International Journal of Contemporary Pediatrics
Alkaysi SN et al. Int J Contemp Pediatr. 2025 Nov;12(11):1846-1849
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20253321

Case Report

Neonatal bacteremia and meningitis caused by *Elizabethkingia*, treatment and challenges: a case report and literature review

Samiha N. Alkaysi[1], Mustafa M. Alkazak[1]*, Jana M. Alaraj[2]

[1]Department of Pediatrics, Sheikh Khalifa Medical City, Ajman, United Arab Emirates
[2]Dubai Medical College, United Arab Emirates

Received: 27 September 2025
Accepted: 13 October 2025

***Correspondence:**
Dr. Mustafa M. Alkazak,
E-mail: kazakmmk1@gmail.com

ABSTRACT

Elizabethkingia is a gram-negative, rod-shaped bacterial genus that is commonly detected in the environment (particularly in soil and water), but it rarely causes human infection; however, following an increased incidence of *Elizabethkingia* infections among patients in adulthood, pediatric and neonatal intensive care units, since 2004. *Elizabethkingia* is considered an emerging pathogen in hospital settings, and it has been linked to outbreaks due to contaminated medical equipment. Moreover, this infection can also be a pathogen causing neonatal sepsis which is associated with high rates of morbidity and mortality, including potential long-term neurological complications. Early recognition as well as identification of appropriate, often prolonged, combination of antibiotic therapy is essential in managing such infections. In our report, we present a case of acute meningitis caused by *E. meningoseptica* in a premature baby 33 weeks of gestational age, admitted to our pediatric word at the 13 days old as a case of neonatal fever, with past history of 18 hours PROM and oligohydramnios. The organism is identified through blood and cerebrospinal fluid cultures. For the treatment of this infection, we started on triple antibiotic therapy (Rifampicin, vancomycin and trimethoprim/sulphamethoxazole) due to known multidrug resistance to many standard antibiotic regimens, making treatment challenging mainly in preterm babies and immunocompromised children. In conclusion, effective management of multidrug resistant bacteria such *Elizabethkingia* requires a multidisciplinary approach, including intensive care support (in some cases), and coordination with infection control teams to prevent further transmission and improve the outcome.

Keywords: *Elizabethkingia meningoseptica*, Neonatal sepsis, Multidrug resistance, Premature infants, Infection control

INTRODUCTION

Elizabethkingia meningoseptica is a rare, Gram-negative, non-motile, non-fermentative bacillus that is considers as a significant risk in neonatal intensive care units (NICUs), particularly among premature or immunocompromised neonates. In 1959 American bacteriologist Elizabeth O. King first time classified as *Flavobacterium meningosepticum*, the organism has since undergone taxonomic revisions and was reclassified under the genus *Elizabethkingia* in 2005 based on phylogenetic analysis.[1,2]

This environmental bacterium is widely distributed in soil, fresh water, and hospital settings. It has been isolated from hospital tap water, sink drains, disinfectants, and respiratory equipment, and is particularly known for causing healthcare-associated outbreaks.[3,4]

In neonates, *E. meningoseptica* is a rare but serious cause of meningitis and septicemia. This infection is associated with high mortality and severe long-term complications including hydrocephalus, brain abscesses, and developmental delays.[3,5]

For these reasons it should be cured as fast as possible and in a correct way. One of the major clinical challenges during the management of *E. meningoseptica* is its radical resistance to a lot of frequently used broad-spectrum antibiotics, which are typically used to treat Gram-negative infections, including beta-lactams, carbapenems, and aminoglycosides. This resistance is largely attributed to the organism's production of multiple β-lactamases.[6]

Empiric therapy often proves ineffective, and treatment requires antibiotics such as vancomycin, fluoroquinolones, rifampicin, minocycline, or piperacillin-tazobactam, often in combination for improved outcomes.[6,7] The organism's antimicrobial susceptibility pattern also varies significantly by geographic location, further complicating treatment decisions.[7]

CASE REPORT

We report a case of *E. meningoseptica* infection in a premature neonate born at 33 weeks and 6 days of gestation via spontaneous vaginal delivery, with a birth weight of 2,380 grams.

The mother, a 32-year-old woman, had a history of premature rupture of membranes (PROM) for 18 hours and oligohydramnios. The baby was admitted to the special care antenatal unit (SCAPU) for one week prior to being discharged home. Two days after discharge, the neonate was brought to urgent care for jaundice evaluation and discharge home with reassuring level of serum bilirubin. On the 13th day of life, the neonate was admitted to the pediatric ward with a diagnosis of neonatal fever.

