture growth, the drain was again removed four days later and he continued to improve clinically on prolonged oral antibiotics.

Discussion

A Taiwan study¹ (see Table 1) comparing patients with pyogenic liver abscesses found most patients with *K. pneumoniae* abscesses had diabetes or glucose intolerance compared to polymicrobial liver abscess control subjects. The patients with *K. pneumoniae* abscesses

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also had minimal associated intraabdominal pathology and lower mortality and relapse rates compared to the polymicrobial subjects. This may have been due to higher rates of septic shock or other associated pathology or inadequate drainage or antibiotic therapy in the control subjects. *Klebsiella pneumoniae* pyogenic abscesses were single or multiple, often with metastatic infection (12%). *Klebsiella pneumoniae* serotype K1 has a higher rate of developing endophthalmitis, for which ceftriaxone is a drug of choice due to its high concentration in aqueous humor.² All strains of *K. pneumoniae* were resistant to ampicillin, with variable resistance to ticarcillin/carbencillin. *Klebsiella pneumoniae* abscesses may be associated with gas formation (nitrogen, oxygen, carbon dioxide and hydrogen) due to fermentation of glucose.³

Effects of diabetes appear to interfere with neutrophil chemotaxis and phagocytosis, and may affect Kupffer cells similarly.^{4,5} Macrophages of diabetic mice have altered function and morphology related to underlying common inflammatory and degenerative manifestations of diabetes mellitus.⁶ Macrophages have altered expression of tumor necrosis factor- α , lipoprotein lipase⁷ and nitric oxide as well as inhibition of interleukin-4 induced activation of macrophages.⁸ Polymorphonuclear neutrophils demonstrate impaired adherence, chemotaxis, phagocytosis, and bactericidal activity in diabetics.⁹

Primary *Klebsiella pneumoniae* liver abscesses with limited antibiotic resistance have been reported as an emerging clinical entity among diabetics in various parts of the world including China,¹⁰ Grenada,¹¹ Singapore,¹² the US¹³ and Korea.¹⁴ When a liver abscess is diagnosed, appropriate therapy consists of adequate surgical or percutaneous drainage and administration of antibiotics until the abscess has completely resolved. *Klebsiella pneumoniae* liver abscesses are relatively benign if found early and treated adequately with good clinical response and low rates of mortality and relapse compared to polymicrobial abscesses. *Klebsiella pneumoniae* abscesses have an increased rate of metastatic infection, and may rupture or precede sepsis, portending a worse prognosis. A high index of suspicion is required to identify these cases in diabetics with *Klebsiella pneumoniae* bacteremia or fever of unknown origin.

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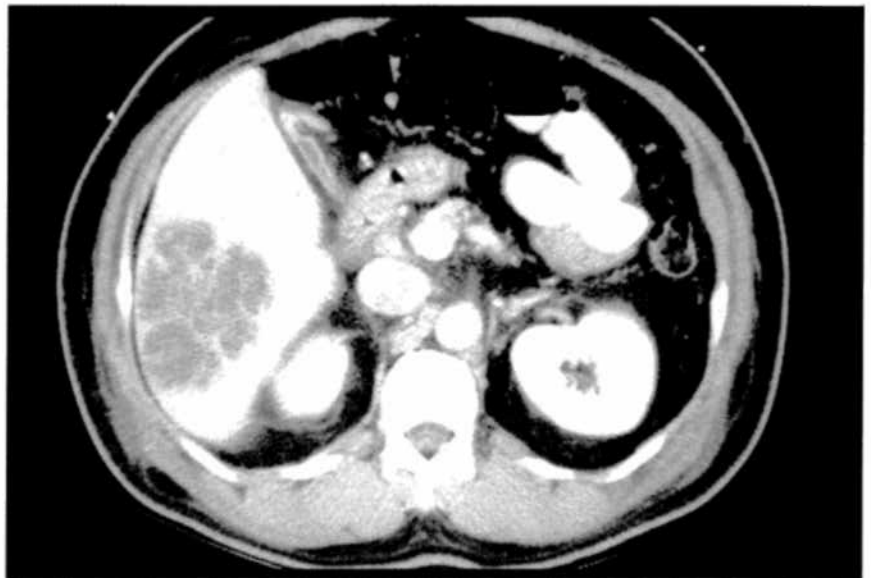


Figure 1.— Eight by six centimeter hepatic abscess.

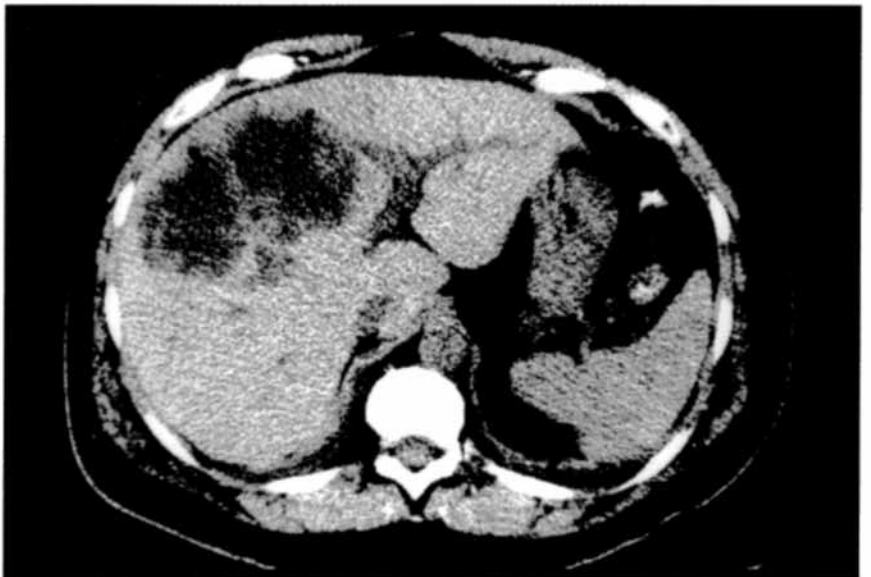


Figure 2.— Ten by six centimeter bilobed hepatic abscess.

Table 1.— Comparison of patients with *K. pneumoniae* or polymicrobial liver abscesses.

Taiwan study ¹ of 182 patients with liver abscesses		
Liver Abscess 1° Bacteria	<i>K. pneumoniae</i>	Polymicrobial
Patient Number	160	22
Diabetes or Glucose Intolerance	75%	<5%
1° Intraabdominal Pathology (e.g. ruptured appendix)	0.6%	95%
Evidence of Metastatic Infection	12%	0%
Relapse Rate	4%	41%
Mortality Rate	11%	41%

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