Successful Management of *Elizabethkingia meningoseptica* Meningitis with Intraventricular Vancomycin

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### Abstract

*Elizabethkingia meningoseptica*, formerly *Chryseobacterium meningosepticum* usually causes neonatal meningitis and is a rare cause of nosocomial meningitis in adults. *E. meningoseptica* is resistant to most antibiotics, and the use of inactive drugs as empirical therapy may contribute to poor outcome in many patients. Vancomycin, alone or in combination with rifampicin, has been successful in the treatment of meningitis in infants. We present a case of *E. meningoseptica* meningitis in an adult who was treated initially with intravenous vancomycin and oral rifampicin, but did not respond to the treatment. Thereafter, intraventricular vancomycin was added which resulted in good treatment response.

### Introduction

*Elizabethkingia meningoseptica* is a rare cause of adult meningitis. We report a case of *E. meningoseptica* meningitis in an adult who was treated with intraventricular vancomycin after failing conventional treatment with intravenous vancomycin and oral rifampicin.

### Case Report

A 67 year old male patient had presented to the hospital emergency services with hypertensive intracerebral hemorrhage with increased intracranial pressure. The patient was a diabetic and hypertensive on treatment with oral hypoglycemics and antihypertensive agents for the past 4 years. The patient was a chronic alcohol user for the past 10 years

On examination, pulse was 76 beats per minute and blood pressure was 140/90 mm of mercury. His sugar on presentation was 267 mg/dl. His Glasgow Coma Scale score was 8 (E1 V2 M5).

CT scan of the brain showed intraventricular hemorrhage with hydrocephalus. The patient underwent emergency craniotomy and Ommaya reservoir insertion along with external ventricular drainage. The patient’s sensorium improved but the Ommaya reservoir developed repeated blockage requiring manipulation many times. During his stay in the intensive care unit, the patient developed fever, neck stiffness and altered sensorium on the 8th postoperative day. CSF showed the picture of pyogenic meningitis but culture was negative. The patient was treated with various antibiotics including meropenem, vancomycin, colistin and teicoplanin with no response. CSF culture was repeated which showed *Elizabethkingia meningoseptica*, susceptible to vancomycin (MIC-3mg/liter), rifampicin and linezolid. The patient was then referred for infectious disease opinion and was started on vancomycin 1 gram intravenously 8 hourly and rifampicin 600 mg orally once a day. Serum vancomycin trough level was 20 mg/L and CSF vancomycin trough levels was 11 mg/liter. However CSF cultures remained positive even after 6 days of systemic antibiotics.

Intraventricular vancomycin (15 mg) was therefore added to the regimen with the goal of achieving high CSF vancomycin levels resulting in a CSF vancomycin trough level of 140 mg/Liter. The patient improved well clinically. CSF cell count decreased and cultures repeated after 2, 10 and 15 days of this regimen remained negative. VP shunt and Ommaya reservoir were eventually removed and the patient was discharged.

### Discussion

*Elizabethkingia meningoseptica* is a nonfermenting, nonmotile, oxidase-positive Gram-negative aerobic bacillus that is ubiquitous in the environment and is found in freshwater, saltwater, and soil. *E. meningoseptica* has been found in the hospital environment in such sites as water supplies, saline solution used for flushing procedures, disinfectants, and medical devices, including feeding tubes and arterial catheters. In this patient, there was manipulation of the Ommaya reservoir on multiple occasions which may have been a potential source of infection. *E. meningoseptica* has unusual resistance patterns and mechanisms. It is intrinsically resistant to most β-lactams, including carbapenems, due to production of chromosomal metallo-β-lactamases (MBLs).² It is thus resistant to the usual agents used in the treatment of meningitis, such as ampicillin, ceftriaxone, gentamicin, kanamycin, and chloramphenicol. Vancomycin given intravenously alone or in combination with other agents, such as rifampin, has been successful in the treatment of meningitis in infants. This may be due to better CSF penetration of vancomycin in infants which may not be the case in adults.

Another important property of this bacterium is its ability to form biofilms. Biofilms decrease susceptibility to antimicrobial agents. This is due to the physical impairment of diffusion of antibiotics, reduced bacterial growth rates and local alterations of the microenvironment that may impair the activity of the antimicrobials. Hence it is important to remove foreign bodies bearing biofilms for successful treatment of infection.

After the growth of *E. meningoseptica* in the CSF of this patient, it was considered that the Ommaya reservoir

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and the VP shunt be removed. However, there was a need to keep intracranial pressure under control by the Ommaya reservoir and it also served as port to instill intraventricular vancomycin. Hence the Ommaya reservoir as well as the VP shunt were kept in situ.

In this patient, MIC of vancomycin was 3 mg/liter, CSF vancomycin level obtained with systemic administration was 11 mg/liter. Hence it was thought that intravenous vancomycin and rifampicin would result in a response. However an inhibitory quotient (Vancomycin trough level/Vancomycin MIC) of 10-20 has been shown to be required for cure4. Hence intraventricular vancomycin was used, which generated a CSF trough level of 140 mg/Liter, an inhibitory quotient of 140/3 and a successful outcome.

**Conclusion**

To our knowledge, this is the second reported case where intraventricular vancomycin was required and was used in the treatment of Elizabethkingia meningoseptica meningitis.

**References**


