

## ***Delftia acidovorans* Bacteremia in an Intravenous Drug Abuser**

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**Abstract:** *Delftia acidovorans* (*Comamonas acidovorans*) is an aerobic, non-fastidious, non-fermentative gram-negative bacillus classified in the *Pseudomonas* rRNA homology group III that is generally regarded as an environmental organism found in soil and water and as a non-pathogen. We report the first case of systemic *D. acidovorans* infection in a patient without a long-term immunosuppressive condition where *D. acidovorans* has been recovered in pure culture as a primary pathogen.

**Key words:** Bacteremia, *Delftia acidovorans*, drug paraphernalia, water contamination

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### **CASE REPORT**

A 35-year-old man with a long history of heroin abuse presented to the emergency department with shaking chills, chest discomfort and shortness of breath with mild nausea and vomiting approximately 2 hours after using heroin. He gets clean, wrapped needles from a friend, uses tap water to dissolve the heroin and draws the heroin up through cotton. He recalls that on the day he became sick, the cotton was wet and may have been contaminated with water from a windowsill. His past medical history is remarkable for intravenous heroin abuse and intranasal cocaine abuse. An HIV serology was negative. His health history was otherwise unremarkable. In the emergency department, his temperature rose to 39.4°C and he was treated with intravenous cefotaxime and intravenous gentamicin to cover the possibility of subacute bacterial endocarditis. Three separate blood culture sets were obtained in the emergency department before antibiotic therapy was started and the patient was admitted to the telemetry unit in stable condition. Blood cultures were processed using the ESP II Culture System (TREK Diagnostic Systems, Cleveland, OH).

On physical examination later that day, the patient's temperature was 36.6°C and his blood pressure was 119/70 mm Hg. There was evidence of a needle tract in his left neck where he injected heroine through the external jugular vein. There was no evidence of infection in the neck. His abdomen was soft without hepatosplenomegaly. There was no acute joint inflammation or rash. His chest x-ray was unremarkable. His initial leukocyte count was 1800/mm<sup>3</sup> but quickly rose to 17,000/mm<sup>3</sup> falling later in the admission to 12,900/mm<sup>3</sup>. A sedimentation rate was normal. A CT scan of the abdomen showed small bilateral pleural effusions and evidence of fluid adjacent to the liver and gallbladder, which contained a

gallstone. An echocardiogram showed normal valves without vegetations. Liver function tests, urine culture and urinalysis, and electrolytes were normal. His toxicology screen was positive for cocaine metabolites and opiates.

At 24 hours incubation, a gram stain of the aerobic bottle of one of three blood culture sets obtained in the emergency department was positive for gram-negative rods. Following the laboratory work-up of this blood culture, the gram-negative rod was identified as *D. acidovorans* susceptible to ceftazidime, cefotaxime, ceftriaxone, levofloxacin, piperacillin tazobactam, imipenem, and trimethoprim sulfamethoxazole, resistant to gentamicin and intermediate to tobramycin. The organism identification and susceptibility results were confirmed by an external reference laboratory. Four observations led us to believe that the isolated bacterium was not a contaminant despite the fact that only one of three initial blood cultures obtained in the emergency department was positive for *D. acidovorans*. First, there was a sudden onset of symptoms consistent with a sepsis syndrome. Second, the organism was recovered in pure culture. Third, there was a history of water contamination of the patient's drug paraphernalia, which is consistent with the normal distribution for this organism<sup>[1]</sup>. Lastly, this organism has not been previously isolated in our laboratory. Based on these findings, the patient was started on intravenous imipenem therapy. Blood cultures obtained before treatment with imipenem therapy and more than 24 hours after a single dose of cefotaxime therapy were negative. The patient's bacteremia appeared to have cleared with his first and only dose of cefotaxime. The risk of endocarditis was thought to be extremely low and the patient's treatment was switched to a 10-day course of levofloxacin therapy. He did not return to the hospital with recurrent symptoms.

## DISCUSSION

*Delftia acidovorans* (*Comamonas acidovorans*) is an aerobic, non-fastidious, non-fermentative gram-negative bacillus classified in the *Pseudomonas* rRNA homology group III<sup>[1]</sup>. Although generally regarded as an environmental organism found in soil and water and as a non-pathogen<sup>[1]</sup>, *D. acidovorans* has been associated with serious infections such as central venous catheter-associated bacteremia<sup>[2,3]</sup>, corneal ulcers<sup>[4]</sup> and endocarditis in an intravenous drug-abuser<sup>[5]</sup>. More recently, a case of *D. acidovorans* and *Ochrobactrum anthropi* bacteremia was reported in an immunocompetent patient with a thoracoabdominal gunshot wound<sup>[6]</sup>. Despite these documented cases of infection, *D. acidovorans* is still considered a highly unusual pathogen that is rarely recovered from clinical specimens<sup>[1]</sup>. Because infection with this organism is uncommon and because *D. acidovorans* is often resistant to a class of drugs commonly used to treat systemic gram-negative infections (aminoglycosides)<sup>[1]</sup>, timely identification of this organism to the species level is necessary to determine the most appropriate antibiotic therapy. It should also be noted that many automated susceptibility testing systems such as the Vitek legacy (bioMerieux, Durham, NC) require that *D. acidovorans* susceptibility test results be confirmed using a reference testing method due to the small clinical database associated with this organism.

Although the epidemiological history of this patient is consistent with previous reports, i.e., infection associated with a drug addict<sup>[5]</sup> and exposure via the intravenous route<sup>[2]</sup>, this report provides the most direct clinical evidence to date of water contaminated drug paraphernalia as a cause of systemic *D. acidovorans* infection. To our knowledge, this is the first case of systemic *D. acidovorans* infection in a patient without a long-term immunosuppressive condition where *D. acidovorans* has been recovered in pure culture. Based on these findings, it is important to consider *D. acidovorans* bacteremia as part of the differential diagnosis in patients with a history of intravenous drug abuse, particularly in situations where water contaminated drug paraphernalia is known or suspected, regardless of the patient's degree or history of immunocompetence.

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