QJM Advance Access published August 26, 2013

Q J Med
doi:10.1093/qjmed/hct170

Case report

QJM

Achromobacter xylosoxidans meningitis in an immunosuppressed patient

F. BELLISSIMO, M.R. PINZONE, S. TOSTO, G. NUNNARI and B. CACOPARDO

From the Division of Infectious Diseases, Department of Clinical and Molecular Biomedicine, Garibaldi Nesima Hospital, University of Catania, Catania, Italy

Address correspondence to Giuseppe Nunnari, Department of Clinical and Biomedical Science, Institute of Infectious Diseases, ARNAS Garibaldi Hospital, University of Catania, Catania, Italy, Via Palermo 636, 95100, Catania, Italy. email: gnunnari@hotmail.com

Learning Point for Clinicians

Even if rare, central nervous system infections due to *Achromobacter xylosoxidans* may occur, especially in immunocompromised patients. Considering the high mortality associated with *A. xylosoxidans* infections, prompt identification of the pathogen and tailored antibiotic treatment are fundamental.

Case report

A 44-year-old man presented to the emergency department with fever, acute headache, nausea and vomiting. Computed tomography (CT) scan of the brain was unremarkable. His past medical history was significant for non-Hodgkin lymphoma (NHL), which had been successfully treated ten years before with splenectomy and bone marrow transplantation.

At admission, the patient had mild neck stiffness. Body temperature was 38.4°C and two sets of blood cultures were obtained. Laboratory findings revealed that neutrophil count was 14 400 cells/μl, platelets 57 000/μl, C-reactive protein 18.03 mg/dl, erythrocyte sedimentation rate 41 mm/h, fibrinogen 760 mg/dl, ferritin 1335 ng/ml, serum potassium 2.7 meq/l, alanine aminotransferase 45 IU/l, aspartate aminotransferase 99 IU/l, total serum proteins 4.8 g/dl, albumin 2.35 g/dl, gamma globulins 0.22 g/dl. Anti-Human immunodeficiency virus (HIV)-1 antibodies were negative as well as serological markers for Hepatitis B and C virus infection, VDRL and TPHA.

Lumbar puncture (LP) showed a cloudy cerebrospinal fluid (CSF), with a protein concentration of 147 mg/dl and a neutrophil count of 960 cells/μl. VDRL and TPHA on CSF were both negative.

Empiric antibiotic therapy was started with ampicillin (12 g/day intravenously in 4 divided doses) and cefotaxime (12 g/day in 3 divided doses). Mannitol and dexamethasone were also administered together with intravenous rehydration therapy and immunoglobulin infusion.

In the following days the patient remained febrile and drowsy. He developed acute adrenal insufficiency, on the basis of serum sodium and potassium levels (128 and 5.7 mEq/l, respectively), 24-h natriuria (287.1 mEq/24 h) and blood glucose concentration (43 mg/dl). Replacement therapy with cortisone acetate was started.

Three days after hospital admission, both CSF and blood cultures were positive for *Achromobacter spp*. Identification was performed by biochemical tests (API 20 NE strip; bioMérieux, France).

On the basis of the antibiotic susceptibility pattern of the isolates (Table 1), antibiotic therapy was changed to meropenem (6 g/day intravenously in 3 divided doses) and sulphamethoxazole/trimethoprim (cotrimoxazole) (5.6 g/1.12 g/day intravenously in 4 divided doses). Within 8 days from antibiotic switch, the patient became afebrile and nausea,

Table 1 Antibiotic susceptibility pattern of *Achromobacter xylosoxidans* isolated from blood and cerebrospinal fluid cultures

Antibiotic	Minimum inhibitory concentration
Amikacin	32 mg/l
Aztreonam	>16 mg/l
Cefepime	>16 mg/l
Cefotaxime	>32 mg/l
Ceftazidime	16 mg/l
Ciprofloxacin	>2 mg/l
Levofloxacin	4 mg/l
Gentamicin	>8 mg/l
Imipenem	4 mg/l
Meropenem	<1 mg/l
Piperacillin-Tazobactam	<4/4 mg/l
Tobramycin	>8 mg/l
Trimethoprim-Sulfamethoxazole	<0.5/9.5 mg/l

headache, drowsiness progressively vanished, with a definitive normalization of cytobiochemical and bacteriological characteristics of CSF.

Prior to hospital discharge, the patient received anti-meningococcal, anti-pneumococcal and anti-*Haemophilus influenzae* vaccination.

Discussion

Achromobacter xylosoxidans, also known as *Alcaligenes xylosoxidans*, is an aerobic, motile, Gram-negative rod first described in 1971 in patients with chronic otitis media.[1] Achromobacter species have been isolated from water sources and occasionally from the human gastrointestinal tract and ear canal, but it is unclear whether they represent normal components of human endogenous flora. Infections due to *A. xylosoxidans* are rare and have been usually reported in immunocompromised patients, such as patients with cancer, hypoglobulinemia, HIV infection and premature newborns.[2,3] Only few cases of meningitis due to *A. xylosoxidans* have been previously published, usually in patients with accompanying sepsis after neurosurgical procedures, penetrating head traumas and low birth weight children.[4,5] In our case, splenectomy was an important risk factor for *A. xylosoxidans* infection, considering the major role of the spleen in phagocytosing bacteria and producing antibodies. The patient also had hypogammaglobulinemia, which may be associated with several haematological malignancies, including NHL and may contribute to defective opsonization and reduced capability to mount effective antibody responses.[6] Treatment can be difficult because *A. xylosoxidans* is often highly resistant to many different antibiotics; a large number of isolates are still susceptible to cotrimoxazole, carbapenems and antipseudomonal penicillins, which are considered the agents of choice.[3]

Our report demonstrates the importance of searching for unusual or atypical microorganisms when meningitis occurs in patients with severe comorbidities. The prompt and adequate antibiotic adjustment following bacterial isolation has been shown to rapidly modify the clinical outcome.

Conflict of interest: None declared.

References

1. Yabuuchi E, Ohyama A. *Achromobacter xylosoxidans* sp. from human ear discharge. *Jpn J Microbiol* 1971; **15**:477–81.
2. Pickett MJ, Hollis DG, Bottone EJ. Miscellaneous Gram-negative bacteria. In: Balows A, Hausler WJ Jr, Herrmann KL, Isenberg HD, Shadomy HJ, eds, *Manual of Clinical Microbiology*. 5th edn. Washington, DC: American Society for Microbiology, 1991:410–28.
3. Aisenberg G, Rolston KV, Safdar A. Bacteremia caused by Achromobacter and Alcaligenes species in 46 patients with cancer (1989–2003). *Cancer* 2004; **101**:2134–40.
4. D'Amato RF, Salemi M, Mathews A, Cleri DJ, Reddy G. Achromobacter xylosoxidans (Alcaligenes xylosoxidans subsp. xylosoxidans) meningitis associated with a gunshot wound. *J Clin Microbiol* 1988; **26**:2425–6.
5. Namnyak SS, Holmes B, Fathalla SE. Neonatal meningitis caused by Achromobacter xylosoxidans. *J Clin Microbiol* 1985; **22**:470–1.
6. Papanicolaou G, Mehta J. Infections in patients with hematologic malignancies. In: Safdar A, ed. *Principles and Practice of Cancer Infectious Diseases*. 19th edn. Houston: Humana Press, 2011:27–38.