Two cases of *Klebsiella pneumoniae* liver abscess necessitating liver resection for effective treatment

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ABSTRACT

We report two British cases of liver abscess, due to *Klebsiella pneumoniae* and associated with synchronous infection elsewhere, which required liver resection for definitive treatment. They illustrate the geographic spread of aggressive *K pneumoniae* liver infection and demonstrate the importance of early aggressive treatment.

KEYWORDS

Klebsiella pneumoniae – Pyogenic liver abscess – Hepatectomy – Metastatic abscess – *Klebsiella* liver abscess syndrome

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In the 1980s mucoviscous strains of *Klebsiella pneumoniae* were identified as a cause of liver abscess in diabetics in south east Asia. In the past decade, cases have been reported in North America and Europe but mostly in immigrants or travellers from east Asia. *K pneumoniae* liver abscess is associated with haematogenous dissemination and secondary foci of infection, particularly in the eye. More recently, *K pneumoniae* liver abscess has been seen in non-diabetic patients. Definitive treatment with drainage, percutaneously in the first instance, is important to secure a good outcome. We report two cases of *K pneumoniae* liver abscess in Wales that were associated with synchronous infection in the hallux and parotid gland, respectively. Both cases required laparotomy and liver resection to achieve source control, and highlight the ongoing geographic spread of this challenging condition.

Case 1

A 74-year-old woman presented to a district hospital with a 2-day history of confusion and right upper quadrant pain. She was febrile (38.9°C) with a distended abdomen and tenderness in the right upper quadrant. She suffered from chronic obstructive pulmonary disease, hypothyroidism and osteoarthritis; she was not diabetic. She had undergone an osteotomy and plate insertion for hallux valgus nine weeks prior to presentation with abdominal symptoms. She developed a wound infection and the plate was removed four weeks prior to presentation, at which point the wound had almost healed. Wound swabs showed a Gram-negative *Bacillus* on microscopy.

Ultrasonography showed a multiloculated abscess in segments 2 and 3 of the patient's liver so a drain was

inserted, and pus was sent for microscopy and culture. This grew *K pneumoniae*, sensitive to meropenem. She underwent computed tomography (CT) (Fig 1).

The patient developed acute kidney injury (creatinine 507mol/l) and a severe acute phase response persisted (white cell count $39.8 \times 10^9/l$). Her bilirubin was within the normal range. She was transferred to our tertiary unit and we decided to perform a laparotomy for definitive treatment. At laparotomy, we found a large multiloculated abscess replacing the left liver, extending into segment 4a. The right lobe and the gallbladder were normal. There was over a litre of turbid free fluid distributed across all four quadrants of the abdomen. The left branch of the portal vein and the left hepatic vein were thrombosed. We mobilised the left lobe and debrided the abscess cavity, performing an atypical left lateral sectionectomy. Following surgery, she made a good recovery.

Case 2

A 51-year-old man was admitted with malaise, left facial swelling and diarrhoea. He had received a kidney transplant 15 years previously, with good graft function on azathioprine and tacrolimus for immunosuppression. On examination, his temperature was 36.3°C, his blood pressure was 81/45mmHg and his Glasgow coma score was 14/15. He had a swelling over his left masseter and serous discharge from his left ear. The abdomen was soft with no organomegaly.

Initial blood tests showed: white cell count $4.9 \times 10^9/l$, C-reactive protein 317mg/l, bilirubin 45mol/l, creatinine 452mol and glucose 42 mmol/l. Blood cultures grew *K pneumoniae* and methicillin sensitive *Staphylococcus aureus*. The patient failed to respond to intravenous antibiotics

Figure 1 Computed tomography showing an abscess in the left lateral segments of the liver (asterisk) and a previously inserted pigtail drainage catheter (arrowhead)

Figure 2 Computed tomography showing a multiloculated abscess in segment 2 of the liver (white arrowhead) and a small abscess in the right liver (black arrowhead)

and further investigations were undertaken. Polymerase chain reaction of serum showed Epstein–Barr virus deoxy-ribonucleic acid (127 copies/ml). Computed tomography confirmed left parotitis and unexpectedly showed multiple small hypodense liver lesions, predominantly in segment 2 but also in the right lobe (Fig 2). They were not suitable for percutaneous drainage.

At laparotomy, a swollen liver was found with a large left lateral segment deviating the falciform ligament to the right. Intraoperative ultrasonography was used to delineate and resect the focus, which amounted to a partial segment 2 resection. The samples grew *K pneumoniae*. The patient made a good recovery following surgery.

Discussion

K pneumoniae can cause liver abscesses with a variety of local complications even in immunocompetent patients. There are reports of abscess rupture leading to pneumoperitoneum, hepatoduodenal fistula, pleural empyema and in three cases, cardiac tamponade from rupture into the pericardial space. Hepatic vein thrombosis, as seen in our first case, has been reported previously,¹ and several cases of limb and renal vein thrombosis have been reported in association with *K pneumoniae* liver abscess.²

Haematogenous seeding of ‘metastatic’ abscesses occurs most commonly in the eye: 3 of 58 cases in one series also developed endophthalmitis.³ Septic emboli to the lung cause multiple peripheral abscesses. There are also reports of spread to the brain, meninges, kidney, bone, epididymis and prostate; of mitral valve endocarditis; of emphysematous cystitis; and of necrotising fasciitis. Our cases both had synchronous infection elsewhere at diagnosis, in the hallux and parotid gland (associated with Epstein–Barr virus infection) respectively.

Early reports of *Klebsiella* liver abscess were exclusively from east Asia, most notably Taiwan. Recent reports from Europe and the US are mostly of immigrants from Taiwan, the Philippines and Korea. There are only ten reported cases in native continental Europeans. A series from London reported in 2014 contained only three cases from non-diabetic Caucasians and only one confirmed *K pneumoniae* in the abscess aspirate.⁴ This is the first case series from Wales, of two white non-diabetic British patients with no travel history. Awareness of this condition’s varied clinical presentation is important; our second case had no abdominal signs on presentation.

Some centres advocate surgical drainage for liver abscesses of >5cm but with repeated attempts percutaneous drainage can still be successful.⁵ However, the severity of infection in case 1 precluded repeated attempts at drainage, and our approach was vindicated by operative findings of diffuse abdominal contamination and the necessity for an atypical liver resection. Case 2 had a large number of small loculated abscesses with only partial liquification and was therefore not structurally amenable to percutaneous drainage. These cases highlight the virulence of this pathogen and the frequent necessity for liver resection to achieve source control.

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