

# *Aeromonas hydrophila* bacteraemia and portal pyaemia

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## ABSTRACT

The *Aeromonas* species uncommonly cause disease in humans. We report portal pyaemia secondary to *Aeromonas hydrophila* bacteraemia occurring in a 71-year-old Chinese man with no history of hepatobiliary disease or malignancy. He presented with fever, rigors and abdominal bloating for four days and was subsequently found to have *Aeromonas hydrophila* bacteraemia, portal vein thrombosis and a psoas abscess. He was treated with ciprofloxacin and had a good recovery. *Aeromonas hydrophila* infection is an uncommon cause of intestinal and extraintestinal infection in man, but must be suspected in immunocompromised hosts and in those exposed to brackish or salt water.

**Keywords:** *Aeromonas hydrophila*, bacteraemia, portal vein thrombosis, psoas abscess

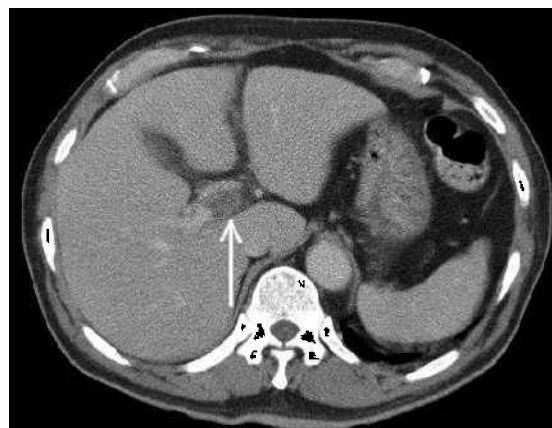
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## INTRODUCTION

Five species of *Aeromonas* have been associated with disease in humans, and more than 85% are caused by *Aeromonas hydrophila*, *Aeromonas caviae* and *Aeromonas veronii*.<sup>(1)</sup> They are gram-negative bacteria that proliferate in fresh water and soil, and they produce  $\beta$ -lactamase. They may cause bacterial gastroenteritis, sepsis and bacteraemia in infants with multiple medical problems and in immunocompromised hosts, especially those with malignant or hepatobiliary diseases.<sup>(1)</sup> Sepsis may also occur as a result of contamination of wounds from fresh water or soil sources,<sup>(2)</sup> or with the use of medicinal leeches.<sup>(3)</sup> *Aeromonas* species is an uncommon cause of hepatobiliary infection in man.

## CASE REPORT

A 71-year-old Chinese man was admitted with a four-day history of fever with rigors and abdominal discomfort. He was not vomiting and had no bowel or urinary symptoms. He had no travel history, but was a heavy smoker and drank about 20 units of alcohol per week. He was a retired cook, and his hobby was fishing with a line and hook in the sea. Past medical history included hypertension on enalapril and nifedipine and diabetes mellitus on diet, both well-controlled. He was allergic to amoxycillin. On examination, he was febrile at 38°C. His blood pressure



**Fig. 1** Contrast-enhanced axial CT image taken in the portal venous phase shows a thrombus (arrow) in the main left portal vein. There is no tumour or abscess in the liver. No biliary sepsis is identified.

was 110/60 mmHg with a heart rate of 96 beats per minute. He was jaundiced, had palmar erythema but no ankle oedema, no finger clubbing, no spider naevi and no evidence of any skin injury or infection. His heart sounds and lungs were normal to examination. The abdomen was soft with no mass palpable, but there was tenderness over the right upper quadrant.

Laboratory investigations showed: haemoglobin 15.1 (14–18) g/dL, total white cell count 12.2 (4–10)  $10^9$ /L, neutrophils 91 (40–75) %, platelet count 26 (140–440)  $10^9$ /L, urea 13.4 (2.8–7.7) mmol/L, creatinine 121 (63–110)  $\mu$ mol/L, sodium 129 (135–145) mmol/L, potassium 3.9 (3.3–4.9) mmol/L, chloride 93 (96–108) mmol/L, glucose 12 (3.9–11) mmol/L, amylase 71 (44–161) U/L, aspartate transaminase 65 (15–33) U/L, alanine transaminase 73 (7–36) U/L, alkaline phosphatase 195 (32–103) U/L, bilirubin 52 (3–24)  $\mu$ mol/L, gamma glutamyl transferase 207 (11–63) U/L, protein 57 (62–82) g/L, albumin 26 (37–51) g/L. Carcinoembryonic antigen, CA 19-9 and alpha-fetoprotein were normal. Blood film for malarial parasites, hepatitis B surface antigen, hepatitis B core IgM antibody and dengue IgM were negative.

