

# Hypermucoviscous *Klebsiella pneumoniae* liver abscess requiring liver resection

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## DESCRIPTION

A 41-year-old healthy woman from China presented to her local hospital with a 4-day history of fevers, malaise and epigastric pain. On examination, she had localised right upper quadrant abdominal pain on palpation. Laboratory investigations showed leukocytosis ( $13.8 \times 10^9/L$ ), thrombocytopenia ( $82 \times 10^9/L$ ) and elevated alanine transaminase (184 U/L). An abdominal CT scan revealed a  $10 \times 8 \times 9$  cm multiloculated collection within the right liver lobe, with a second nodular septated collection under the left subcapsular region (figure 1). Her blood cultures returned positive for *Klebsiella pneumoniae*, resistant to ampicillin and susceptible to ceftazidime, ciprofloxacin and meropenem. She was admitted to hospital and started on ceftriaxone.

Diagnostic and therapeutic ultrasound-guided 10F drains were inserted into both abscesses by interventional radiology, which drained purulent fluid positive for *K. pneumoniae* with identical susceptibility patterns as her blood cultures. However, she remained persistently febrile over the following 9 days. Despite upsizing to 12F drains, the viscosity of the fluid led to inadequate drainage, and repeat imaging showed minimal change in the size of the collections. Ultimately, she was transferred to our centre for assessment by hepatobiliary surgery.

Given the multiple loculated abscesses, and lack of clinical and radiographic response after at least 5 days of optimal antimicrobial and interventional therapy, the abscesses were surgically debrided with an open liver resection of segments 2/3 and 6/7 (figure 2). As most deep-seated abscesses,



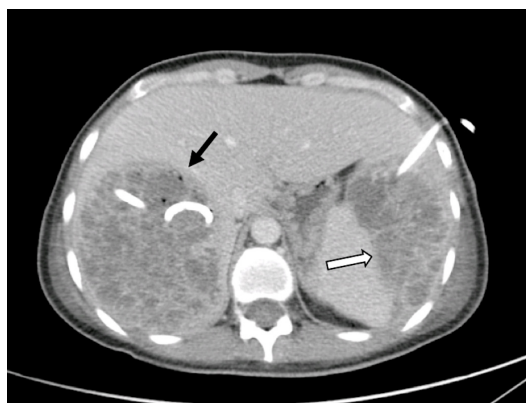
**Figure 2** Resected segments 6/7 of the same patient revealing the multiloculated cystic and necrotic liver abscess with the interventional radiology drain in situ.

particularly visceral, require >4 weeks of antibiotics, she completed a 6-week course of ceftriaxone from the time of surgical resection. A repeat abdominal CT was done to confirm no evidence of recurrent or new collections. She was seen in follow-up 6 months later and remained well, without any recurrent fevers or abdominal pain.

Hypervirulent (hypermucoviscous) *K. pneumoniae* (hvKP) was first described in the Asian Pacific Rim during the mid-1980s but is now increasingly recognised in Western countries. Infection has been associated with diabetes mellitus, middle-aged Asian men, hypertension and fatty liver.<sup>1</sup>

As seen in our case, patients typically present with a unique clinical syndrome of community-acquired bacteraemia and pyogenic liver abscesses, with a propensity for metastases to distant sites in 10%–15% of cases.<sup>1</sup> Complications include meningitis, brain abscesses, endophthalmitis, infective endocarditis, septic pulmonary emboli, empyema, splenic abscess, spontaneous bacterial peritonitis, osteomyelitis and complicated skin and soft tissue infections. As a result, hvKP is associated with significant morbidity and mortality, ranging from 3% to 42%.<sup>1</sup>

Management of pyogenic liver abscesses due to hvKP requires antimicrobial therapy in conjunction with source control of hepatic and other metastatic sites. Interestingly, hvKP isolates have been reported to be more susceptible to several antimicrobial agents compared with non-hvKP isolates,<sup>2</sup> specifically to ampicillin/sulbactam, ceftriaxone, ceftazidime, ciprofloxacin and levofloxacin. However, there have been increasing reports



**Figure 1** Abdominal CT showing large multiloculated liver abscesses in segments 2/3 of the left liver lobe (white arrow) and segments 6/7 of the right liver lobe (black arrow).



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## Images in...

of multidrug-resistant, including carbapenem-resistant, hvKP isolates.<sup>2</sup>

Drainage of liver abscesses has become less invasive with percutaneous drainage, sometimes repeated, with good outcomes when compared with open surgical drainage. However, for liver abscesses greater than 5 cm, surgical drainage provides better clinical outcomes than percutaneous drainage with respect to less treatment failures, fewer numbers of secondary procedures, shorter length of hospitalisation and no difference in morbidity and mortality rates.<sup>3</sup> Thus, while antimicrobial treatment and percutaneous drainage are first-line treatment options, surgical resection should be considered in the following situations: liver

abscess not amenable to percutaneous drainage, ruptured liver abscess, lack of clinical improvement with optimal antimicrobial therapy and percutaneous drain and concomitant pathologies that require surgical intervention.<sup>3</sup> A less invasive laparoscopic approach could be considered if the liver abscess was in a favourable location.

This case stresses the importance of considering surgical resection when patients have multiple large, non-liquefied, multiloculated liver abscesses with inadequate percutaneous drainage, which may lead improved outcomes and faster recovery.

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## Learning points

- ▶ Hypervirulent (hypermucoviscous) *Klebsiella pneumoniae* (hvKP), while first described in the mid-1980s, is an increasingly recognised cause of pyogenic liver abscesses, often seen in middle-aged Asian patients with diabetes.
- ▶ hvKP should be considered in patients presenting with a pyogenic liver abscess without other risk factors or conditions associated with traditional routes of infection.
- ▶ Treatment of hvKP liver abscesses requires a combined approach of antimicrobial therapy and source control, with early consideration for surgical drainage if patients have multiple large, non-liquefied, multiloculated liver abscesses that have failed percutaneous drainage.

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