Sepsis and Empyema Caused by *Yersinia enterocolitica*

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*Yersinia enterocolitica* is the cause of gastrointestinal infection in the overwhelming majority of recognized cases, although extraintestinal sites are occasionally involved. We report a case of *Y. enterocolitica* septicemia and empyema complicated by the adult respiratory distress syndrome. The organism was also recovered from the patient’s feces by alkaline enrichment and persisted through at least 19 days of antibiotic treatment.

*Yersinia enterocolitica* is a bipolar-staining cocccobacillus in the family Enterobacteriaceae. The increasing interest in this organism has produced both general reviews (5, 16) and reviews covering primarily the bacteriological (6) or infectious disease (12, 14, 23) aspect. Although *Y. enterocolitica* infection usually causes acute gastroenteritis (19, 23), sepsis and infection of extraintestinal sites, most commonly hepatic and splenic abscesses, have been reported (7, 8, 10, 12, 15, 17, 21, 23). Patients with extraintestinal manifestations usually have some serious underlying illness, such as cirrhosis of the liver or a blood dyscrasia (12, 23). We now describe a patient with empyema from whom *Y. enterocolitica* was isolated from blood, pleural fluid, and feces.

**Case report.** A 58-year-old white male with alcoholic liver disease had increasing abdominal pain for 2 weeks and came to the hospital with a 3-day history of pain in his left shoulder and shortness of breath.

On admission the patient was afebrile. He had physical findings consistent with a left-side pleural effusion. The abdomen was tender in the left upper quadrant; the liver was not enlarged, but the spleen was felt 3 cm below the costal margin. His hemoglobin was 9.4 g/dl, the leucocyte count was 9,300/mm³ with a normal differential, and serum sodium was 124 meq/liter. The chest X ray showed a left-side pleural effusion. A liver/spleen scan showed a subcapsular hematoma. Thoracentesis yielded cloudy fluid containing 4,100 erythrocytes and 4,200 leucocytes per mm³, of which 77% were polymorphonuclear. The pleural fluid pH was 7.1. Blood, sputum, urine, and pleural fluid were cultured, and empirical therapy was begun with penicillin and amikacin.

On day 3 in the hospital the patient developed respiratory distress requiring intubation. He was transferred to the medical intensive care unit. A chest X ray showed diffuse interstitial pulmonary edema and reaccumulation of the left-side pleural effusion. The clinical diagnosis of adult respiratory distress syndrome was determined by heart catheterization. The initial pleural fluid and blood cultures grew *Y. enterocolitica* organisms that were susceptible to amikacin. With continued amikacin therapy and tube thoracostomy, the patient defervesced; his respiratory status improved, and his abdominal pain dissipated.

**Microbiology.** *Y. enterocolitica* was isolated from blood and pleural fluid obtained on day 2 in the hospital and from a fecal specimen obtained on day 22, 19 days after the institution of antibiotic therapy. Repeat cultures taken after 30 days were negative. Of the four blood culture sets (a set was two bottles, one containing 45 ml of brain heart infusion broth and the other 45 ml of Schaedler broth; 5 ml of blood was added to each) initially collected over a 6-h period, one bottle was positive. The biochemical characterization of all three isolates indicated a typical *Y. enterocolitica* strain. The tests for urease, DNase, acetoain (by the Voges-Proskauer method) at 25°C, indole at 35°C, fermentation of sucrose, nitrate reduction, and decarboxylation of ornithine were positive. The tests for fermentation of rhamnose, indole at 25°C, and acetoin at 35°C were negative. The API 20E (Analytab Products, Plainview, N.Y.) number was 1154723 at 35°C and 1115723 at 25°C. Motility tests were positive at 25°C and negative at 35°C. Unusual features were the relatively large size of the colonies after a 72-h incubation on blood or MacConkey agar plates at 35°C (isolated colonies measured more than 4 mm) and that indole tests were negative at 25°C and positive at 37°C. Colonies on blood, chocolate, or MacConkey agar measured less than 1 mm after 24 h. The
organism was found by Dr. Shayegani of the State of New York Department of Health to be of serotype O:5,27 and confirmed as Wauter's biotype 2. The organisms were isolated from the stool specimen only after pretreatment with 0.033% KOH and 2 min (2, 22) and not by direct plating. Fecal specimens obtained on day 30 were negative for *Yersinia* by the same methods. The organism was susceptible to amikacin, carbenicillin, cefamandole, chloramphenicol, gentamicin, streptomycin, tetracycline, tobramycin, and trimethoprim-sulfamethoxazole and resistant to ampicillin, cephalothin, and cefoxitin by the disk diffusion susceptibility test.

**Discussion.** Although infections due to *Y. enterocolitica* may manifest themselves in a variety of forms depending on the age and physical condition of the host and the bioserotype of the organism (14, 16, 18, 19), gastrointestinal symptoms predominate in the majority of cases (18, 19). Although our patient had no diarrhea, his major symptom on admission was abdominal pain. In addition to sepsis, which presumably results from an intestinal focus of infection (7, 8, 12, 13, 15, 17), other areas of involvement reported include the liver and spleen (10, 12, 21, 23) and, rarely, other sites, such as joints (10, 15, 17), lymph nodes (10, 16, 23), and skin and soft tissues (1, 10, 13). In three previously reported cases a pulmonary infiltrate was present, and cultures of blood, sputum, and a third site were positive for *Y. enterocolitica* (11, 13, 17). Bigler et al. (3) document a case of lung abscess with a pleural infiltrate, positive sputum cultures, and negative blood cultures. In other cases of pulmonary infection, the sputum may have been positive for *Y. enterocolitica* with no documentation of a pneumonia (4) or there were pulmonary infiltrates present, with *Yersinia* isolated from the blood only (12) or with a documented serological response (7, 8). The only previously reported case of empyema in which *Y. enterocolitica* was isolated from the pleural fluid involved a 10-month-old, severely malnourished infant (9). In that case a thoracentesis of the left pleural cavity yielded 50 ml of cloudy fluid, with a differential of 70% polymorphonuclear leukocytes and 30% lymphocytes. Blood cultures were negative, and the patient died 2 days after admission.

Using an alkali enrichment procedure (2, 22) we were still able to isolate *Y. enterocolitica* from the feces of our patient after 19 days of amikacin therapy. The previously used cold enrichment technique is slower and may not be of value for all serotypes (20). The strain of *Yersinia* documented in our case, *Y. enterocolitica* serotype O:5,27, Wauters biotype 2, has been commonly associated with human infection in some (4, 18) but not all (19) reports. This serotype has also been found in swine (18); our patient did not have any known animal exposure.

Viteri et al. (21) documented a case of hepatic abscess with negative blood cultures and hypothesized a non-hematogenous spread of the organism. In our case, only one of the eight blood culture bottles inoculated at admission was positive. These observations might suggest that the organisms are present at a low concentration in the blood or that the spread of infection to additional sites occurred before the blood was cultured. The rate at which the organism is cleared from the stool after antibiotic treatment remains undefined. The physiological state of the patient and the techniques used to isolate the organism could account for the difference between the 10 days observed by Portnoy and Martinez (11) and the 19 to 30 days we report.

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**LITERATURE CITED**


