

CASE REPORT

Emergence of Neonatal Meningitis and Septicaemia: A Case Report on *Elizabethkingia Meningoseptica* Infection

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Abstract

Elizabethkingia meningoseptica, a Gram-negative bacterium, presents a concerning challenge in healthcare, notably in NICUs and among immunocompromised patients. This abstract reviews its clinical impact and antibiotic resistance through a case report of a premature infant diagnosed with sepsis and meningitis. Despite susceptibility to levofloxacin, resistance to multiple antibiotics complicates treatment. The discussion emphasizes early diagnosis, multidisciplinary care, and stringent infection control measures to mitigate outbreaks. Enhanced diagnostics and standardized antibiotic testing are crucial for improved patient outcomes. This highlights the evolving threat of *E.meningoseptica* in healthcare and the necessity for proactive infection control strategies.

Keywords

Elizabethkingia meningoseptica, nosocomial, sepsis, meningitis

Introduction

Elizabethkingia meningoseptica is a bacterial species that belongs to the genus *Elizabethkingia*, which was named in honor of the bacteriologist Elizabeth O. King. It is a Gram-negative, rod-shaped bacterium known for its ability to colonize various environments such as water sources, soil, and healthcare settings.

This bacterium has garnered attention due to its association with nosocomial infections, particularly in neonatal intensive care units (NICUs) and among immunocompromised patients. It has been isolated from hospital water supplies, sinks, taps, and various medical devices, highlighting its potential role in healthcare-associated infections. Infections caused by *Elizabethkingia meningoseptica* can range from mild to severe and may manifest as meningitis, bacteremia, pneumonia, cellulitis, and other soft tissue infections^[1]. Neonates, especially premature infants, are particularly

vulnerable to these infections, and outbreaks in NICUs have been reported. One of the significant challenges in managing infections caused by *Elizabethkingia meningoseptica* is its intrinsic resistance to multiple antibiotics, including beta-lactams and carbapenems. This resistance is attributed to the production of various beta-lactamases, including class B metallo-beta-lactamases (MBLs) and class A extended-spectrum beta-lactamases. As a result, treatment strategies often rely on antibiotic susceptibility testing to guide appropriate therapy.

Overall, *Elizabethkingia meningoseptica* poses a notable concern in healthcare settings due to its ability to cause severe infections, its resistance to commonly used antibiotics, and its propensity to persist in the environment, necessitating stringent infection control measures to prevent outbreaks and transmission^[2].

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Case Report

We present a case involving a 29-week premature infant who presented with neonatal sepsis and meningitis. Despite the initial stability, the infant's health deteriorated on the 17th day of life, marked by fever, seizure like activity and an elevated total white blood cell count, ultimately leading to a diagnosis of sepsis and meningitis. A septic screen was conducted, revealing a Gram-negative rod morphology upon staining (Fig 1A), and subsequent culturing on Blood and Chocolate agar plates yielded smooth, greyish-white colonies (Fig 1B and 1C), with no growth observed on MacConkey agar plates (Fig 1D). The organism was identified as *Elizabethkingia meningoseptica* via the VITEK 2 system, demonstrating susceptibility to Levofloxacin but resistance to Amikacin, Gentamycin, Cefipime, Ceftazidime, and Trimethoprim/Sulfamethoxazole. Treatment consisted of Inj. Levofloxacin and continued intravenous antibiotics for 21 days, resulting in improvement of the infant's condition. The infant was discharged on Day 93 of life with adequate weight gain and a corrected gestational age of 42 weeks and 4 days.

