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A rare bacteremia caused by *Cedecea davisae* in patient with chronic renal disease

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Patient: Female, 77
Final Diagnosis: Bacteremia
Symptoms: Chills • diarrhea • fever • nausea
Medication: —
Clinical Procedure: X-Ray • CBC • urine and blood cultur
Specialty: Infectious diseases

Objective: Rare disease

Background: *Cedecea davisae* is a gram negative, oxidase negative bacilli that include 5 species. In the medical literature there are very few reports that describe infections caused by different species of the *Cedecea* genus.

Case Report: In this paper we report a fourth case of bacteremia in a 77 year-old patient with a chronic renal disease that was successfully treated with ceftazidim and ciprofloxacin. Additionally, we present a review of all the reported infections that were caused by *C. davisae*.

Conclusions: Five cases (not including our report) of *Cedecea* bacteremia were reported so far. *Cedecea* infections and particularly *C. davisae* infections can be difficult to treat due to the antibiotic resistance of the bacterium. Therefore we propose to consider treating *C. davisae* bacteremia with a combined antibiotic treatment until getting laboratory results for antibiotic-sensitivity tests.

Key words: *Cedecea davisae* • bacteremia

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Background

Cedecea are gram negative, oxidase negative bacilli that include 5 species. This genus was designated by the Centers for Disease Control (CDC) in 1981 as a separate genus in the *Enterobacteriaceae* family. The *Cedecea* bacteria are closely related to the *Serratia* bacteria but do not hydrolyze DNA or gelatin [1]. In the medical literature there are very few reports that describe infections such as pneumonia, soft tissues infections, urinary tract infections and sepsis, which were caused by different species of the *Cedecea* genus such as *C. neteri* and *C. lapagei*. In most cases, these infections appeared in immunocompromised patients [2–7].

In the present case report we describe a third case of sepsis which caused by *Cedecea davisae* in a patient with chronic renal disease stage V and to present a review of all literature documented cases which were caused by *C. davisae*.

Case Report

A 77 year-old female patient with chronic kidney disease stage V, a history of diabetic nephropathy and hypertension, on hemodialysis treatment since 2008, was admitted to our Nephrology Department for a routine hemodialysis treatment on May 2012.

During the hemodialysis treatment, the patient started to complain of chills, fever, nausea and leg cramps. Later, non-hemorrhagic diarrhea and vomiting appeared lasting a few days.

On physical examination, the patient was hemodynamically stable with a blood pressure of 200/90 mm Hg and fever of 39.5°C. Chest X-ray revealed no evidence of inflammatory infiltration, 6,800 leukocytes per mcL on cell blood count test, with 90% neutrophils. Urine culture, 2 sets of blood culture and culture from the Permacat catheter tip were drawn and antibiotic treatment was started with vancomycin and gentamicin. Urine culture was negative. However, all the blood cultures (Bactec FX system, BD, USA) and the catheter tip culture were positive, with gram negative bacilli growth on blood, chocolate and MacConkey agars. Later, these bacilli were defined as *Cedecea davisae* by an automatic microbial identification system, VITEK 2 (BioMérieux, Durham, NC) and by means of the molecular biology method of 16S RNA. In addition, an antibiogram test was performed in the Kirby-Bauer method (disk diffusion antibiotic sensitivity testing) in which we found that the bacterium was sensitive to amikacin, ceftazidim, ciprofloxacin, gentamicin, meropenem, trinethoprim/sulfa and levofloxacin, and resistant to ampicillin, ampicillin/sulbactam and cefazolin. Therefore the treatment was replaced with ciprofloxacin and ceftazidim. During the antibiotic therapy, no additional fever rises were seen and follow-up cultures that were drawn were sterile. The patient got released from the hospital after 4 hospitalization days in a stable state with a recommendation for further treatment with ciprofloxacin for 10 days (Table 1).

Table 1. All reported cases of *Cedecea davisae* infections.

Infection course	Source of isolate	Medical history	Age/sex	Year [reference]
Inpatient, febrile with pneumonia; defervesce within 11 days on cefazolin	Sputum	DM, CHF, HTN	65/F	1981 [2]
Inpatient, with scrotal abscess; resolved in 5 days with tetracycline	Scrotal abscess	HTN, CHF, alcoholic hepatitis	50/M	1983 [3]
Inpatient who developed DIC, platelet count recovered on mezlocillin, gentamycin, clindamcin	Blood	Heart disease, bronchitis, COPD	70/F	1986 [4]
Inpatient, febrie, successfully treated with 12 days of cefotaxime, amikacin	Leg ulcer, blood	DM	67/M	2008 [5]
Outpatient, afebrile, successfully treated with 21 days of ciprofloxacin	Oral ulcer	S/P renal transplantation, DM, HTN	42/M	2009 [6]
Inpatient, febrile and pneumonia, successfully treated with ceftazidime, ciprofloxacin piperacillin-tazobactam	Blood	AML, C. diff colitis	52/M	2011 [7]
Inpatient, febrile wit Chills, vomiting and diarrhea; defervesce within 2 days on Ceftazidim and 12 days of ciprofloxacin	Blood and permacat catheter tip	DM, HTN, chronic renal disease	77/M	2012 [current case]

DM – diabetes mellitus; HTN – hypertension; CHF – congestive heart failure; COPD – chronic obstructive pulmonary disease; DIC – disseminated intravascular coagulation; AML – acute myeloid leukemia.

Discussion

In 1981, a gram negative, oxidase negative, fermentative bacillus formerly known as enteric group 15 of the family *Entrobacteriacaeae*, was designated as a new and a separate genus. This genus includes 5 different species]1[. In the medical literature there are a few documented cases in which these bacteria were isolated from various clinical specimens including sputum, urine, soft tissues and blood. Most of the isolates came from infections in immunocompromised patients. To the best of our knowledge, five cases (not including our report) of *Cedecea* bacteremia were reported so far. The first case was reported in 1982. Three out of these five *Cedecea* bacteremia cases were caused by *C. davisae* and the rest by *C. lapagei* and *C.neteri* [2,7].

Cedecea infections and particularly *C. davisae* infections can be difficult to treat due to the antibiotic resistance of the bacterium [5,8]. The previously described cases reported microbial resistance to cephalothin, cefuroxime, ceftazidim, ampicillin, tetracycline, cefoxitin, piperacillin, nitrofurntoin and ciprofloxacin. In our report we described another case of *C. davisae* bacteremia in a patient with chronic renal disease stage V that was successfully treated with ceftazidim and ciprofloxacin.

Conclusions

In this case report, we report for the first time on *C. davisae* isolation from Permacath catheter tip culture and on microbial resistance to ampicillin/sulbactam and cefazolin. Therefore we propose to consider treating *C. davisae* bacteremia with a combined antibiotic treatment until getting laboratory results for antibiotic-sensitivity tests.

Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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