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# *Elizabethkingia meningoseptica* in a Female Neonate: A Case Report from Afghanistan

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**ABSTRACT**

*Elizabethkingia meningoseptica* is a rare and Gram-negative bacterium that can cause severe complications in neonates. Here a case of meningitis in an 18-day-old female is reported from Afghanistan. CSF analysis and culture confirmed *E. meningoseptica* as the causative agent. The isolate was resistant to the most antibiotics, with susceptibility only to tigecycline. This case highlights the clinical importance of early detection and the challenge of treating infections caused by this pathogen, especially in resource limited countries like Afghanistan.

**Keywords**: *Elizabethkingia meningoseptica*, Afghanistan, Neonate, Case report

## Introduction

*Elizabethkingia meningoseptica*, formerly Known as *Chryseobacterium meningosepticum*, is a Gram-negative, non-fermentative, non-motile bacillus that identify by biochemical tests such as oxidase test and bile esculin test. This name took for this bacterium in honor of Elizabeth O. King. This bacterium sources are either environmental such as water and soil, as well as from hospital settings, that lead to opportunistic nosocomial infections, especially outbreaks of meningitis in newborns (1, 2).

*E. meningoseptica* is an opportunistic infection that primarily affect sensitive people such as premature newborns and neonates. It has been associated with a variety of clinical diseases, like meningitis, sepsis, heart disease, respiratory, skin, soft tissue, and bladder infections. ICU department is a major source of *E. meningoseptica* and others related infections, accounting for over 60% of all reported cases (3).

Subsequent research revealed that it possesses genetic elements coding for virulence factors, which enable it to effectively penetrate brain endothelial cells. These mechanisms bear a striking similarity to those utilized by *Escherichia*

*coli* in breaching the blood-brain barrier during neonatal meningitis cases. This finding underscores the pathogen's sophisticated ability to target and infiltrate critical cellular barriers, mirroring strategies observed in related bacterial infections. The presence of such genes highlights a shared pathogenic toolkit, potentially informing future therapeutic and diagnostic approaches for managing severe neurological infections (4).

Several studies over the past two decades have shown that *E. meningoseptica* could cause infections in both immunocompromised and immunocompetent individuals. Although infections are more common and severe in those with weakened immune systems, cases in healthy people have also been reported, indicating the bacterium's broad pathogenic potential (5-10).

Here we report the first rare case of pericardial meningitis due to *E. meningoseptica* in a patient from Afghanistan.

## Case Report

An 18-day-old female neonate was admitted to Irene Salimi Children Hospital in Kabul, Afghanistan, with clinical suspicion of meningitis. The patient was febrile and irritable, with poor feeding and decreased responsiveness. A lumbar puncture was performed and cerebrospinal fluid (CSF) was collected and sent to SRL Diagnostics Laboratory for analysis and culture. The sample was processed by a clinical microbiologist using standard protocols. Table 1 shows the biological data characteristics of the patient.

Based on the communication with the attending physician, the patient's condition has improved and they have now recovered following the administration of tigecycline. The final diagnosis was meningitis.

**Table 1:** Biological Data characteristics of the patient with *E. meningoseptica*

| ***Variable*** | ***Result*** | ***Reference Range*** | ***Interpretation*** |
|---|---|---|---|
| Appearance | Slightly hazy | Clear | Abnormal |
| Cob-web formation | Present | Absent | Indicative of exudate/infection |
| Protein | 389.9 mg/dL | 15–45 mg/dL | Markedly elevated |
| Glucose | 9 mg/dL | 40–70 mg/dL | Critically low |
| Total WBC Count | 916 cells/cumm | 0–30 cells/cumm | Severely elevated |
| Neutrophils | 67% | 0–8% (neonates) | High (neutrophilic pleocytosis) |
| Mononuclear cells | 13% | 50–94% (neonates) | Low |
| RBC Count | 40 cells/cumm | 0 | Traumatic tap or hemorrhage |
| pH | 8.0 | 4.7–7.5 | Elevated |
| LDH | 1674.2 U/L | Not established | Extremely elevated (cellular injury) |

The CSF sample was cultured on Blood Agar and MacConkey Agar under aerobic conditions at 37 °C. After 24 hours of incubation the growth was observed on Blood Agar, showing yellow-pigmented colonies, weak colony observed on MacConkey Agar, and Gram stain revealed Gram-negative cocco-bacilli. Biochemical characteristics was included Non-motile, Oxidase-positive and bile esculin-positive. Based on these characteristics and confirmation via automated identification systems, the isolate was identified as *E. meningoseptica*. All laboratory procedures were carried out by the attending microbiologist. Following isolation of *E.*

*meningoseptica* from the cerebrospinal fluid culture, antimicrobial susceptibility testing (AST) was performed using standard disk diffusion and automated methods in accordance with CLSI guidelines. The isolate exhibited a multidrug-resistant profile, with resistance to a wide range of β-lactams, carbapenems, aminoglycosides, and fluoroquinolones. Notably, the organism was only susceptible to tigecycline, while demonstrating intermediate susceptibility to piperacillin-tazobactam (Table 2).

This resistance pattern is consistent with the intrinsic resistance mechanisms known for *E. meningoseptica*, including the presence of metallo-β-lactamases and efflux pumps. The organism's resistance to carbapenems, which are typically considered last-resort agents, further underscores the therapeutic challenge in managing such infections.

**Table 2:** Result of antimicrobial susceptibly testing

| ***Antibiotic*** | ***Result*** |
|---|---|
| Ceftazidime | Resistant |
| Doripenem | Resistant |
| Levofloxacin | Resistant |
| Piperacillin-Tazobactam | Intermediate |
| Minocycline | Resistant |
| Ofloxacin | Resistant |
| Amikacin | Resistant |
| Cefotaxime | Resistant |
| Ceftriaxone | Resistant |
| Tigecycline | Sensitive |

## Discussion

*E. meningoseptica*, a gram-negative bacterium, is a rare cause of severe infections. It is linked to contaminated water sources and primarily affects immunocompromised people, causing conditions like pericardial effusion, meningitis, and bacteremia (11).

A study in Pakistan reported 17 cases from 2013–2018, with infections and noting a high mortality rate in drug-resistant cases. Its broad antibiotic resistance complicates treatment, with quinolones and minocycline Showed better outcomes for susceptible strains. This emphasizes the need for targeted therapies and vigilant infection control in high-risk setting (6).

A case study of a 78-year-old male with a neurological disorder reported *E. meningoseptica* meningitis, treated with ceftriaxone, vancomycin, and tobramycin, but the patient succumbed on day 10 post-admission. The bacterium's resistance to vancomycin monotherapy highlights the need for combination therapies and underscores its growing clinical importance (7).

The increasing number of reported cases and the challenges in managing these infections highlight the growing clinical relevance of *E. meningoseptica*. Treatment often requires combination therapy tailored to antimicrobial susceptibility results, as no standardized guidelines currently exist for this pathogen. Early detection, infection control measures, and further research into optimal therapeutic strategies are essential to improve patient outcomes and prevent future outbreaks (8, 9).

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## Conflict of Interest

The authors declare that there is no conflict of interests.

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