

Ochrobactrum anthropi: a rare case of endocarditis

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ABSTRACT

Ochrobactrum anthropi is an aerobic Gram-negative bacillus, formerly known as “Achromobacter group Vd”. It is increasingly recognized as a potentially problematic, opportunistic, and nosocomial pathogen. Most cases of human diseases due to *O. anthropi* are associated with central venous catheter line infection; few case reports about infective endocarditis, pancreatic abscess, puncture wound osteochondritis, endophthalmitis, urinary tract infection, meningitis, pelvic abscess, and osteomyelitis are present in the literature. Among the previously stated infections it can cause, infective endocarditis is very rare; only four cases have been described in the literature. Here, we report the case of an immunocompromised man who developed native valve endocarditis with septic cerebral embolization due to *O. anthropi*.

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Introduction

O. anthropi is an aerobic Gram-negative, oxidase-positive, urease-positive, motile, non-lactose-fermenting bacillus previously known as “Achromobacter group Vd”.¹ Moreover, it is an AmpC β -lactamase producer that is resistant *in vitro* to penicillin and cephalosporins; it is also generally susceptible to imipenem, fluoroquinolones (variable susceptibility), trimethoprim/sulfamethoxazole, tetracyclines and aminoglycosides.²

Ochrobactrum spp. have been isolated from soil, hospital water sources, antiseptic solutions, and contaminated pharmaceuticals; they may also be part of the normal flora of the human large intestine. Occasional exposure to these bacteria cannot be excluded, as they have also been isolated from the rhizosphere of potatoes, rice, and wheat.^{2,3}

Infections due to these organisms are uncommon, and they have been regarded as opportunistic pathogens of low pathogenicity, but severe infections have been described, especially in immunocompromised patients.

Most reported cases of human disease due to this pathogen have been associated with central venous catheter line infection. However, this organism has also been reported as a cause of infective endocarditis,^{4,5} pancreatic abscess, puncture wound osteochondritis, endophthalmitis, urinary tract infection, meningitis, pelvic abscess, and osteomyelitis.^{1,6-8}

Among the many infections it can cause, infective endocarditis is very rare; it has been described only in four patients in the literature.

Case Report

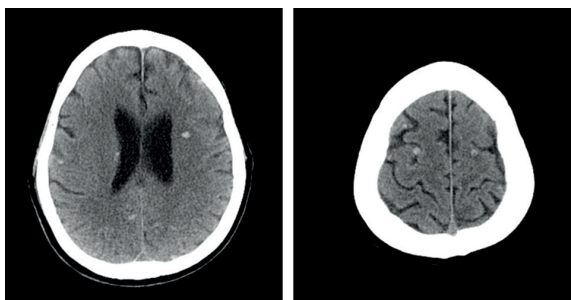
A 68-year-old man presented to the Desenzano Hospital Emergency Room (ER) in Brescia (Italy) for the onset of fever and mental confusion that started a few days before.

He had a history of chronic myelomonocytic leukemia transformed into acute myeloid leukemia under azacitidine

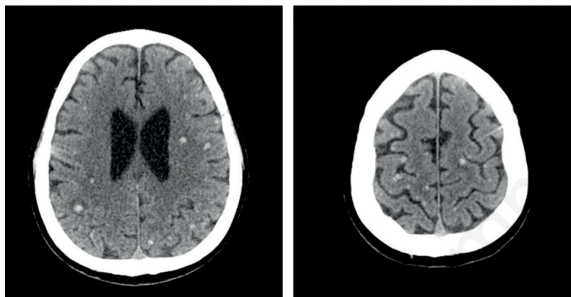
treatment. Due to his disease, the patient needed once-a-week blood transfusions (both with platelets and red blood cells) and a peripherally inserted central catheter (PICC) for hematological therapies.

He was affected by dilated cardiomyopathy [with non-sustained ventricular tachycardia episodes that led to a consequent implantable cardioverter defibrillator (ICD) implantation]; he also had a history of radioactive iodine therapy for Graves' disease.

At ER admission, the exams showed an increase in C-reactive protein and a severe pancytopenia consistent with his hematological disease (hemoglobin 7.2 g/dL, platelets $12 \times 10^3/\mu\text{L}$).



