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Plesiomonas shigelloides in Acute Cholecystitis: a Case Report

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***Plesiomonas shigelloides* was isolated as the sole pathogen from gallbladder bile and wall in a 58-year-old woman with acute cholecystitis. The patient developed an unusual postoperative complication characterized by culture-negative discharge from the wound in combination with extensive abdominal cellulitis and afebrility. Agglutinating antibodies to *P. shigelloides* were demonstrated in the serum of the patient by the microscopic Widal agglutination test.**

The pathogenic role of *Plesiomonas shigelloides* is generally associated with infective gastrointestinal disorders. Rare reports of extraintestinal infection include meningitis and septicemia (1, 4, 5, 8, 11), cellulitis (6, 14), endophthalmitis (3), septic arthritis (7), and pyometra (14). During an investigation of bacterial flora in acute cholecystitis (2), *P. shigelloides* was isolated in pure culture from the gallbladder of a 58-year-old female and possibly incriminated in a postoperative septic complication.

A 58-year-old woman with mild hypertonia was admitted with a 4-day history of colicky upper abdominal pain, vomiting, and subfebrility (maximum, 38.0°C). Two weeks before symptoms developed, the patient had eaten a bad-tasting crab. After the crab meal, the patient noted intermittent obstipation and larger, darker, and looser stools than normal. At the time of admission, the patient was subfebrile (37.7°C) but in fairly good condition. Tenderness in the right subcostal area was marked. Icterus was not seen. Preoperative laboratory data including hemoglobin, leukocyte count, erythrocyte sedimentation rate, bilirubin, alkaline phosphatase, alanine-amino transferase, and serum electrolytes were in the normal range, whereas the urinary amylase level was slightly elevated (61 μkatals/liter; reference level, 2 to 33). A cholescintigram supported the clinical diagnosis of acute cholecystitis. A cholecystectomy was performed on the third hospital day, as the temperature of the patient remained elevated (38.4°C) and symptoms did not abate. No pre- or peroperative antibiotics were given. At the time of the operation, the gallbladder was large, distended, and seriously inflamed, and it contained one concrement. Gallbladder bile and wall were sampled as follows. Immediately after entry into the peritoneal cavity, 5 ml of bile was aspirated and transported in a sealed CO_2-gassed bottle. Bile was sampled also with a cotton swab through the incised organ just after cholecystectomy, and another cotton swab was streaked against the inner gallbladder wall. Finally, a specimen of gallbladder wall tissue (5 by 5 mm) was excised. The three latter samples were transported to the laboratory in Stuart medium. All samples were inoculated onto culture media within a few minutes. Columbia agar with 7.5% blood was used for aerobic and anaerobic cultivation (Gas Pak; BBL Microbiology Systems, Cockeysville, Md.) in addition to thioglycolate broth. After 24 h, all culture plates and broths from the four samples yielded rich and pure growth of a gram-negative rod identified as *P. shigelloides* by API 20E and API 20 NE (Analytab Products, Plainview, N.Y.), verified by E. Falsen, Culture Collection, University of Göteborg, Sweden, and designated as strain CCUG12890 (Table 1). Histological examination showed fibrotic thickening of the gallbladder wall, as well as leukocyte infiltration, bleeding, and necrosis.

Four days postoperatively, the patient developed extensive cellulitis in an area just distal to the wound covering the right side of the abdomen down to the groin. Despite this intense reaction the patient was afebrile. Simultaneously, local wound sepsis with a serous-purulent discharge was seen .The wound was routinely sampled with a cotton swab which was transported in Stuart medium to the laboratory. The sample was incubated aerobically and anaerobically on the same media as described above. At this point in the study, the results of gallbladder bile and wall cultures were not available, and the patient was given penicillin (1.6 g two times daily). Wound cultures were negative, however, and the symptoms vanished in a week. A fecal specimen, collected 10 days postoperatively and cultured on Columbia with 7.5% blood, Drigalski, brilliant green, deoxycholate, and xylose-lysine-deoxycholate agars, yielded no growth of *P. shigelloides*.

An agar dilution method with an inoculum of 10^5 CFU/ml and the SIR system for antibiotic susceptibility testing (13) showed that the microbe was susceptible to sulfamethoxazole, co-trimoxazole, ampicillin, doxycycline, cefuroxime, gentamicin, chloramphenicol, cefoxitin, mecillinam, nitrofurantoin, and nalidixic acid. The bacterium was intermediately susceptible to penicillin and resistant to clindamycin.

