

Klebsiella pneumoniae liver abscess

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A 63-year-old Japanese man with diabetes mellitus was admitted because of high fever. Before a detailed clinical evaluation could be performed, he suffered a bout of shivering and suddenly died. An autopsy revealed liver abscesses, for which pus smears showed many large Gram-negative bacilli with capsule formation (Figure 1). Septic emboli were apparent in many organs. In the lungs, purulent pneumonia and alveolar hemorrhage were also evident. Cultures of blood and liver abscesses demonstrated growth of *Klebsiella pneumoniae* (*K. pneumoniae*). Spreading of *K. pneumoniae* colonies on agar plates resulted in formation of strings >5 mm in length, demonstrating a hypermucoviscosity phenotype (Figure 2). The patient was finally diagnosed as dying of septic shock due to “*Klebsiella pneumoniae* liver abscess” (KPLA).^{1,2}

KPLA is clinically characterized by liver abscesses and consequent bloodstream pyogenic infections such as endophthalmitis and meningitis. KPLA is generally no longer fatal but causes catastrophic disabilities due to irreversible ocular and central nervous system complications.¹⁻³ Prevalence of KPLA has been observed worldwide with predominance in Southeast Asia.¹ Diabetes mellitus and an Asian ancestry are known to be predisposition factors.^{1,2} KPLA is caused by hypervirulent strains of *K. pneumoniae*, which feature a hypermucoviscosity phenotype and expression of capsular K1 or K2 antigens as well as *magA* (mucoviscosity-associated gene A)

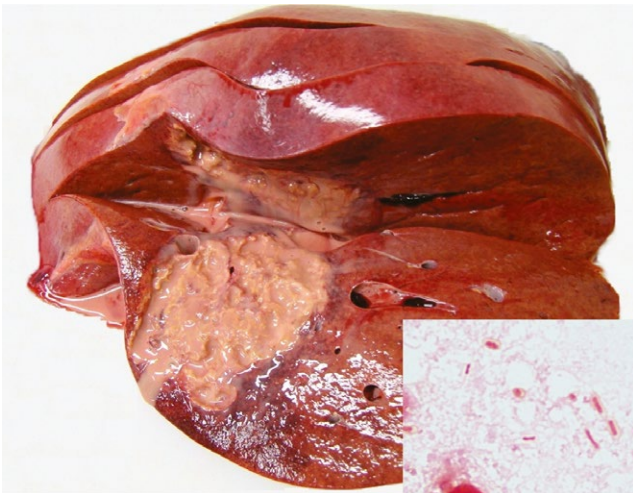


FIGURE 1 Autopsy findings of the liver: Liver abscess, measuring 7 cm in long diameter, is full of pus and debris. Inset, Gram stain examination of the pus reveals many large Gram-negative bacilli with capsule formation (original magnification $\times 1000$ with oil immersion)

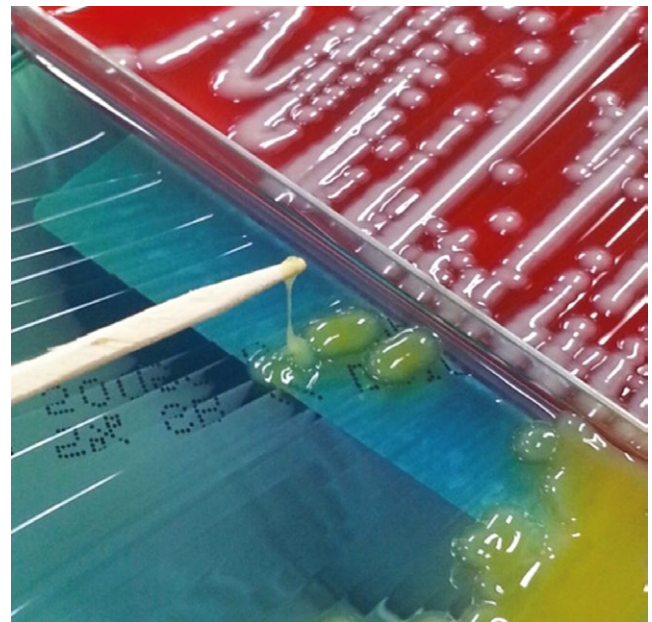


FIGURE 2 String test: Spreading *K. pneumoniae* colonies on the agar plate forms a string >5 mm in length, demonstrating a hypermucoviscosity phenotype

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and/or *rmpA* (regulator of mucoid phenotype A) genes. The hypermucoviscosity phenotype is defined by the string test, which monitors the formation of viscous strings of greater than 5 mm in length on spreading with an inoculation loop. The hypervirulent strains of *K. pneumoniae* (also known as serotype K1-*K. pneumoniae*) have been reported not only in Asian countries but also in other areas of the world.^{1,3}

For KPLA, early diagnosis and aggressive therapy are essential to prevent serious complications. Therefore, awareness of clinical symptoms is important. Gram stain examination of purulent discharges from liver abscesses can lead to immediate pathognomonic diagnosis. Therefore, generalist physicians, as potential first-line physicians or consultants, should be familiar with the characteristic morphology of *K. pneumoniae*, that is, "large Gram-negative bacilli with capsule formation". Furthermore, for rapid detection of hypervirulent strains, the string test should be well recognized and aggressively employed as a useful method that can be easily performed in community hospital laboratories.⁴

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CONFLICT OF INTEREST

The author has stated explicitly that there are no conflicts of interest in connection with this article.

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