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Acinetobacter spp. Coinfection with Elizabethkingia meningoseptica: A Case Report at a Referral Hospital in Iran

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ABSTRACT

Elizabethkingia meningoseptica is an emerging nosocomial gram-negative, rod-shaped pathogen in patients with underlying diseases. This bacterium is also considered to be a major pathogen in hospitalized patients. Some of the main risk factors for E. meningosepticum infections include immunosuppression (e.g., end-stage hepatic and renal diseases) and prematurity in neonates. Furthermore, E. meningosepticum could cause pneumonia, endocarditis, and bacteremia in adults. The uncommon resistance pattern of this bacterium, as well as its intrinsic resistance to colistin, makes the treatment of the associated infections challenging unless the susceptibility patterns are available. In this article, we have presented the first case of pulmonary coinfection with multidrug-resistant (MDR) Acinetobacter spp. and E. meningoseptica in Iran. A 20-year-old female patient was admitted to our hospital with tetralogy of fallot as an underlying disease since childhood. The patient underwent cardiac surgery. On the third postoperative day (POD), the patient developed lung infection and left-lung collapse. Antibiotic therapy was initiated for MDR Acinetobacter spp. obtained from her primary culture of tracheal discharges. When fever persisted in the patient, the secondary culture of her tracheal discharges was observed to be positive for E. meningoseptica. In this case report, no clinical correlations were observed between the E. meningoseptica isolated from respiratory secretions and the primary respiratory infection, suggesting that E. meningoseptica is an indicator of severe underlying diseases rather than an actual pathogen.

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Introduction

Elizabethkingia meningoseptica is a gram-negative, rod-shaped bacterium, which could spread in hospital environments and is not among the human microflora (1). The genus Elizabethkingia belongs to the Flavobacteriaceae family, comprising of four species, three of which are known to be human pathogens, while the pathogenicity of E. endophytica remains unknown (2). E. meningoseptica (E. meningosepticum) is non-motile, oxidase-positive, and a medically important non-fermentative species. It is an unusual colonizer of the respiratory tract, the pathogenicity of which remains unknown (1,3,4).

In this article, we have presented the first clin-

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ical case of pulmonary coinfection with multi-drug-resistant (MDR) Acinetobacter spp. and E. meningoseptica in Iran. It is notable that no clinical correlation was observed between the E. meningoseptica isolated from respiratory secretions and the primary respiratory infection, suggesting that E. meningoseptica is an indicator of severe underlying diseases rather than an actual pathogen.

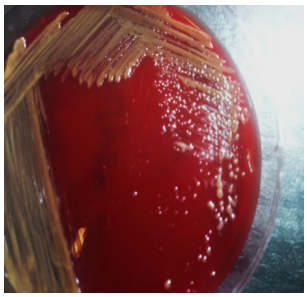
Case report

A 20-year-old female patient was admitted to the emergency department of our hospital with tetralogy of fallot (TOF), which is a congenital heart defect. She had a history of congenital heart disease, dyspnea, polycythemia, hypoxia, cyanosis, cold and clammy extremities, and lethargy during physical activity. The patient underwent total correction (TC) surgery. On the third postoperative day (POD) day, the patient developed lung infection, and the chest X-ray revealed left-lung collapse. The patient was intubated and due to persistent fever, her lung secretions and blood were cultured using BACTEC 9240 automated method (BACTEC, BD Diagnostic Systems, Sparks, Md.), which was flagged positive within 24-30 hours.

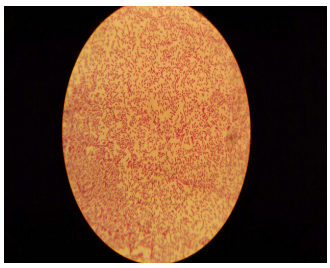
The primary blood culture of the patient on sheep blood agar plates was negative after 24 hours. On the fourth POD, MDR Acinetobacter spp. grew on the primary culture of the tracheal discharges. Antibiotic susceptibility was determined using Kirby-Bauer disk-diffusion test, and the results were analysed in accordance with the guidelines of the Clinical and Laboratory Standards Institute (CLSI, 2016).