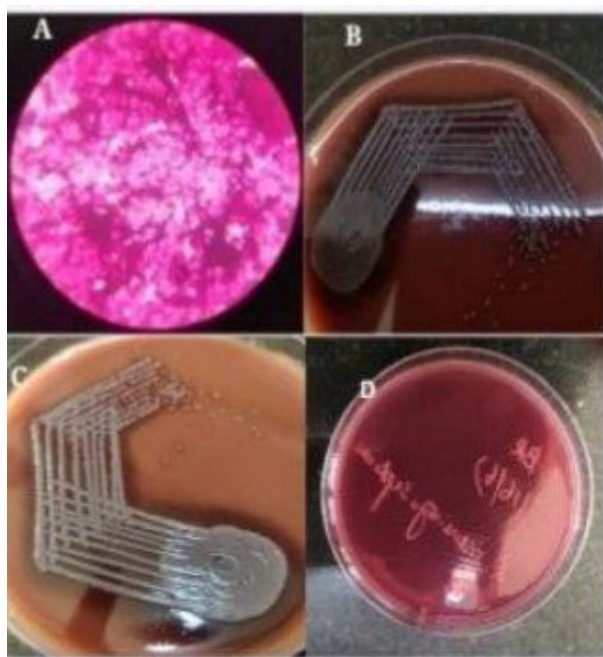


Fig 1A: Gram-negative rod morphology on Gram staining

Fig 1B: Blood agar plate yielded smooth, greyish-white colonies

Fig 1C: Chocolate agar plate yielded smooth, greyish-white colonies

Fig 1D: MacConkey agar plates shows no growth

Discussion

Elizabethkingia meningoseptica is a relatively rare pathogen that predominantly impacts newborns and individuals with compromised immune systems. However, our understanding of clinical aspects related to *Elizabethkingia meningoseptica* infections remains limited. This bacterium inherently exhibits resistance to numerous antibiotics, and our patient's infection failed to respond to multiple antibiotic treatments. Existing literature documents cases of *Elizabethkingia meningoseptica* causing various conditions such as pneumonia, meningitis, soft tissue infections, and osteomyelitis. In our patient's case, meningitis and sepsis were observed in association with this organism. While *Elizabethkingia meningoseptica* primarily affects immunocompromised individuals and is linked to heightened mortality rates, instances of sepsis induced by this bacterium have been reported in immunocompetent patients as well. Factors that may elevate the risk of acquiring the infection include conditions like diabetes, steroid use, organ transplantation, and malignancy^[3]. Recent research has indicated the potential efficacy of fluoroquinolones against this pathogen, and accordingly, our patient was also treated with levofloxacin.

Detecting the source of an *E. meningoseptica* outbreak typically involves sampling various sources such as food, infant formulas, wet and dry surfaces, equipment, and the hands of healthcare workers in contact with affected patients^[4]. This underscores the importance of revising antibiotic prescribing policies and admission protocols for neonatal units, alongside rigorous unit disinfection, as recommended strategies for eradicating *E. meningoseptica* outbreaks in pediatric wards^[5]. Previous research has suggested additional infection control measures, including the use of alcoholic hand rubs post-handwashing, using sterile water for infant toileting instead of tap water, and implementing maintenance procedures like repairing, cleaning, super chlorinating, and isolating water tanks from hospital feeder tanks, as well as replacing sink taps. Furthermore, continuous training programs are essential to reinforce the significance of hand hygiene and adherence to contact precautions among hospital staff.^[6,7]

Conclusion

The rise of nosocomial infections caused by *E. meningoseptica* poses a growing challenge in healthcare settings, particularly for immunocompromised patients. This is primarily attributed to its environmental resilience

and inherent antimicrobial resistance. It is imperative to enhance laboratory capabilities for diagnosing this bacterium and to adopt a multidisciplinary approach for managing infected neonates. Our firsthand experience underscores the importance of employing combined antibiotic strategies to achieve favorable outcomes. *E. meningoseptica* represents an emerging infectious threat in healthcare, particularly in the neonatal context, carrying a heightened risk of complications and mortality among premature infants. Enhancing the precision of bacterial identification and standardizing antibiotic susceptibility testing are crucial for early diagnosis and targeted treatment, aiming to mitigate mortality and neurological sequelae. Rigorous intensive care practices and multidisciplinary interventions play pivotal roles in effective case management. Proactive infection control measures within hospital environments, especially concerning water sources, are essential for curbing potential epidemics associated with *Elizabethkingia meningoseptica*.

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