Chest radiograph was normal. Computed tomography (CT) showed a thrombus in the main left portal vein (Fig. 1). There was no tumour or abscess in the liver. No biliary sepsis was identified. Incidental findings included multiple colonic diverticuli and bilateral renal calculi. The thrombophilia screen was normal. Doppler ultrasonography of the liver showed left portal vein

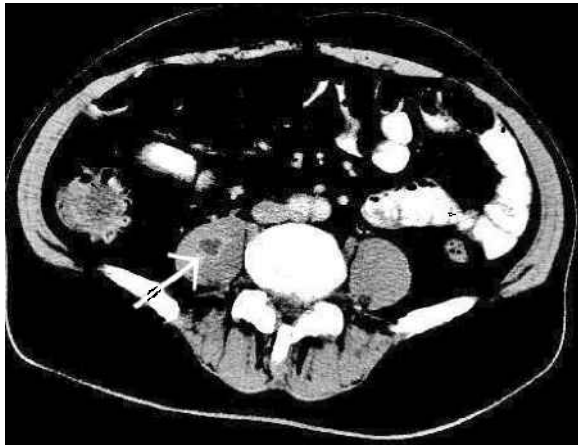
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**Fig. 2** Contrast-enhanced axial CT image shows a ring-enhancing lesion in the right psoas muscle (arrow). It measures about 1.2 cm and is consistent with an intramuscular abscess. There is no destruction of the adjacent lumbar spine.

thrombosis, but there were normal right portopetal flow and patent hepatic veins. He was initially diagnosed as a case of abdominal sepsis, and treated with intravenous ciprofloxacin and metronidazole. He made a gradual recovery, and became asymptomatic and afebrile within a few days. The platelet counts normalised without transfusion, liver function test improved, and white cell count, urea, creatinine and electrolytes became normal. The blood sugar levels subsequently remained normal during the course of the illness. The first anaerobic blood culture grew *Aeromonas hydrophila*.

Repeat CT of the abdomen and pelvis 12 days after the initiation of antibiotic therapy showed no interval change in the left portal vein thrombosis with no evidence of any bile or pancreatic duct dilatation. However, there was a ring-enhancing lesion in right psoas muscle, measuring about 1.2 cm, which was consistent with an intramuscular abscess (Fig. 2). When the second set of blood cultures taken one week after starting treatment became negative, metronidazole was discontinued and the patient was discharged on oral ciprofloxacin. Follow-up CT after two months of ciprofloxacin therapy showed resolution of the thrombus in the main left portal vein and complete resolution of the right psoas muscle abscess. The liver function test reverted to normal.

## DISCUSSION

*Aeromonas* are ubiquitous bacteria that are native to aquatic environments, and have been found in fresh, brackish, estuarine, marine, chlorinated and unchlorinated water supplies worldwide.<sup>(4)</sup> The tropical climate of Singapore, and the presence of both freshwater and marine aquaculture, may facilitate the exposure of humans to *Aeromonas*, but severe human infections rarely occur.<sup>(5)</sup> Genotyping of eight virulent strains of *Aeromonas* recently studied at the National University of Singapore revealed

19 putative virulent factors.<sup>(6)</sup>

Our patient was initially thought to have cholangitis in view of the triad of fever, jaundice and right upper quadrant tenderness. He was treated with intravenous ciprofloxacin and metronidazole as he was allergic to penicillin. However, when CT of abdomen revealed portal vein thrombosis, and *Aeromonas hydrophila* was isolated from blood cultures, the diagnosis of portal pyaemia due to *Aeromonas hydrophila* was established. The patient did not have any evidence of injury to the skin and had no exposure to contaminated brackish water or soil. However, his participation in a salt water-related activity, diabetes mellitus and probable underlying alcoholic liver disease may have contributed to the development of *Aeromonas* bacteraemia.

Clark and Chenoweth in 2003 reviewed 126 patients from whom the *Aeromonas* species was isolated over a seven-year period.<sup>(7)</sup> They identified 17 episodes of involvement of the hepatobiliary system in 15 patients. They observed that cholangitis accounted for the majority of the episodes (13 of 17). During that same period, 980 patients were admitted with cholangitis, thus *Aeromonas* infection of the biliary tract accounted for 1.3% of admissions due to cholangitis. All the 15 patients had evidence of bile or pancreatic duct obstruction caused by calculi (seven patients), cholangiocarcinoma (three patients), pancreatic cancer (three patients), non-malignant stricture (six patients) and necrotising pancreatitis (one patient). Our patient did not have any evidence of bile or pancreatic duct obstruction or malignancy.

Portal pyaemia (pyelphlebitis) is septic thrombophlebitis of the portal venous system characterised by high fever, rigors and abdominal pain, and our patient had all these features. It is rare, but should be suspected in patients with intraabdominal sepsis associated with liver function abnormalities.<sup>(8)</sup> Plemmons et al in 1995 identified a precipitating focus of infection (most commonly, diverticulitis) in 68% and bacteraemia in 88% of the patients. The most common blood isolates were *Bacteroides fragilis*, gram-negative bacilli (mostly *Escherichia coli*) and aerobic streptococci.<sup>(9)</sup> Diagnosis is made radiologically, and management comprises appropriate antibiotic cover and drainage or resection of the underlying septic source. The role of anticoagulation is controversial.<sup>(10)</sup>

Our patient had *Aeromonas hydrophila* bacteraemia. *Aeromonas* species produce a  $\beta$ -lactamase and are therefore resistant to penicillins and first-generation cephalosporins.<sup>(11)</sup> Antimicrobial agents most active against *Aeromonas* are third-generation cephalosporins, carbapenems and quinolones. He was prescribed ciprofloxacin as he was allergic to amoxycillin, and was therefore fortuitously provided an appropriate antibiotic from initial presentation. In summary, we believe that

this is the first reported case of *Aeromonas hydrophila* bacteraemia with portal pyaemia and psoas abscess in a patient with no obvious intraabdominal sepsis. The *Aeromonas* species, though uncommon, is an important cause of hepatobiliary infection, especially in those with impaired biliary drainage due to calculi, neoplasm or surgical intervention.

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