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Recurrent bacteremia by *Chryseobacterium indologenes* in an oncology patient with a totally implanted intravascular device

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Chryseobacterium indologenes was isolated from the blood cultures of an oncological patient with a totally implantable device. Because a catheter-related infection was suspected, the Port-A-Cath® was removed after a 10-day course of piperacillin–tazobactam. Differences in susceptibility may exist if either the criteria for either *Pseudomonas* or *Enterobacteriaceae* are used.

INTRODUCTION

Totally implantable intravascular devices are used to administer drugs to patients with a malignant disease. These devices offer the advantage of improved patient image and obviate the need for routine catheter-site care. However, pathogenic and opportunistic bacteria can contaminate indwelling catheters, especially in the hospital environment. The device can then become a reservoir for further dissemination of the bacteria. We report a case of an oncology patient with a totally implantable intravascular device (Port-A-Cath®, PAC) that became contaminated with *Chryseobacterium indologenes*.

CASE REPORT

In October 1999, a 38-year-old woman was diagnosed with bone and liver metastases of an already locally and regionally advanced breast cancer. Because of the severity of the hypercalcemia and associated symptoms (the patient underwent a successful resuscitation because of ventricular fibrillation), urgent renal dialysis was performed. Two weeks later a chemotherapeutic regimen of CAF (cyclophosphamide–adriamycine–5-fluorouracyl) together with biphosphonates was started in a day-patient setting. The drugs were administered through the PAC on days 1 and 8, and repeated every 28 days. On day 8 of this first cycle the patient was urgently admitted to the hospital because of a relapsing hypercalcemia. Laboratory investigations revealed no neutropenia. Within half an hour after manipulation of the PAC she experienced a fever of 39 °C. Apart from the tumor in the right breast, physical examination revealed no abnormalities. The patient was started on a combination of intravenous piperacillin and tazobactam (4 × 4 g IV daily).

One day after blood cultures were taken, bacterial growth was detected with a Bactec 9240 (Becton Dickinson Diagnostic Instruments System, Sparks, MD, USA) in the aerobic blood culture bottles (Bactec™ Plus Aerobic) collected from two different samples. The first sample was through a venous puncture; the second sample was through the PAC of the patient. The anaerobic blood bottles cultured negative.

The Gram stain showed Gram-negative bacilli. On the second day, two types of colonies appeared: the first strain was identified as *Acinetobacter lwoffii*; the second strain grew on conventional agar media but did not grow on MacConkey agar. *Chryseobacterium* was suspected but the conventional tests could not make a differentiation to the species level after 72 h of incubation. With the BBL® Crystal™ Enteric/non-fermenter identification system (Becton Dickinson Diagnostic Instruments System), *C. indologenes* was identified (code 2301110112; oxidase-positive, indole-negative) with a probability of 70.3%. The strain was sent to a reference laboratory (Prof. Wauters, Cliniques Universitaires, St-Luc, Woluwe, Belgium) for further identification and confirmation.

Antimicrobial susceptibility testing was performed with the disc diffusion method according to NCCLS [1]. For interpretation we used the zone diameters for *Pseudomonas aeruginosa*. The strain was resistant to ampicillin, amoxycillin–clavulanate, cefazolin, cefuroxime, aztreonam, ceftriaxone, amikacin, doxycycline, colistin and meropenem. The strain was susceptible to piperacillin, piperacillin–tazobactam, ceftazidime, ofloxacin and trimethoprim–sulfamethoxazole. Additional E test susceptibility testing was performed, in accordance with the manufacturer's directions, for piperacillin, piperacillin–tazobactam, ceftazidime and ciprofloxacin. The minimum inhibitory concentration (MIC) breakpoints of the NCCLS for 'other non-*Enterobacteriaceae*' were used. The strain was susceptible to the four antimicrobials tested, with a MIC of 4 mg/L for piperacillin ($S \leq 16$ mg/L) and piperacillin–tazobactam ($S \leq 16$ mg/L), 3 mg/L and 0.5 mg/L for ceftazidime ($S \leq 8$ mg/L) and ciprofloxacin ($S \leq 1$ mg/L), respectively.

