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## Title

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## An Unusual Presentation of a Liver Abscess: Klebsiella Liver Abscess Syndrome Disproportionately in East Asian Patients

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### Introduction

Klebsiella Liver Abscess Syndrome (KLAS) is a monomicrobial infection that disproportionately affects patients of East Asian ethnicity. Many studies have demonstrated its epidemiologic predilection and suggested potential mechanisms for its pathogenic niche and clinical manifestations. We report an otherwise healthy 29-year-old Chinese male who presented with sepsis, headache, and myalgias for three days prior to admission. Although an unlikely diagnosis for a young, otherwise healthy patient with no major risk factors, the diagnosis should be considered given its epidemiologic tendencies and its metastatic potential.

### **Case Presentation**

A 29-year-old male with history of gallbladder polyps and Gilbert Syndrome presented with headaches, myalgias and fevers for three days. One day prior, he was evaluated at his ambulatory office and found to have elevated liver tests and leukocytosis. His symptoms worsened and he was admitted through the emergency department. On admission, he reported persistent headaches, myalgias, tea-colored urine, and dull RUQ and epigastric abdominal pain. He denied any recent travel history or sick contacts. Vital signs were notable for temperature of 104F, heart rate of 115 bpm, with other vital signs within normal limits. Pertinent exam findings included scleral icterus, jaundice of upper extremities, mild epigastric tenderness on palpation with no rebound or guarding, no neck rigidity, and unremarkable neurologic exam. Laboratory results on admission showed elevated liver function tests, leukocytosis, and hyperglycemia despite no history of diabetes. Further evaluation included HgbA1c of 5.5% and negative hepatitis viral serologies. Other extensive infectious work-up was also unremarkable. The patient was empirically started on ceftriaxone and metronidazole. CT scan showed a multiloculated 48x42 mm hepatic abscess in the right hepatic lobe (Figure 1). Shortly thereafter, Interventional Radiology performed a CTguided placement of a drain into the abscess. During the hospitalization, blood cultures from his outpatient clinic and aspirate culture from the drain were positive for speciated mucoid Klebsiella pneumoniae. The patient improved and was transitioned to oral ciprofloxacin 500 mg twice daily based on microbial sensitivities. Repeat CT scan eight days later showed a decrease in size of the abscess to 15x27 mm. The drain was subsequently removed. The patient remained afebrile for several days before discharge. He was followed closely by

Infectious Disease as outpatient and continued to show improvement clinically and objectively via interval CT imaging showing resolving abscess.



Figure 1.

### Discussion

Liver abscesses are rare and commonly are polymicrobial. However, numerous cases of monomicrobial Klebsiella pneumoniae abscesses have been reported worldwide and show a predisposition for patients of East Asian ethnicity.<sup>1-8</sup> Our patient, who is a young and otherwise healthy Chinese male, shares many similarities with the presentations and demographics of these cases. Prior research studies report potential mechanisms of KLAS and potential explanations for increased risk in East Asians. Some showed close association of KLAS specifically with the hyper-mucoviscous phenotype of K1 and K2 Klebsiella pneumoniae species.<sup>9-12</sup> Of note, the magA gene and rmpA genes have been isolated from serotypes K1 and K2 strains and specifically code for the hyper-mucoviscous phenotype. This particular phenotype has been shown in studies from Yu et al. to have a specific affinity for purulent tissue infections, particularly in liver, lung, psoas muscle, and other focal abscesses.<sup>10,12</sup>

An epidemiologic study reported patients of Chinese ethnicity specifically have K1 and K2 Klebsiella pneumoniae naturally

colonized in their intestinal flora.<sup>13</sup> Lin et al. suggested that Chinese ethnicity itself may be partially linked to the increased prevalence of KLAS in Asian countries.<sup>13</sup> One of the strongest risk factors in studies of KLAS is hyperglycemia.<sup>8,14</sup> Although there are many etiologies for hyperglycemia, our otherwise healthy patient had persistently elevated blood sugars during the admission despite no history of diabetes and a normal HgbA1c. The mechanism can be multifactorial but KLAS may play a role and may contribute to the patient's overall clinical picture.

Our patient's clinical presentation is similar to many reported cases worldwide. These symptoms include fever, abdominal pain, and leukocytosis.<sup>2,7</sup> Some have also shown a male predominance and a higher incidence of a focal lesion within the right hepatic lobe, as with our patient.<sup>2,15</sup> In addition, multiple worldwide cases of metastatic KLAS complications have been reported, which include meningitis and endophthalmitis.<sup>8,16,17</sup> Although our patient did not develop these complications, we monitored closely for metastatic signs both during hospitalization and subsequent outpatient follow-up. Additionally, our use of both CT-guided drain placement and antibiotics was supported as the best option when compared with monotherapy.<sup>15</sup> Recognition of this syndrome was critical to the treatment and subsequent monitoring, and provided insight on the etiology of a disease that occurred in an otherwise young, healthy individual.

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