A full septic workup was initiated, the lumbar puncture was traumatic so only cerebrospinal fluid (CSF) culture sent for analysis, the other laboratory investigations shown in table1, then empirical antibiotics treatment with parenteral ampicillin and cefotaxime started. After two days of admission, the antibiotics coverage was escalated to meropenem upon identification of Gram-negative bacilli in the blood culture. Subsequently, (CSF) and blood cultures confirmed the presence of *E. meningoseptica* on day 5 of hospitalization along with susceptibly to trimethoprim/sulfamethoxazole, and resistant to all cephalosporins. Repeating lumbar puncture offered but refused by parents. Pediatric infectious disease consultant was involved and recommended to start management with triple antibiotics regimen consisting of: parenteral trimethoprim/sulfamethoxazole and vancomycin for a duration of 4 to 6 weeks, along with parenteral rifampicin for 2 weeks.

The baby received the full course of antibiotics and was discharged home with no concerns. During follow up, after 4 and 12 weeks, his hearing test and neurological assessment was normal.

Table 1: Laboratory investigations findings in a 13-day-old neonate with fever.

Tests	Results	Reference range
White blood cells	18000	4,500-13,500/mm³
Neutrophils (%)	62	
Lymphocytes (%)	27	
ANC	10	
Monocytes	1.3	
Platelets	339000	150,000-450,000 /mm³
Hemoglobin	18.8 g/dl	13.5-17.5 g/dL (newborn)
C-reactive protein	23 then after 5 days raised to 48	<5 mg/L
Procalcitonin	0.75	<0.5 µg/L
G6PD	Normal	Normal
CSF, blood cultures at 120 hours	*Elizabethkingia* bacteria	Positive
CSF PCR	Not done	N/A
Respiratory panel	Not done	Negative
Urinalysis	Insignificant	Normal

DISCUSSION

Neonatal bacterial meningitis is serious infection associated with high mortality and the morbidity remains high among survivors.[8] The types and distribution of relative pathogens depending on birth, gestational age, postnatal age, and geographic region. *Streptococcus agalactiae* still the most common cause of neonatal sepsis and meningitis since the early 1980s.[9]

E. meningoseptica is a ubiquitous waterborne saprophytic bacillus not considered part of the normal human flora. It rarely causes infection in the post-neonatal immunocompetent host.[10]

Prematurity is a risk factor for meningitis because most maternal immunoglobulins cross the placenta after 32 weeks gestation, so infants born extremely preterm are at a significantly higher risk for infections. *E. meningoseptica* can associated with high mortality because of its antibiotic resistance and difficult diagnosis.[11] As a primarily opportunistic pathogen, *E. meningoseptica* mainly infects newborns and immunocompromised hosts from all age groups.

International environmental studies have confirmed that the bacteria can survive in chlorine-treated municipal

water supplies, often colonizes sink basins and taps, and has become a potential reservoir for infections in hospital settings.[12] As in our case, premature newborn weighing <2380 gm is at higher risk of *E. meningoseptica* infection and outcome was with minimal sequelae, most probably due to early identification of the pathogen and proper management.

The source of an *E. meningoseptica* outbreak can be detected by obtaining cultures from food and infant formulas, wet areas, dry surfaces, equipment, and the hands of healthcare workers or parents who in closely contact with infected patients.[13] However, the exact source of these infections is often not elucidated. The virulence factors responsible for invasive *E. meningoseptica* disease have not yet been fully elucidated.

Changing the prescribing policy for empiric antibiotics and protocols for admissions to the neonatal unit, in addition to thorough disinfection of the unit have been recommended as measures to eradicate *E. meningoseptica* outbreaks in pediatric hospitals.[14]

E. meningoseptica is resistant to most antibiotics, and the use of inappropriate drugs as empirical therapy may contribute to the poor outcome in many infections.[14]

The bacterial isolates in our cases were sensitive to ciprofloxacin, piperacillin/tazobactam, and vancomycin. Recent studies have demonstrated the effectiveness of fluoroquinolones, due to their superior pharmacokinetics compared to hydrophilic antimicrobials, such as Beta-lactams.[15] Sparfloxacin, clinafloxacin, and levofloxacin have shown better activity against *E. meningoseptica* than ciprofloxacin. Rifampin has been used as part of combination therapy for the treatment of persistent infection. Vancomycin alone or in combination with other agents like rifampin has been successful in the treatment of meningitis in infants.[16]

CONCLUSION

E. meningoseptica is a rare but clinically significant cause of neonatal meningitis, particularly in preterm infants. In this case, a preterm neonate was diagnosed with *E. meningoseptica* meningitis, confirmed by positive blood and CSF cultures, despite a traumatic lumbar puncture. Antimicrobial susceptibility testing revealed sensitivity only to trimethoprim-sulfamethoxazole (Bactrim), with resistance to all tested cephalosporins.

