Case Report

Budvicia aquatica sepsis in an immunocompromised patient following exposure to the aftermath of Hurricane Katrina

Angela Corbin,¹ Charlotte Delatte,² Sharee Besson,² Anne Guidry,² Andrew H. Hoffmann III,² Paul Monier³ and Rajkumar Nathaniel¹

Correspondence

Rajkumar Nathaniel
Rajkumar.nathaniel@nicholls.edu

¹Department of Biological Sciences, Nicholls State University, Thibodaux, LA, USA

²Department of Clinical Pathology, Thibodaux Regional Medical Center, Thibodaux, LA, USA

³Department of Infectious Diseases, Thibodaux Regional Medical Center, Thibodaux, LA, USA

Received 22 December 2006

Accepted 27 March 2007

Budvicia aquatica has been found in surface water not associated with human faeces or sewage. The first known case is described of infection in an 85-year-old woman exposed to the aftermath of Hurricane Katrina, who tested positive for *B. aquatica* from both blood and urine samples.

Introduction

The genus *Budvicia*, with its single species *Budvicia aquatica*, was first isolated and described in 1983 in Czechoslovakia (Aldova *et al.*, 1983). The bacterium has been found in various freshwater sources, including wells, water pipes, swimming pools, brooks and rivers (Hausner *et al.*, 1986; Schubert & Groeger-Sohn, 1998).

Case report

The patient, an 85-year-old woman who was originally from New Orleans, LA, was staying with family members in a nearby community due to Hurricane Katrina, which ravaged New Orleans on 29 August 2005. The patient was active for her age, very independent and generally took care of herself. She returned ill from cleaning her flooded New Orleans home in the aftermath of the hurricane and presented with fever, chills and mild hypoxia, and complained of discomfort while urinating. She had a history of autoimmune hepatitis and was undergoing immunosuppressive therapy (azathioprine).

At the time of admission, the patient was febrile (39.3 °C) and had a blood pressure of 107/60 mmHg. Blood and urine were taken for culture. Haematology reports indicated a white blood cell count of $3.9 \times 10^9 \text{ l}^{-1}$, a platelet count of $158 \times 10^{12} \text{ l}^{-1}$, a haemoglobin of 11.5 g dl⁻¹ and a haematocrit of 34.1 %. A differential count revealed 93 % neutrophils, 6 % lymphocytes and 1 % monocytes. Urinalysis showed clear, yellow urine, pH 8.5, specific gravity 1.015, 30 mg dl⁻¹ protein, white cell count 100 cells per low-power field view, red cell count 7 cells per low-power field view, epithelial cell count 7 cells per low-power field view, while glucose, ketone, nitrite, bilirubin and occult blood were undetectable. Urine culture yielded bacteria at $>100\,000 \text{ c.f.u. ml}^{-1}$. Blood cultures also tested

positive for a Gram-negative rod. Biochemical characterization showed the bacterium to grow well on MacConkey agar and nutrient agar at 30 °C and 37 °C. The bacteria produced H₂S, hydrolysed urea and ONPG, and did not deaminate phenylalanine or decarboxylate lysine, arginine or ornithine. Little or no gas was produced from fermentation of carbohydrates. It was motile at 22 °C and variable in motility at 37 °C. The bacterium produced enterobacterial common antigen I. The isolate was identified as *Budvicia aquatica* by the VITEK (bioMérieux) microbial identification system. The bacterial identification was subsequently confirmed by Quest Diagnostics Services. The bacterium was found to be sensitive to several agents. MICs were found to be (in µg ml⁻¹): amikacin (<8), ampicillin (<4), ceftazidime (<4), ceftiofur (<4), ceftriaxone (<4), cefuroxime (<4), ciprofloxacin (<0.5), gentamicin (<2), imipenem (<2), piperacillin (<16), ticarcillin/clavulanic acid (<16) and trimethoprim/sulfamethoxazole (<0.5).

The patient was hospitalized with a diagnosis of urosepsis and treated empirically with intravenous levofloxacin. Considering the severity of the infection, azathioprine was discontinued. After the patient's condition improved and culture results became available, her antimicrobial therapy was switched to orally administered ciprofloxacin. The patient responded well to treatment and was discharged home in good condition to complete a 14-day course of antibiotics. Azathioprine was not restarted pending further evaluation as an outpatient.

Discussion

Autoimmune hepatitis is a chronic inflammatory disease of the liver characterized by histological changes of the liver occurring in the presence of circulating autoantibodies (Czaja, 1995). Immunomodulating drugs such as

azathioprine are used to treat this disease. Azathioprine is thought to suppress the immune system at least partially by its effect on T lymphocytes, and this is mediated through blocking the purine-synthesis pathway (Maltzman & Koretzky, 2003). Azathioprine can further compromise the immune system by suppressing the bone marrow and causing neutropenia. Individuals being treated on a long-term basis with this or any immunosuppressive agent are at risk of the development of opportunistic infections.

B. aquatica has been reported elsewhere as a surface-water contaminant not associated with human faeces or sewage. As this organism has not been implicated before in human disease, this case presents a concern regarding the exposure risks for immunocompromised patients exposed to the aftermath of Hurricane Katrina.

References

- Aldova, E., Hausner, O., Gabrhelova, M., Schindler, J., Petras, P. & Brana, H. (1983).** A hydrogen sulphide producing Gram-negative rod from water. *Zentralbl Bakteriol Mikrobiol Hyg [A]* **254**, 95–108.
- Czaja, A. J. (1995).** Autoimmune hepatitis. Evolving concepts and treatment strategies. *Dig Dis Sci* **40**, 435.
- Hausner, O., Kocmoud, Z. & Gabrhelova, M. (1986).** The incidence and diagnosis of a new type of bacteria, *Budvicia aquatica*, in specimens from the laboratory for water study. *Cesk Epidemiol Mikrobiol Immunol* **35**, 336–340 (in Czech).
- Maltzman, J. & Koretzky, G. (2003).** Azathioprine: old drug, new actions. *J Clin Invest* **111**, 1122–1124.
- Schubert, R. H. & Groeger-Sohn, S. (1998).** Detection of *Budvicia aquatica* and *Pragia fontium* and occurrence in surface waters. *Zentralbl Hyg Umweltmed* **201**, 371–376.