Isolation of *Pseudomonas putrefaciens* in Intra-Abdominal Sepsis

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We report the isolation of *Pseudomonas putrefaciens* from an intra-abdominal abscess in a patient with colonic carcinoma and from bile in two patients with biliary tract disease. In all three cases, *P. putrefaciens* was isolated in mixed culture with enteric bacteria.

*Pseudomonas putrefaciens* has rarely been isolated from clinical material. In most cases it was isolated in mixed culture, and its pathogenic role remains uncertain. Sources of isolation etiologically linked to clinical disease were mainly skin ulcers (1, 3, 10) and ear discharge (3, 4, 13).

Although *P. putrefaciens* has been cultured in a patient with infected ascitis (11), this is the first report to our knowledge of isolation of this microorganism from an intra-abdominal abscess and the third of an isolation from human bile (8, 13).

**Case reports.** (i) **Case 1.** A 78-year-old woman was admitted to the hospital with asthenia, anorexia, weight loss, fever (39.5°C), and diarrhea. A diagnosis of adenocarcinoma of the colon was made by colonoscopy and biopsy. Repeated blood cultures were taken. The patient was treated with clindamycin and tobramycin. Seven days later, a sigmoid colostomy was carried out as resection of the primary tumor could not be performed. A paracolic abscess was found and debrided, and pus was sent for culture.

*P. putrefaciens* and *Proteus vulgaris* were isolated. Stool cultures did not yield *P. putrefaciens*. Blood cultures were negative.

(ii) **Case 2.** A 60-year-old man was admitted with acute cholecystitis. Gastrectomy for a perforated duodenal ulcer had been performed 3 years earlier. Four days before entry, the patient developed right colic abdominal pain, nausea, and vomiting. The temperature was 38.5°C. He was treated initially with ampicillin and tobramycin. Cholecystectomy and sphincterotomy were performed 10 days later for common bile duct and gallbladder lithiasis. The postoperative course was uneventful. Microscopic examination of the removed gallbladder demonstrated xanthogranulomatous cholecystitis.

Cultures from gallbladder bile showed profuse growth of *P. putrefaciens* mixed with *Escherichia coli* and *Aeromonas hydrophila*. No anaerobes were found. Blood cultures taken on admission were negative.

(iii) **Case 3.** A 65-year-old woman was admitted with acute cholecystitis. Preoperative prophylaxis with cefamandole was given. Cholecystectomy was performed 5 days later. Lithiasis of the gallbladder was found. The postoperative course had no complications.

Cultures from gallbladder bile yielded five different species: *P. putrefaciens*, *E. coli*, *Enterobacter aerogenes*, *Citrobacter freundii*, and *Klebsiella oxytoca*. Anaerobic culture was negative.

**Bacteriological results.** After overnight incubation, ten colonies were isolated from chocolate agar, blood agar, and MacConkey agar. Identification tests were performed by standard methods (5). In all three cases, isolates were made of gram-negative, nonfermentative, oxidase-positive, H2S-producing rods, easily identified as *P. putrefaciens*. Tests were run in parallel at 27 and 37°C. Similar results were obtained, but saccharolytic activity was better visualized after incubation at 27°C.

Levin divided strains of *P. putrefaciens* into two groups on the basis of their salt tolerance (6). Growth on salmonella-shigella agar and saccharolytic activity tests were added for biotyping by Riley et al. (7). The strain isolated from case 2 failed to grow on salmonella-shigella agar and was not saccharolytic. According to these results it did not fit either of the two groups described. Unfortunately, this strain did not survive in frozen skim milk, and salt tolerance could not be tested. Strains corresponding to cases 1 and 3 did not grow on salmonella-shigella agar, failed to grow in the presence of 6.5% NaCl and were saccharolytic (acid production from glucose, maltose, sucrose and arabinose). They belonged to group 1 of Levin.

Antibiotic susceptibility testing showed that strains were susceptible to a wide variety of

**References**
commonly used antimicrobial agents. Our results agree with descriptions of *P. putrefaciens* as belonging to the rather susceptible group of pseudomonads.

The clinical significance of *P. putrefaciens* remains unclear. In our cases, samples were purulent, and infection was polymicrobial. The presence of other species makes it difficult to determine the real significance of *P. putrefaciens*. Although this microorganism has not been described as part of the normal gastrointestinal flora, the fact of its isolation in mixed culture with bacteria of enteric origin suggests that it is.

Case 1 was an example of opportunistic infection in a compromised patient. The neoplastic and infected necrotic tissues provided good conditions for *P. putrefaciens* growth.

Case 2 had special interest as xanthogranulomatous cholecystitis is an infrequent inflammatory disease of the gallbladder, characterized by the presence of foamy histiocytes containing bile, lipids, and lipofuscin pigment. The lipophilic characteristic of *P. putrefaciens* has been demonstrated as this microorganism is frequently isolated from fatty food, petroleum, and oil brines. Thus, in this case the lipidic nature of the gallbladder wall could be the cause of the presence of *P. putrefaciens* in bile.

Case 3 had no special feature that could be associated with the isolation of *P. putrefaciens* from bile.

Our patients had no postoperative wound infection or bacteremia. As far as we know, only six cases of bacteremia owing to *P. putrefaciens* have been reported. Four were of cutaneous origin (2, 8, 10, 12), one was of respiratory origin (12), and one was of possible biliary origin (9). This last case involved an elderly patient with suppurative cholangitis and bile duct lithiasis.

In our patients, *P. putrefaciens* was probably acting as a secondary invader in poorly vascularized tissues, but the possibility of serious infections and bloodstream invasion must lead one to consider *P. putrefaciens* as a potential pathogen in the future, especially in debilitated patients.

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**LITERATURE CITED**