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Bacteremia due to *Cellulosimicrobium cellulans* associated with central catheter for hemodialysis



Bacteriemia asociada a catéter central para hemodiálisis debida a *Cellulosimicrobium cellulans*

We report a case of an 80 year-old female patient with history of hypertension and chronic renal failure secondary to nephrosclerosis on hemodialysis through permanent central venous catheter.

In June 2013, during a hemodialysis session, the patient presented general discomfort, tremor and discrete acrocyanosis; neither fever nor other abnormalities on physical examination were found.

Catheter blood cultures were obtained, for aerobic and anaerobic microorganisms, and antibiotic treatment was initiated with vancomycin and ceftazidime. After five days of incubation, blood cultures were reported as negative and therefore antibiotic treatment was discontinued.

However, a week later, symptoms reappeared with no apparent origin, so blood cultures were extracted through the central venous catheter (for aerobic and anaerobic microbes). They were incubated into the BACTEC (Becton Dickinson) system and after 18 h of incubation, they resulted positive. Gram staining was performed and branched gram positive bacilli were observed. The recovered bacteria from blood cultures were subcultured in blood agar, chocolate agar and Mac Conkey plates, and incubated at 37 °C in a 5% CO₂ atmosphere. Twenty-four hours later, 2 mm diameter, bright yellow, irregular edges and convex surface colonies were observed. They were identified as *Cellulosimicrobium cellulans* by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF) (Bruker Daltonics). An API *Coryne* gallery was conducted to compare the results, identifying *C. cellulans* with a reliability of 99.9%. The identification of the genus was confirmed by sequencing the 16S rRNA, showing a 100% similarity with *C. cellulans* and a 99.8% for *C. funkei* (Colección Española de Cultivos Tipo, CECT).

Antimicrobial susceptibility tests were performed using MicroScan microdilution panels, which were interpreted according to CLSI criteria for *Nocardia* and others aerobic Actinomycetes breakpoints. The inoculum suspension was made adjusting the turbidity to 0.5 McFarland standard and incubated at 37 °C for 24 h. The results of antimicrobial susceptibility testing for the following antimicrobial drugs were: susceptible to amoxicillin/clavulanate (MIC ≤ 4/2 mg/L), imipenem (MIC ≤ 2 mg/L), moxifloxacin (MIC = 1 mg/L), cotrimoxazole (MIC ≤ 2/38 mg/L) and linezolid (MIC ≤ 1 mg/L); and

resistant to tobramycin (MIC > 8 mg/L), amikacin (MIC = 16 mg/L), ciprofloxacin (MIC > 2 mg/L). The CMI for vancomycin was ≤ 0.5 mg/L (there are no criteria for interpretation).

A 4-week course of vancomycin, adjusted according to our patient renal function (1 g initially followed by 0.5 g at each dialysis session) was started. During the treatment, the patient presented several episodes of tremor. Control blood cultures were taken from the central venous catheter and from peripheral veins one week after finishing each treatment cycle, persisting positive after two –4 week cycles-. After three positive controls, it was decided to remove the catheter and blood cultures became negative.

Cellulosimicrobium cellulans, formerly known as *Oerskovia xanthineolytica*, belongs to the order *Actinomycetales*, suborder *Micrococcineae*, family *Promicromonosporaceae*.¹ It has a worldwide distribution and it is found in the environment mainly in the soil, water, plant residues, cut grass and in decomposed organic matter.² It infects primarily immunocompromised patients but it has also been implicated in foreign body infections in immunocompetent patients with central venous catheters, peritoneal catheters, ventriculo-peritoneal shunts and prostheses. Moreover, it has been related to neonatal infections, bacteremia, peritonitis, meningitis, endocarditis, keratitis, pyonephrosis, soft tissue infection and tenosynovitis.³

They are branched gram-positive bacilli with irregular contours, growing in regular culture media at room temperature but faster at 37 °C, differentiating it from the genera *Corynebacterium* and *Nocardia*. These bacteria are aerobic and facultative anaerobic, non-motile, catalase positive, oxidase negative, reduces nitrate to nitrite, and hydrolyzes gelatin, urea and DNA. They have a fermentative metabolism using sugars such as glucose, ribose, sucrose, lactose and maltose. However, they do not ferment mannitol or sorbitol.⁴ *Cellulosimicrobium cellulans* is phenotypically identified by API-Coryne®, and it can also be identified by 16S rRNA sequencing,⁵ or mass spectrometry.³

The treatment of choice in patients with normal renal function is vancomycin 1 g every 12 h or linezolid 600 mg every 12 h. Carbapenems and associations with rifampicin can also be used for antibiotic therapy.⁶ In our case, dosage had to be adjusted due to our patient renal impairment. Unfortunately, despite receiving a 4-week course treatment, the microorganism was still isolated in cultures. Complete healing was not achieved until catheter removal.

The catheter-related bacteremia case reports published in the literature were treated with antibiotics associations such as vancomycin and rifampicin, and complete cure was achieved.⁷ However, the optimal treatment is the withdrawal of the foreign

body with specific antibiotics, except those cases where is complicated to attain a new vascular access. In these especial cases, it is recommended to attempt complete healing with only antibiotic treatment before removing the catheter,⁷ as in the case of our patient. Two months later, the patient died of non-infectious causes.

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