Bacteraemic Cellulitis Caused by Pseudomonas putida—2 Cases

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Abstract: Pseudomonas putida is a Gram-negative bacillus which is widely distributed in soil and water habitats. It is not a common human pathogen and infrequently causes bacteraemia, which is most often intravenous catheter-associated. There are only 2 reports of bacteraemia occurring due to soft tissue infection caused by P. putida. We report 2 cases of P. putida cellulitis with bacteraemia. Both occurred in immunosuppressed patients who sustained minor trauma with definite or likely exposure to water and soil.

Key Words: Pseudomonas putida, bacteremia, cellulitis, immunosuppression, water

CASE 1—Mr HH

The patient was an 81-year-old man who was being treated with prednisone (8 mg daily) because of idiopathic thrombocytopenia purpura. Other medical history included an unprovoked right leg deep venous thrombosis which was being treated with daily subcutaneous enoxaparin injections.

He attended the emergency department (ED) because of swelling, redness and pain in the left leg, with rigors occurring on the day of presentation. The affected leg had been bumped on a car licence plate and scratched on a bromeliad (a spiky plant) in the garden several days ago. The temperature was 39.3°C in the ED; the blood pressure, 95/60 mm Hg; and the pulse rate, 115 beats per minute. The left leg examination showed erythema, swelling, and warmth from below the knee to near the ankle. There was a row of small puncture marks which were bleeding on the upper leg, consistent with trauma from the bromeliad (Fig. 1).

The fever did not recur, and the tachycardia and hypotension resolved with intravenous fluids. Antibiotics (intravenous ceftriaxone, and cotrimoxazole) were commenced for cellulitis of the leg. Investigations included a white cell count of 14.2 × 10⁹/L (normal range, 4–11) with neutrophils 13.3 × 10⁹/L (normal range, 1.8–7.7) and C-reactive protein 140.3 mg/L.

On day 2 of the hospital admission, 1 of 2 sets of blood cultures became positive at less than 24 hours with Gram-negative bacilli seen on Gram stain. The organism on culture was malodorous and weakly oxidase-positive, and was identified by the Vitek 2 (bio-Merieux) identification system as P. putida. We report 2 cases of P. putida cellulitis with bacteremia. Both occurred in immunosuppressed patients who sustained minor trauma with definite or likely exposure to water and soil.

On review 4 days after discharge, the cellulitis was improving clinically, and it was decided to continue for another 7 days of oral ciprofloxacin.

CASE 2—Mr GG

The patient was a 71-year-old man with multiple myeloma, which was being treated with lenalidomide and dexamethasone. He initially presented to the ED on May 15, 2010, with pain, erythema, and swelling of the dorsum of the right foot, extending onto the lower leg. There was associated nausea and malaise but no fevers nor rigors. The symptoms developed about 24 hours after the patient spray-cleaned his driveway with a high-pressure hose, which resulted in considerable muddy debris covering the feet and lower legs. Antibiotic treatment was commenced with oral cephalaxin, subsequently changed to fluclaxacillin. The patient returned to the ED on May 19, 2010, because of lack of improvement of the symptoms. On assessment, there was a persisting cellulitis of the foot with a large bullous lesion on the dorsum of the foot which was leaking serous fluid (Fig. 2). There was no fever, and the blood pressure and pulse were within normal limits. Blood test results included white cell count 6.1 × 10⁹/L (neutrophils, 5.0; lymphocytes, 0.51; and C-reactive protein, 140.3 mg/L). The antibiotics were changed to intravenous ticarcillin/clavulanic acid plus oral clindamycin after collection of blood cultures. The blood culture became positive at less than 24 hours with Gram-negative bacilli seen on Gram stain. The organism on culture was malodororous and weakly oxidase-positive, and was identified as P. putida by the Vitek 2 (bio-Merieux) identification system. It was resistant to amoxicillin/clavulanic acid, cephalzin, ticarcillin/ clavulanic acid, ceftriaxone, and cefotrimoxazole but susceptible

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FIGURE 1. Patient 1: cellulitis of the leg, with puncture marks from a bromeliad plant.
to gentamicin, meropenem, and ciprofloxacin by Vitek-2 susceptibility testing. The antibiotics were changed to meropenem and ciprofloxacin on May 25 after receiving the susceptibility results. The cellulitis had improved sufficiently to allow discharge on oral ciprofloxacin by May 31. At clinic review on June 9, the cellulitis had resolved but there was a large ulcer on the dorsum of the foot.

DISCUSSION

*Pseudomonas* species are aerobic Gram-negative bacilli which are able to colonize a range of soil and fresh water environments. *Pseudomonas putida* has largely been recognized as an environmental bacterium and an uncommon cause of bacteremia. This organism has the ability to thrive in a wide range of temperatures (4–45°C). The exact mechanism by which this environmental bacterium adapts to human conditions is unclear.

Most reported cases of bloodstream infection have been neonatal infections or have occurred in outbreaks due to transfusion of contaminated blood or fluid. Excluding paediatric and outbreak cases, there have been only 29 cases of *P. putida* bacteremia reported in the literature. Among the 22 cases with identified primary infection sites, 13 were catheter-related bloodstream infections. Other causes of bacteremia included acute cholecystitis, pneumonia and soft tissue infection in 2 cases each, and single reports of acute cholangitis related to a blocked biliary drainage tube, thrombophlebitis, and acute tonsillitis.

One patient with *P. putida* bacteremia related to soft tissue infection occurred in an immunocompetent host in the setting of exposure to floodwater. The other case of bacteremia with soft tissue infection was a fatal infection in an 80-year-old woman with chronic renal insufficiency and peripheral vascular disease.

Of the 29 patients with *P. putida* bacteremia, 25 were immunocompromised because of immunosuppressive drugs, malignancy or other immunosuppressive disease, or recent surgery. The prognosis was good, with 26 of 29 patients cured. The 2 patients in this article were both immunosuppressed, due to corticosteroids in both patients as well as lenalidomide and underlying myeloma in patient 2. Both cases of cellulitis were preceded by minor trauma, related to a spiky plant in one case and presumed microtrauma from high-pressure hosing in the second case. In both cases, the minor trauma occurred in the environment, with clear exposure to water and debris from the driveway in case 2. The combined risk factors of immunosuppression and minor trauma in the environment with water and dirt contamination explain the role of *P. putida*, a low-virulence environmental Gram-negative bacillus, in the infections. *Pseudomonas putida* isolates are generally susceptible to most antipseudomonal antibiotics including carbapenems, quinolones, and aminoglycosides. However, clinical isolates harboring VM-like metallo-beta-lactamases conferring resistance to carbapenems have been reported. Broad-spectrum antibiotic treatment is advisable when an immunosuppressed patient with cellulitis reports a history of minor trauma, with possible wound contamination by soil or water.

REFERENCES