The bacterium was sensitive to colistin and minocycline, while resistant to amikacin, cefepime, ceftriaxone, ceftazidime, ciprofloxacin, cotrimoxazole, meropenem, and gentamicin. The patient received treatment with colomycin (colistin or polymyxin E). However, lung secretions and blood were cultured again due to the persistent fever of the patient. It is notable that the patient entered the renal failure stage due to the use of colomycin and agreed to dialysis treatment. At this stage, the blood culture showed no growth after 24 hours, while the culture of the tracheal discharges was positive for the growth of E. meningoseptica. Moreover, the culture results indicated the growth of smooth, circular , non-hemolytic colonies (diameters: 1-2 mm), as well as complete margins with slight yellow pigmentation on the sheep blood agar plates after 24 hours of incubation (Figure 1). After gram-staining, the microscopic examination of the colonies revealed slender, slightly-curved, gram-negative rods (Figure 2).

Microgen® Gram-negative A strip (Microgen Bioproducts Ltd, UK) with 12 substrates was used to determine the biochemical reactions of the detected gram-negative rod. The other observed properties were as follows: catalase-positive, oxidase-positive, non-motile, catalase, indole- and oxidase-positive, and negative for mannitol, urease, citrate, and nitrate reduction. Therefore, the organism was identified as E. meningoseptica by the Microgen® ID system.



Figures 1. Shows E.meningoseptica yellowish non-hemolytic colonies on blood agar.



Figures 2. Gram stain showing slightly curved gram negative rods (magnification, ×1,000).

The antibiotic susceptibility pattern of the bacterium was described as resistant to colistin and cotrimoxazole and sensitive to amikacin, ceftazidime, ciprofloxacin, cotrimoxazole, imipenem, and gentamicin. Due to the sensitivity of Acinetobacter to colistin and resistance of Elizabethkingia to this antibiotic, Elizabethkingia resistance to the antibiotic was evaluated using the Epsilometer test (MIC≥16 mg/l).

The patient received treatment with targocid (teicoplanin), tazocin (piperacillin/tazobactam), and colomycin. After 48 hours of receiving the antibiotic regimen, the tracheal discharges were re-cultivated, and no bacterial growth was observed.

Discussion

Infections such as bacteremia, pneumonia, meningitis, and artificial shunt infections are commonly associated with E. meningoseptica, especially in hospitalized patients with long-term disposal to broad-spectrum antibiotics and those exposed to prolonged intravenous devices (1, 5). Considering that colistin and tigecycline have numerous clinical applications against carbapenem-resistant

bacteria (e.g., MDR Acinetobacter baumannii), the incidence of coinfections with resistant pathogens such as Elizabethkingia species have caused significant challenges in critical healthcare setting (6,7). Biological believability confirms that virulence factors have the tendency for biofilm formation (8), intracellular influx (9), and chromosomal and plasmid-mediated resistance to several commonly used antibiotics (10,11). According to the results of the present study, the coupling of the intrinsic resistance to colistin and uncommon resistance pattern confirmed the therapeutic complexity of the detected bacterium, and only access to the susceptibility patterns could effectively address the issue in the patient (12).

Conclusion

The findings of the current research indicated no clinical correlation between the E. meningoseptica isolated from respiratory secretions and the primary respiratory infection, which suggested that E. meningoseptica could be an indicator for severe underlying diseases rather than an actual pathogen. Moreover, E. meningoseptica exhibited resistance to colistin, making it difficult to treat the coinfection with MDR Acinetobacter spp. and a gram-negative organism such as E.meningoseptica.

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None.

Conflict of Interest

The authors declare no conflict of interest.

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