Patient serum was collected 1 month and 1 year postoperatively for detection of antibodies against *P. shigelloides*. The microscopic Widal agglutination test (10), slightly modified, was used because the strain was motile. An overnight glucose broth culture (5 μl) incubated at 37°C was mixed with 10 μl of twofold serum dilutions in saline (1/5 to 1/160) on a cover glass. A hollow ground slide ringed with petrolatum was placed over the cover glass, turned over, and incubated at 37°C for 2 h. Motility and aggregation of bacteria were then examined microscopically. Controls included saline, serum samples from 30 blood donors, and

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TABLE 1. Biochemical characteristics of the actual *P. Shigelloides* strain

Method of testing and test	Test result
API 20E	
ONPG[a]	+
Arginine dihydrolase	+
Lysine decarboxylase	+
Ornithine decarboxylase	+
Citrate	−
Hydrogen sulfide	−
Urease	−
Tryptophan deaminase	−
Indole	+
Voges-Proskauer	−
Gelatin	−
Glucose	+
Mannitol	−
Inositol	+
Sorbitol	−
Rhamnose	−
Sucrose	−
Melibiose	−
Amygdalin	−
Arabinose	−
Oxidase	+
API 20 NE	
NO_3 reduction	+
Tryptophanase	+
Glucose fermentation	+
Arginine dihydrolase	+
Urease	−
Esculin	−
Gelatin	−
PNPG[b]	+
Glucose	+
Arabinose	−
Mannose	−
Mannitol	−
N-Acetylglucosamine	+
Maltose	−
Gluconate	+
Caprate	+
Adipate	−
Malate	+
Citrate	−
Phenyl acetate	−
Oxidase	+
Others	
DNase	−
Sensitivity to compound 0/129	+

[a] ONPG, *o*-Nitrophenyl-β-D-galactopyranoside.
[b] PNPG, *p*-Nitrophenyl-β-D-glucoside.

serum samples from five patients with a positive Widal reaction for one of the following antigens: *Salmonella* sp. strain TO, *Salmonella* sp. strain BO, *Salmonella* sp. strain TH, *Brucella* sp., and *Yersinia* sp. The serum sample from the first patient repeatedly had a titer of 1/80, whereas the second serum sample from the same patient yielded a titer of 1/20. All controls were negative (<1/5). Agglutination of patient sera was also performed against other motile gram-negative rods (*Proteus mirabilis*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*) to eliminate the possibility of cross-reaction. These tests were negative. A conventional Widal test was also negative.

P. shigelloides is a facultatively anaerobic or aerobic gram-negative rod resembling members of the family *Enterobacteriacae*, from which it is easily differentiated by a positive oxidase test. The ability to ferment inositol but not mannitol helps to distinguish it from the closely related genus *Aeromonas*.

The normal habitat of *Plesiomonas* sp. is freshwater and salt water. In the case described here, the bad-tasting crab might have served as the source of the organism. The change in character of the stools of the patient after the crab meal supports this theory.

Certain clinical details in this case history remain unclear. Contrary to the typical features of acute cholecystitis, preoperative laboratory data, including erythrocyte sedimentation rate and leukocyte count, were all in the normal range, thus giving no hint of an inflammatory reaction. The extensive postoperative cellulitis covering the right abdominal wall, the absence of fever, and the negative wound cultures in the presence of pus are all puzzling features. We regret that the area with cellulitis was not punctured for aspiration and cultivation of tissue fluid.

As bacterial isolates from bile usually are responsible for postoperative septic events in biliary surgery (9), *P. shigelloides* was considered a possible etiological agent in this patient. Moreover, cellulitis dominates among the few reports in adults of extraintestinal infection with this bacterium (6, 14). Fatal cellulitis and septicemia rapidly progressed after the hand of a 62-year-old woman with sickle cell anemia was pierced with a fish bone (6). On admission, that patient was afebrile, despite the cellulitis of the hand and arm, which in this respect resembled the condition of our patient. Thus, previous reports in the literature support the concept that *P. shigelloides* may cause an unusual clinical picture once it invades the body.

In studies concerning the serology of *P. shigelloides*, at least 40 serotypes consisting of 30 O-antigen groups and 11 H-antigen groups have been established (12). The serological investigation on our patient suggests the presence of agglutinating antibodies. The significant reduction in titer during the year after the acute infection supports this concept. The microscopic Widal agglutination test was useful, although the sensitivity of the method is not known in this context. Sera from healthy blood donors and patients who had systemic infections with enteric pathogens were negative. The serotype of the *P. shigelloides* strain is not known.

In the original study of acute cholecystitis (2), we found that 72% of patients had bactibilia at the time of operation, that bacteria were present early in the progress of disease, and that there was a coincidence in species isolated from postoperative wound sepsis and at the time of operation. This endogenous bacterial source thus represents a risk for postoperative septic complications. The present case suggests that *P. shigelloides* should be added to the list of possible pathogens in acute cholecystitis.

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