Fatal Pasteurella dagmatis peritonitis and septicaemia in a patient with cirrhosis: a case report and review of the literature

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CASE REPORT

65 year old woman with biopsy confirmed alcoholic cirrhosis and known portal hypertension with ascites was admitted to hospital complaining of worsening ankle swelling and abdominal distention, abdominal pain, and spontaneous bruising over the previous week. She was at that time drinking one third of a bottle of sherry (seven to eight units of alcohol) each day. She reported having been scratched on her left arm by her dog one week previously.

She was found to be febrile (37°C) and jaundiced with bilateral peripheral oedema to her mid thighs. Her pulse rate was 95 beats/minute, her blood pressure was 115/45 mm Hg, and she had a tender abdomen distended with ascites and bilateral peripheral oedema to her mid thighs. Her pulse rate was 95 beats/minute, her blood pressure was 115/45 mm Hg, and she had a tender abdomen distended with ascites and covered in echymoses. Her left arm was erythematous and warm and the overlying skin was indurated.

Laboratory tests showed a normal white blood cell count (8.2 × 10^9/litre; normal range, 4.0–10.0), deranged liver function tests (bilirubin, 357 μmol/litre; normal range, 0–17; alkaline phosphatase, 153 U/litre; normal range, 40–130; aspartate aminotransferase, 48 U/litre; normal value, > 30), and abnormal synthetic liver function (albumin, 31 g/litre; normal range, 35–50 g/litre; prothrombin time, 32 seconds; normal range, 10–9–14.5).

Abdominal paracentesis yielded blood stained fluid. The ascitic fluid protein was 62 g/litre (indicating an exudate), albumin was 45 g/litre, and the red cell count was > 2160 μl. The sample contained no white blood cells and the Gram stain revealed no organisms.

Treatment was begun with intravenous benzylpenicillin, ciprofloxacin, and metronidazole.

Over the course of the next few hours the patient's condition worsened with a high fever, tachycardia, and hypotension, and despite vigorous attempts at resuscitation she deteriorated very rapidly and died 24 hours after admission.

**MICROBIOLOGY**

Specimens of blood were inoculated into aerobic (vented) and anaerobic (unvented) media (BacT-Alert; Cambridge, UK). Gram negative coccobacilli were isolated from both aerobic and anaerobic bottles after nine and 12 hours, respectively. Ascitic fluid was inoculated into blood culture media as above and also cultured directly on to MacConkey agar, 5% horse blood in Columbia agar (Oxoid, Basingstoke, UK), and chocolate blood agar incubated at 37°C in air and 5% CO2, in addition to Anaerobe Agar (BioConnections, Shipley, UK) incubated at 37°C in an anaerobic cabinet (Don Whitley, Shipley, UK). Direct culture and enrichment cultures of ascitic fluid also grew a Gram negative coccobacillus. These isolates were identified using API 20 NE (Bio-Merieux UK Ltd, Basingstoke, UK). A presumptive identification of Pasteurella multocida was made and the isolate was referred to the laboratory of health care associated infection, Health Protection Agency, Colindale, London, UK. Analysis was carried out using the Sherlock microbial identification system (MIDI Inc, Newark, Delaware, USA), with additional biochemical tests, and the isolate identified as Pasteurella dagmatis. The organism was sensitive in vitro to penicillin, gentamicin, and ciprofloxacin (VITEK system; Bio-Merieux UK Ltd).

**DISCUSSION**

Spontaneous bacterial peritonitis occurs in approximately 15% of patients with cirrhotic liver disease and ascites. The causative organisms are usually enteric Gram negative bacilli or streptococci.\(^1,2\) We report the first case of spontaneous bacterial peritonitis and septicaemia caused by an unusual organism, *P dagmatis*, following a scratch from a domestic animal.

Pasteurella species are Gram negative coccobacilli that commonly colonise the oropharynx of healthy domestic animals—especially cats (90%) and dogs (66%).\(^3,4\) They are well recognised as veterinary pathogens, and over recent years, increasingly commonly as a cause of human infection. *Pasteurella multocida* is the most frequently reported species.

In 1985, members of the genus pasteurella were reclassified into 11 species including *P multocida* and *P dagmatis*.\(^5\) *Pasteurella multocida* and *P dagmatis* cannot be distinguished morphologically and the API 20 NE system, like most commercially available identification systems, cannot distinguish between the two because *P dagmatis* is not in its current database. This explains why the organism in our patient was not immediately recognised as *P dagmatis*. It may also explain the low frequency of reports of *P dagmatis* infection. A positive urease test distinguishes *P dagmatis* from *P multocida*, but...
Take home messages

- We report a case of *Pasteurella dagmatis* peritonitis and septicemia in a patient with cirrhosis, which occurred after she was scratched by a pet dog
- Despite appropriate antibiotic treatment the patient died of the infection
- *Pasteurella dagmatis* is a relatively recently described species, which is rarely reported as a human pathogen, and bacterial peritonitis caused by this organism has not been reported previously
- This species may be misidentified unless commercial identification systems are supplemented by additional biochemical tests
- Because of the high mortality rate, appropriate antibiotic treatment should be instituted as soon as possible, and first line antibiotic treatment should include a β-lactam agent

In our patient, *P. dagmatis* caused spontaneous bacterial peritonitis, septicemia, and ultimately death. In patients with cirrhosis and ascites, only one third of cases of spontaneous bacterial peritonitis are caused by non-enteric organisms. *P. multocida* as a causative organism is particularly rare, with only 15 documented cases. There are no previous reports of *P. dagmatis* in this setting.

*Pasteurella* infection should be suspected as a cause of spontaneous bacterial peritonitis and septicemia in patients immunocompromised by cirrhosis, especially if there is a history of exposure to domestic animals. In view of the high mortality, appropriate antibiotic treatment should be instituted as soon as possible, and first line antibiotic treatment should include a β-lactam agent. Speciation may not influence clinical management, but accurate identification of *pasteurella* to species level will help characterise the prevalence, antibiotic susceptibilities, and pathogenic potential of *P. dagmatis*.

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