(a) Brain CT without contrast agent performed at the Emergency Room.



(b) Brain CT with contrast agent performed on day 4.

Figure 1. Comparison of brain computed tomographies (CT) performed in the emergency room and on day 4.

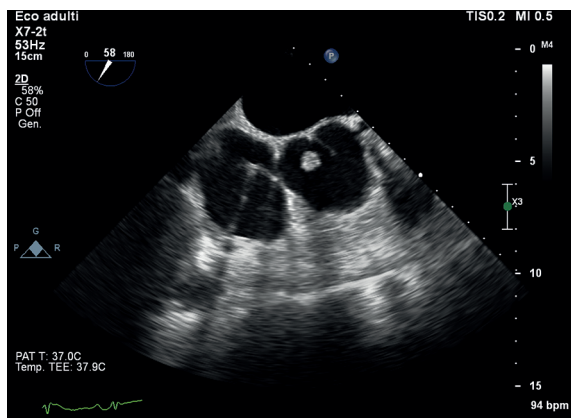


Figure 2. Transesophageal echocardiography: valvular vegetation adherent to the non-coronary cusp of the aortic valve.

A brain computed tomography (CT) without a contrast agent was performed and showed multiple bilateral hyperdense lesions compatible with cerebral microhemorrhages (Figure 1a).

Blood cultures (both from peripheral vein and PICC) and urine cultures were collected at admission; empiric antibiotic therapy with piperacillin-tazobactam was then started.

Blood cultures resulted positive for *O. anthropi*; in particular, the peripheral sample turned positive in 39 hours while the PICC sample turned positive in 25 hours. The differential time to positivity between the catheter and peripheral blood cultures was diagnostic of catheter-related infection, so PICC was removed as soon as possible on day 3, after platelets support. Piperacillin-tazobactam was stopped, and combined antibiotic therapy with gentamicin, trimethoprim-sulfamethoxazole, and meropenem was started according to the susceptibility testing.

On the same day, an additional brain CT with a contrast agent was then performed: the hyperdense lesions in relation to microbiological isolation could be considered as brain septic embolization with associated hemorrhagic transformation (Figure 1b).

An immediate transthoracic echocardiogram showed aortic vegetation with mild-moderate aortic regurgitation, confirming the diagnosis of infective endocarditis.

To better understand the valvular involvement, a transesophageal echocardiography was performed on day 6 (Figure 2). The valvular vegetation measured 9 mm in diameter, and it appeared adherent to the non-coronary cusp of the aortic valve. Lead ICD vegetation was instead not detected.

A surgical approach was excluded by the heart surgeon because of the high risk of mortality related to extracorporeal circulation in a patient with multiple hemorrhagic cerebral lesions.

Antibiotic therapy was optimized in the infectious disease department: a 2-week treatment with intravenous gentamicin and trimethoprim-sulfamethoxazole was performed, while meropenem treatment was continued until the discharge on day 30. The therapeutic approach was discussed by a multidisciplinary team consisting of an infectious disease specialist, a hematologist, and a palliative care specialist.

Considering the poor prognosis of his hematologic disease, the patient was provided with home palliative care support, together with potential blood transfusions at the hospital. He then had to undergo oral antibiotic therapy at home with ciprofloxacin (750 mg bis in die) and trimethoprim/sulfamethoxazole (800/160 mg ter in die). An infectious disease visit was planned 30 days after the discharge to evaluate the antibiotic therapy effectiveness and define future treatments.

Discussion and Conclusions

This report describes the case of a patient affected by *O. anthropi* bacteriemia with infective endocarditis of the aortic valve and secondary septic cerebral embolization.

Clinical manifestations of *O. anthropi* bacteriemia have still not been clearly described in the literature because the infection is rare in humans and pathogen identification is difficult.

The first case of human infection with *O. anthropi* was reported in 1980 as a pancreatic abscess.⁶

Later, in 1998, Yu *et al.* reported 15 cases of patients with

Table 1. Patients' features in prior publications of Ochrobactrum anthropi endocarditis.

