Delftia acidovorans as an Unusual Causative Organism in Line-Related Sepsis

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Abstract The problem of line-related sepsis in patients undergoing chemotherapy for malignant disease remains a major problem in cancer-care even into the third millennium. We report a highly unusual pathogen which represented both a diagnostic and treatment challenge and highlights important issues around patient education as well as laboratory capability in the identification of causative organisms in line-related infections to facilitate clinical management.

Keywords Hickman line · *Delftia acidovorans* · Lymphoma · Chemotherapy · Line sepsis

Short report

A 65 year old man was admitted with fever and signs of sepsis (Neutrophil count, $5.1 \times 10^9/l$) 3 weeks after receiving ICE chemotherapy for NK cell lymphoma. Empirical therapy for neutropenic sepsis was commenced in view of the history and comprised combination therapy with tazobactam/piperacillin and gentamicin. Despite 24 h of empirical antimicrobial therapy he remained pyrexial and displayed features of continued sepsis.

At initial presentation, specimens of blood were taken from peripheral sites and from both lumens of the Hickman line and inoculated into fastidious growth media. At 3 h of blood culture incubation, the aerobic bottle flagged as positive and Gram staining revealed the presence of both

Gram-positive cocci and Gram-negative bacilli. Pure growth plates were inoculated and after 24 h the morphology and biochemical reactivity of the cocci suggested *Corynebacterium* species which were later confirmed with pure growth plates. The Gram-negative bacillus failed to incubate well at 41°C but oxidase reaction was positive. Antimicrobial susceptibility disc testing of the bacilli found the as yet unidentified organism to be resistant to aminoglycosides. In light of these findings, the Hickman line was removed and antimicrobial therapy changed to Imipenem/cilastatin and Teicoplanin on microbiologist advice.

Further subculture of the Gram-negative organism was achieved via incubation at 30°C and the organism was identified as *Delftia acidovorans* susceptible to piperacillin/tazobactam, carbapenems, cefazidime, trimethoprim and ciprofloxacin but resistant to aminoglycosides. Our laboratory findings were confirmed by a national reference laboratory. *Delftia acidovorans* are strictly aerobic, non-fastidious, Gram-negative bacilli which are oxidase and catalase positive [1]. They were formerly known as *Comamonas acidovorans* before being renamed in 1999 and are classified in the *Pseudomonas* rRNA homology group III [2]. It is an environmental pathogen found in common household water supplies and plant life, and under normal conditions is regarded as a harmless organism in humans. As infection with this organism is uncommon and due to the species' recognised resistance to aminoglycosides [1], prompt speciation by microbiological laboratories is essential to guide treatment, as was demonstrated in the patient described here.

Since the first description of *Delftia acidovorans*, there have been sporadic reports of infection of central venous catheters [3], indwelling pressure monitoring devices [4], gunshot wounds [5] and bacteraemia in injecting drug users due to contaminated equipment [6, 7]. Contaminated water

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sources have been identified in ice machines [8] and in water analysed after space flights [9].

We speculate that household water contamination of the Hickman line, either through showering, bathing or other inadvertent contamination, led to the development of a life-threatening sepsis in this patient. This case raises issues around patient education in the care of indwelling catheter devices and our knowledge of potential microbiological pathogens to which our patients with haematological malignancies may be exposed. In this instance, the prompt removal of the line combined with appropriate use of antimicrobials to which the organism was sensitive resulted in a positive outcome for the patient who was well enough to be discharged home 10 days after he was first admitted to hospital.

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