Bacteremia with CDC Group IV c-2 in an Immunocompetent Infant

CDC group IV c-2 is a gram-negative bacillus that causes septicemia primarily in severely immunocompromised patients [1]. We recently treated an apparently healthy child with bacteremia caused by this organism. Such an occurrence has not, to our knowledge, been reported previously.

A 6-month-old infant was well until 7 days prior to admission to Texas Children’s Hospital (Houston), when she developed fever (38.9°C), vomiting, and diarrhea. She was evaluated at a local emergency department, where a presumptive diagnosis of pneumonia was made. She received parenteral cefotaxime and was discharged to her home to receive cefprozil. A blood culture subsequently yielded gram-negative rods, identified as CDC group IV c-2, and the patient was referred to Texas Children’s Hospital.

The patient had been born at 30 weeks’ gestation and was hospitalized for 1 month after birth. She had no documented infections during her nursery stay and no subsequent hospital admissions or intercurrent illnesses.

On physical examination she appeared well. Her temperature was 38°C; pulse, 130/min; respiratory rate, 28/min; and weight, 6.6 kgs (10th–25th percentile). The complete blood cell count and CSF examination findings were normal. Blood cultures performed in duplicate on admission were sterile. No other source of infection was evident. The child received treatment for 10 days with cefotaxime (50 mg/kg every 8 h) and was discharged in good condition. An ELISA for HIV was negative, a blood smear for Howell-Jolly bodies was negative, and the total hemolytic complement value was 49 U/mL (normal range, 23–46 U/mL). The IgG level was 269 mg/dL, the IgA level was 12.3 mg/dL, and the IgM level was 39.9 mg/dL, all within the normal range for age 6 months.

The blood isolate identified as CDC group IV c-2 by the referring institution was a nonfermenting, oxidase-positive, gram-negative bacillus. On referral to the Houston City Health Laboratory, the identity of the bacillus was confirmed to be CDC group IV c-2. The organism was urea-positive, demonstrated motility with peritrichous flagella, failed to reduce nitrate or nitrite, and did not produce gas from nitrate, characteristics that differentiate it from related organisms [2, 3].

Antibiotic susceptibility testing was performed by a microdilution MIC automated panel (Microscan, Negative Combo Panel No. 20; Dude Behring, West Sacramento, CA). The organism was susceptible to cefotetan (<16 mg/mL), ceftriaxone (<8 mg/mL), amikacin (<16 mg/mL), and trimethoprim-sulfamethoxazole (<2/38 mg/mL). It was resistant to ampicillin (>16 mg/mL), piperacillin (>16 mg/mL), ticarcillin/clavulanate (>64 mg/mL), cefazolin (>16 mg/mL), and imipenem (>8 mg/mL), and it showed intermediate resistance to gentamicin (8 mg/mL) and tobramycin (8 mg/mL).

There have been at least 19 reports of human infection caused by CDC IV c-2 [1, 4]. Many of these are included in the recent review by Thayu et al. [1]. These include 16 patients with septicemia, 2 with peritonitis complicating peritoneal dialysis, and 1 with tenosynovitis. All infections, except that in a 73-year-old with cat bite–associated tenosynovitis, occurred in patients with underlying diseases, especially immunosuppression. Eleven infections were considered nosocomial, but 6 additional patients required frequent medical intervention. Fourteen patients had permanent venous catheters, and 2 had peritoneal catheters for dialysis.

Our patient is, to our knowledge, the first apparently immunocompetent host with bacteremia caused by CDC group IV c-2. Her appropriate growth and development and lack of prior infections, together with the normal laboratory findings, suggest that her immune system was intact. Her presentation was consistent with an occult bacteremia that either was self-limited or responded to antimicrobial therapy. The possibility remains that she had a subtle defect in immune function that was not elucidated. The susceptibility of this isolate to aminoglycosides is unusual but has been reported elsewhere [5].

In summary, CDC group IV c-2 is an infrequent cause of human infection; most such infections occur in hospitalized, immunosuppressed patients. Our patient’s presentation illustrates that invasive infection can occasionally occur in immunocompetent hosts.

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References