Rifampicin and vancomycin, although not included in the susceptibility panel, but was administered based on pediatric infectious disease consultation. The infant was treated with a combination of bactrim, vancomycin, and rifampicin, and showed full clinical recovery without neurological or other pathological sequelae. This case underscores the challenges in managing infections caused by multidrug-resistant organisms in neonates and highlights the importance of individualized, expert-guided antimicrobial therapy even when susceptibility data are limited.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. King EO. Studies on a group of previously unclassified bacteria associated with meningitis in infants. Am J Clin Pathol. 1959;31(3):241-7.
2. Kim KK, Kim MK, Lim JH, Park HY, Lee ST. Transfer of *Chryseobacterium meningosepticum* and *Chryseobacterium miricola* to *Elizabethkingia* gen. nov. as *Elizabethkingia meningoseptica* comb. nov. and *Elizabethkingia miricola* comb. nov. Int J Syst Evol Microbiol. 2005;55(3):1287-93.
3. Bloch KC, Nadarajah R, Jacobs R. *Elizabethkingia meningoseptica*: an emerging cause of neonatal meningitis. Clin Infect Dis. 1997;24(3):566-9.
4. Jean SS, Lee WS, Chen FL, Ou TY, Hsueh PR. *Elizabethkingia meningoseptica*: an important emerging pathogen causing healthcare-associated infections. J Hosp Infect. 2014;86(4):244-9.
5. Kothur K, Teng W, Nair S, Britton PN, Smith DW, Yau Y. Neurological sequelae due to *Elizabethkingia meningoseptica* meningitis in neonates: a systematic review. J Child Neurol. 2017;32(10):798-803.
6. Lin PY, Chu C, Su LH, Huang CT, Chang WY, Chiu CH. Clinical and microbiological analysis of *Elizabethkingia meningoseptica* bacteremia in adult patients in Taiwan. Scand J Infect Dis. 2009;41(9):628-34.
7. Lau SKP, Chow WN, Foo CH, Shirly OTC, Chi-Shing LG, Jade LLT, et al. *Elizabethkingia anophelis* bacteremia is associated with clinically significant infections and high mortality. Sci Rep. 2016;6:26045.
8. Ku LC, Boggess KA, Cohen-Wolkowiez M. Bacterial meningitis in infants. Clin Perinatol. 2015;42(1):29-45.
9. Abdelaziz M, Hamadalnil Y, Hashim O, Bashir T, Mahjoub ES. Microbiological profile of neonatal sepsis at a maternity hospital in Omdurman, Sudan. Sudan J Med Sci. 2019;14(1):45-51.
10. Sztajnbok J and Troster EJ. Community acquired *Chryseobacterium meningosepticum* pneumonia and sepsis in a previously healthy child. J Infect. 1998;37:310-12.
11. Aldoghaim FS, Kaabia N, Alyami AM, Alqasim MA, Ahmed MA, Al Aidaroos A, et al. *E. meningoseptica* (*Chryseobacterium meningosepticum*) bacteraemia: a series of 12 cases at Prince Sultan Military Medical City KSA. New Microbes New Infect. 2019;32:100617.
12. Bloch KC, Nadarajah R, Jacobs R. *Chryseobacterium meningosepticum*: an emerging pathogen among immunocompromised adults.

Report of 6 cases and literature review. Medicine (Baltimore). 1997;76(1):30-41.
13. Choi MH, Kim M, Jeong SJ, Choi JY, Lee IY, Yong TS, et al. Risk factors for *Elizabethkingia* acquisition and clinical characteristics of patients, South Korea. Emerg Infect Dis. 2019;25(1):42-51.
14. Han MS, Kim H, Lee Y, Kim M, Ku NS, Choi JY, et al. Relative prevalence and antimicrobial susceptibility of clinical isolates of *Elizabethkingia* species based on 16S rRNA gene sequencing. J Clin Microbiol. 2016;55(1):274-80.
15. Huang YC, Lin YT, Wang FD. Comparison of the therapeutic efficacy of fluoroquinolone and non-fluoroquinolone treatment in patients with *Elizabethkingia meningoseptica* bacteraemia. Int J Antimicrob Agents 2018;51(1):47-51.
16. Hayek SS, Abd TT, Cribbs SK, Anderson AM, Melendez A, Kobayashi M, et al. Rare *Elizabethkingia meningosepticum* meningitis case in an immunocompetent adult. Emerg Microbes Infect. 2013;2(4):e17.

Cite this article as: Alkaysi SN, Alkazak MM, Alaraj JM. Neonatal bacteremia and meningitis caused by *Elizabethkingia*, treatment and challenges: a case report and literature review. Int J Contemp Pediatr 2025;12:1846-9.