Ochromobactrum intermedium: an emerging opportunistic pathogen—case of recurrent bacteraemia associated with infective endocarditis in a haemodialysis patient

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Abstract

We describe the first clinical case report of infective endocarditis related to *Ochrobactrum intermedium* infection. The case involved a 23-year-old man receiving dialysis via an internal jugular long-term haemodialysis catheter. He improved with a prolonged course of meropenem and minocycline. *Ochrobactrum* spp. are recognized as rare emerging opportunistic pathogens.

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A 23-year-old male haemodialysis patient attended the emergency department with fever and rigors 10 days after a 2-week visit to Pakistan. He had bilateral renal dysplasia, with a failed renal transplant while receiving immunosuppression, and was undergoing dialysis via a right internal jugular long-term haemodialysis catheter. He had received maintenance haemodialysis at a medical centre in Pakistan.

On examination, his blood pressure was 99/37 mm Hg, pulse 140 beats per minute and temperature 37.7°C. General examination was unremarkable, with no features of infective endocarditis noted. Investigations revealed a white blood cell count of 7×10^9/L, C-reactive protein of 146 mg/L and normal chest X-ray. In the absence of an obvious septic focus, he received intravenous (iv) flucloxacillin and gentamicin for catheter-related septicaemia as per hospital guidelines.

Admission blood culture (BC) of samples taken from the long-term haemodialysis catheter were positive at 24 hours with Gram-negative rods identified as *Ochrobactrum* spp. by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS; Bruker Microflex, Biotyper 3.1; Bruker Daltonics, Bremen, Germany) and *O. intermedium* by the reference laboratory by partial sequencing of the 16S ribosomal RNA gene. Repeat long-term haemodialysis catheter BC of samples taken 24 and 48 hours after admission and peripheral BC of samples taken 96 hours after admission remained positive for *Ochrobactrum* spp. The catheter was removed, and antibiotic therapy was switched to meropenem 1 g iv twice daily, to continue 48 hours after line removal. He improved and was discharged.

Two months later he again sought care for fever and shortness of breath. At examination he had pulmonary oedema with a raised C-reactive protein of 79 mg/L. BC of samples taken at admission grew *Ochrobactrum* spp. after 31 hours. On the basis of reference laboratory susceptibilities he was treated with meropenem 1 g iv twice daily and tigecycline 50 mg iv twice daily. Transthoracic echocardiography demonstrated a 1.32 cm^2 right atrial vegetation. He developed sudden hypoxia, and computed tomographic pulmonary angiography revealed a right lung pulmonary embolus; he commenced anticoagulation therapy. Five days later he developed abdominal pain with amylase 267 U/L. Computed tomography confirmed pancreatitis. Because of this recognized tigecycline complication, tigecycline was switched to minocycline 100 mg iv twice daily. He was discharged 2 weeks later to complete 6 weeks of treatment with meropenem and minocycline. Repeated BC analyses have since been negative.

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TABLE 1. *Ochrobactrum intermedium* isolates with antibiotic susceptibility in chronological order

Date	Source	Conditions	Identification	Susceptibility (in house)		
				Antibiotic	MIC	Interpretation
25/9/15	iv line	Aerobic BACTEC bottle after 25 hours	*Ochrobactrum intermedium* (laboratory reference)	Ciprofloxacin	2	Intermediate
				Amikacin	>256	Resistant
				Colistin	>256	Resistant
				Meropenem	>32	Resistant
26/9/15	iv line	Aerobic BACTEC bottle after 24 hours	*Ochrobactrum* spp.	Not performed	—	—
27/9/15	iv line	Aerobic BACTEC bottle after 15 hours	*Ochrobactrum* spp.	Not performed	—	—
29/9/15	Peripheral	Aerobic BACTEC bottle after 21 hours	*Ochrobactrum* spp.	Not performed	—	—
21/11/15	iv line	Aerobic BACTEC bottle after 33 hours	*Ochrobactrum intermedium*	Ertapenem	0.5	Susceptible
				Meropenem	1.5	Susceptible
				Tigecycline	1.5	Susceptible
				Ciprofloxacin	4	Resistant
				Colistin	>256	Resistant
				Fosfomycin	>1024	Resistant
24/11/15	iv line	Aerobic BACTEC bottle after 31 hours	*Ochrobactrum* spp.	Tigecycline	1.5	Susceptible
				Ertapenem	1.5	Intermediate
				Meropenem	3	Intermediate
				Colistin	>256	Resistant
				Imipenem	12	Resistant
				Cotrimoxazole	6	Resistant
				Ciprofloxacin	6	Resistant

iv, intravenous; MIC, minimum inhibitory concentration.

Ochrobactrum spp. are non-lactose-fermenting, Gram-negative rods that belong to the genus *Brucella*. The most common species identified is *Ochrobactrum anthropi* [1,2]. They are widely regarded as environmental pathogens with low virulence [3,4].

There is minimal literature on infections caused by *O. Intermedium,* and none is associated with intravascular infection. *Ochromobactrum* spp. infections largely relate to immunocompromised patients with bacteraemias, endophthalmitis and a pyogenic liver abscess [5–8]. Notably, this is the first documented case of infective endocarditis related to *O. intermedium* in humans. Successful therapy has been achieved with combination antibiotic therapy based on known susceptibilities, including imipenem with ciprofloxacin/tobramycin (Table 1).

There are few data to inform treatment or interpret minimum inhibitory concentration (MIC) breakpoints. Reported resistance to penicillins and cephalosporins is widespread, with susceptibility to aminoglycosides, fluoroquinolones, imipenem, meropenem, tetracycline and cotrimoxazole. MICs to carbapenems may rise after carbapenem exposure. *O. anthropi* is generally susceptible to colistin, whereas *O. intermedium* is resistant. Resistance mechanisms are unclear and are possibly due to class C β-lactamases.

To our knowledge, this is the first case of infective endocarditis in an immunocompromised patient related to the emerging opportunistic pathogen *O. intermedium*. We advise colleagues to remain vigilant to the virulence potential of this organism, especially if it is recurrent and occurs in immunocompromised patients.

Conflict of Interest

None declared.

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