

# Septicemia Due to Multidrug Resistant *Elizabethkingia Meningoseptica*: An Emerging Nosocomial Pathogen In India

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## ABSTRACT

*Elizabethkingia Meningoseptica* is a gram-negative bacillus that is known to cause meningitis in premature neonates, and a variety of infections in immunocompromised adults. We are presenting the case of a 37 year old patient with an ileal perforation, in whom an ileostomy was done. He was

on a ventilator for eleven days in the ICU and he developed septicaemia due to this organism. It is important that clinicians consider *Elizabethkingia Meningoseptica* also as a rare cause of septicaemia. The patient was successfully treated with levofloxacin, with a good clinical outcome.

**Key Words:** *Elizabethkingia meningoseptica*, Septicaemia, Nosocomial pathogen, VITEK 2C

## INTRODUCTION

*Elizabethkingia meningoseptica* is a gram negative, rod shaped bacterium which is widely distributed in nature and are the inhabitants of soil and water. In the hospital environment, they exist in water systems and wet surfaces. In 1959, the American bacteriologist, Elizabeth O. King, was studying the unclassified bacteria which are associated with meningitis in infants, when she isolated an organism (CDC group IIa) that she named, *Flavobacterium meningosepticum* [1]. In 1994, it was reclassified in the genus, *Chryseobacterium* and was named as *Chryseobacterium meningosepticum* [2]. Later on, it was placed in the new genus, Elizabeth kingia which is named after the original discoverer [3] and was named as *Elizabethkingia meningoseptica* (*E. meningoseptica*).

It has generally been reported to cause outbreaks of meningitis, predominantly in premature newborns and infants in neonatal intensive care units. Bacteraemia is the second most common presentation of the *E. meningoseptica* infection. *E. meningoseptica* also causes endocarditis, cellulitis, wound infections, sepsis following extensive burns, abdominal abscesses, dialysis associated peritonitis and endophthalmitis. The infections which include cellulitis, septic arthritis, community-acquired respiratory tract infections, keratitis and bacteraemia have been reported in the absence of underlying diseases [4]. The primarily opportunistic pathogens mainly infect newborns and immunocompromised hosts from all the

age groups.

The antimicrobial susceptibility data on this species remains very limited, since this pathogen has rarely been isolated from clinical specimens.

## CASE REPORT

A 37 year old man with a known history of Crohn's disease presented to the emergency department with a history of vomiting, loose stools, fever and abdominal pain for a period of three days duration.

On examination, the patient was found to be febrile. His abdominal examination revealed severe tenderness, guarding and rigidity. Bowel sounds were absent and minimal free fluid was present. Examination of the respiratory system and the chest X-rays showed normal results. There was no focal neurological deficit. The patient was diagnosed to have an ileal perforation. An emergency laprotomy with an ileostomy was done and two litres of faeculent fluid were removed. The patient was shifted to the ICU, where he was on a ventilator for eleven days and was then weaned off after a tracheostomy.

The initial blood investigations revealed haemoglobin-10.3gm/l, a total leucocyte count of  $9.5 \times 10^3$ /ul, a differential count of 94.5% neutrophils, 2.7% lymphocytes, 0.1% basophils and 0.1% eosinophils, serum sodium-137mEq/l, potassium-4.48mEq/l, bicarbonate-15.4mEq/l, creatinine- 1.17mg/

dl, random blood sugar- 187mg/l and an ESR of 14 mm.

The initial blood culture which was sent on the second day of his admission did not grow any organism even after seven days of incubation. Two blood cultures were received again in the microbiology lab, one from the central line and another from the peripheral line, after eight days of stay in the ICU. The blood cultures were processed by using the BacT/ALERT (bioMérieux) automated system and both the cultures became positive after twelve hours of incubation. The organism was a non fermenting, gram-negative bacillus which was nonmotile, oxidase positive, catalase positive, Ehrlich's indole-positive and esculin positive. It did not produce any pigment on 5% sheep blood agar. The isolates were colistin and polymyxin B resistant. The biochemical characterization was confirmed with an ID-GNB card, VITEK 2C (bioMérieux), which identified the organism as *Elizabethkingia meningoseptica*. A tracheal aspirate which was sent for culture also grew the same organism, with the same sensitivity pattern.