After 2 days of intravenous antimicrobial treatment, the fever subsided totally. Intravenous antimicrobial treatment was given for 10 days. However, 6 days after the completion of antimicrobial treatment, the fever recurred. Bacterial growth was detected in the aerobic culture blood bottle, taken through the PAC, while blood taken from a venous puncture cultured negative. The Gram stain showed Gram-negative bacilli. This strain had the same morphological and biochemical characteristics and susceptibility results and was identified as *C. indologenes*. In view of the suspicion of catheter-related septicemia, the PAC device was removed. The PAC cultured negative, probably because only the external part of the device was rinsed with tryptic soy broth. Thereafter the patient was given an additional 7-day course of pefloxacin (2×400 mg IV daily). To date she has not experienced any recurrence of fever. The chemotherapeutic regimen was continued and we noticed a good response.

DISCUSSION

C. indologenes is not part of the human flora but is found in soil, water, plants and foodstuffs [2]. In the hospital environment, the bacterium is found in water and on wet surfaces. Indwelling vascular catheters, feeding tubes and other fluid-associated equipment may become reservoirs for chryseobacteria [2]. The bacteria can easily survive in the biofilm and resist antimicrobial treatment [3]. Our patient was treated in a day-patient setting, where hygienic measures may be less stringent. The drugs were administered through the PAC, which probably favored the infection. Chryseobacteria are non-fastidious, oxidase-positive Gram-negative rods that do not ferment glucose. They are readily distinguished from other non-fermenters by their ability to produce indole in tryptophan broth, but the reaction often is weak and difficult to demonstrate [4].

Despite their low virulence, chryseobacteria are inherently resistant to many antimicrobial agents, which makes them potential candidates for nosocomial infections [5]. Piperacillin, ofloxacin and ciprofloxacin are potential drugs of choice for the treatment of infections caused by chryseobacteria [6]. It has been shown that susceptibility disc diffusion testing is inaccurate for these organisms, since there is often a poor correlation between the disc diffusion results and the MIC values [5,7]. The reason for this remains unclear. Hence, the susceptibility of the organism cannot be predicted accurately from the disc diffusion method alone. Usually the zone diameters for *Pseudomonas aeruginosa* or *Enterobacteriaceae* for the disc diffusion results described by the NCCLS are used, but differences in susceptibility may occur [1,5,6]. An attempt to determine disc diffusion zone diameters for chryseobacteria has been made by Chang et al. [6]. According to the zone diameters used in their study, our strain would have been susceptible to piperacillin and piperacillin–tazobactam. The MIC breakpoints for chryseobacteria have not yet been established by the NCCLS [1,6]. We used the MIC breakpoints for 'other non-*Enterobacteriaceae*' [1]. The E test may be an alternative to the standard agar dilution method for testing susceptibility to ciprofloxacin and ceftazidime but not to piperacillin, since there may be discrepancies between the E test result and the standard agar dilution MIC for piperacillin [5,7].

CONCLUSIONS

The reappearance of the bacterium in the blood cultures 6 days after completion of the first antimicrobial treatment was suggestive of indwelling device-related infection. The blood culture taken through the PAC cultured positive, while the venous blood puncture cultured negative. Generally it is accepted that the device should be removed if clinical symptoms do not improve after appropriate antimicrobial therapy [3]. However, successful treatment of indwelling device-related infections caused by *C. indologenes* without removal of the device have been reported [3]. An alternative treatment option is the antibiotic lock technique in which a high concentration of an antibiotic is delivered and locked into the device. This technique

may be beneficial to treat totally implantable intravascular device-related septicemia, but few reports have been published so far [8].

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