Variables	1 patient McKinley <i>et al.</i> (1990) ^a	1 patient Mahmood <i>et al.</i> (2000)	1 patient Romero <i>et al.</i> (2004)	1 patient Ozdemir <i>et al.</i> (2006)	This work (2024)
Sex	Male	Female	Female	Male	Male
Age	28	39	65	42	68
Immunosuppression	N/A	No	No	No	Yes
Intravenous devices	No	No	No	No	Yes
Prosthetic valve	Yes	No	Yes	No	No, lead ICD
Cardiosurgery need	No	Yes	Yes	No	No
Antibiotic treatment based on susceptibility testing	Cefuroxime + gentamicin	Gentamicin + vancomycin + ofloxacin	Meropenem + gentamicin	Vancomycin + meropenem	Gentamicin + trimethoprim-sulfamethoxazole + meropenem
Possible focus of infection	Recent cardiac surgery	Intravenous injections with reusable glass syringe sterilized in boiling water	None, supposed oral colonization	Multiple invasive procedures carried out during operations and urethral catheter	PICC
Prognosis of endocarditis	Good	Good, but amputation of big toe for septic embolization	Good	Death	Good
Comorbidities					
Hypertension	-	-	Yes	-	Yes
Diabetes mellitus	-	Yes	-	-	-
Hematological neoplasm	-	-	-	-	Yes
Recent surgery	Yes, aortic valve replacement for previous <i>S. sanguis</i> endocarditis	-	-	Yes, operated for traumatic rupture ileum and bladder	-
Rheumatic heart disease	-	Yes	Yes	-	-

N/A, not available; ICD, implantable cardioverter defibrillator; PICC, peripherally inserted central catheter; ^athe bacillus was classified as Chromobacter group B.

O. anthropi bacteriemia; all of them had severe underlying diseases, but none died directly from *O. anthropi* infection.⁹ Their findings indicated that *O. anthropi* could produce clinically significant infections in immunocompromised patients; however, its virulence seemed to be relatively low.

More recently, case reports have described this organism as a cause of infective endocarditis, osteochondritis, endophthalmitis, urinary tract infection, meningitis, pelvic abscess, and osteomyelitis.^{4,7,8,10,11}

Among these various clinical manifestations, the most frequent one is central catheter-related bacteremia in immunocompromised hosts.^{1,12}

In this case report, we want to focus on the rare infective endocarditis caused by *O. anthropi*. To our knowledge, only four cases of *O. anthropi* endocarditis have been described in the literature (Table 1). The four patients were two men and two women; their mean age was 43.5 years. Half of them had an infected prosthetic valve,^{4,13} while in the other half, endocarditis affected a native valve.^{5,14} 50% had a history of rheumatic heart disease;^{4,5} 50% recently underwent surgery (an aortic valve replacement and an abdominal operation for traumatic rupture of ileum and bladder). No one had active tumors or hematological diseases; none of them was a PICC carrier.

Our patient is a 68-year-old man with no prosthetic valves and no history of rheumatic heart disease. His PICC has been identified as the focus of bacteriemia; *in vitro* experiments have shown that *O. anthropi* can adhere to plastic surfaces similarly to *Staphylococcus aureus* and *Staphylococcus epi-*

dermidis. For such a reason, it may play a role in catheter-associated infection.¹²

From the review of the literature, the prognosis of *O. anthropi* endocarditis resulted good in three patients out of four; the remaining one died instead. Even if the prognosis turned out to be favorable in most cases, the endocarditis process was significant: two out of the three alive patients underwent valve replacement surgery.

As far as our patient is concerned, even though *O. anthropi* endocarditis caused mild-moderate aortic regurgitation, his prognosis was mainly affected by his severe hematological disease rather than the infective event.

In conclusion, the clinical characteristics of patients with endocarditis caused by *O. anthropi* and the evolution of the disease itself are highly variable; few cases are still described in the literature.

This case report aims to raise awareness of the clinical manifestations that this rarely-isolated bacterium can cause in order to promptly recognize and treat them. A better insight into possible mechanisms responsible for *O. anthropi* infection will improve the treatment for these patients.

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