The antimicrobial susceptibility of the clinical isolate was determined by the disk diffusion method on Mueller-Hinton agar, according to the recommendations of the CLSI standards and the disks were procured from Bio-Rad Laboratories, Mumbai. The isolates were tested for the following antibiotics: piperacillin, piperacillin-tazobactam, ceftazidime, ceftriaxone, imipenem, meropenem tigecycline, tobramycin, gentamicin, amikacin and levofloxacin. By the disc diffusion method, the isolates were found to be sensitive to piperacillin, piperacillin-tazobactam and levofloxacin, but to be resistant to the others. The MICs were determined for the same antibiotics by using the VITEK 2C, AST card - N090 (bioMérieux) according to the manufacturer's recommendations, which showed resistance to all the antibiotics which were tested by the disc diffusion method.

## DISCUSSION

The strains of this bacterium have rarely been reported to cause infections among immunocompetent adults, which account for only 1-2% of the gram-negative rods which are isolated in the microbiologic culture [5].

In the literature, most of the reported cases of the *E. meningosepticum* infection were found to be hospital acquired and they had usually occurred in immunodeficient patients. The infection which has been described here was considered to be hospital acquired, because the initial blood culture which was sent on admission was sterile and the subsequent blood cultures were positive for this organism, *Elizabethkingia meningoseptica*, which were sent after the patient was put on a ventilator in the ICU after ten days of admission.

*E. meningosepticum* has unusual resistance patterns and

mechanisms. They are resistant to multiple antibiotics, especially to the  $\beta$ -lactams. Different resistance patterns have been reported in different outbreaks which have occurred worldwide. The appropriate choice of the antimicrobial agents which are effective for the treatment of the chryseobacterial infections is quite difficult to make. According to the results of the SENTRY Antimicrobial Surveillance Program, this organism is known to exhibit resistance to the aminoglycosides, tetracyclines, chloramphenicol, erythromycin, clindamycin, and teicoplanin [6]. In addition, the MIC breakpoints have not been established by the National Committee for Clinical Laboratory Standards (NCCLS) for this bacterium [7].

Vancomycin alone or in combination with other agents, which include rifampin, has in the past been successful in the treatment of meningitis in infants. However, the usefulness of vancomycin has more recently been questioned. Vancomycin's MIC though it has not been reported by VITEK 2C, was still tested in our lab for this isolate by using the disc diffusion method, which showed sensitive results. The MIC was also obtained by the Hicomb method (Himedia, Mumbai, India), which showed the MIC to be 4  $\mu$ g/ml.

Based on the results of the disc diffusion method, our patient was started on levofloxacin 500 mg, intravenously, which was given twice daily for a period of sixteen days, even though our VITEK 2C showed the MIC to be resistant for levofloxacin. The patient improved clinically and was subsequently discharged with the plan of an ileostomy closure after three months. Antimicrobial susceptibility testing may cause a therapeutic dilemma, as it may show discrepancies between various methods of testing [8].

Based on the clinical outcome in this case, we agree that VITEK 2C may be less accurate than the disk diffusion method for the detection of the antimicrobial resistance in this organism, which was also stated by another study from Karnataka, India [8].

## CONCLUSION

*Elizabethkingia meningoseptica* should be included in the list of suspected nosocomial infections, especially in patients with immunocompromised status. There is no optimal regimen for the treatment of the *Elizabethkingia* species infections and the antimicrobial therapy should be based on the results of the properly performed susceptibility tests. Keeping a high index of suspicion is necessary for the diagnosis and the prompt treatment of this potentially fatal infection.

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