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Carbapenem-resistant *Klebsiella pneumoniae* meningitis: A case report

Sinan Mermer¹, Sohret Aydemir², Ergin Ozgiray³, Oguz Resat Sipahi¹

¹Ege University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology, Bornova, Izmir, Turkey, ²Ege University Faculty of Medicine, Departments of Microbiology and Clinical Microbiology, Bornova, Izmir, Turkey, ³Ege University Faculty of Medicine, Department of Neurosurgery, Bornova, Izmir, Turkey

Dear Editor,

Carbapenem-resistant *Klebsiella pneumoniae* is moving towards becoming a major health problem in Turkey as well as southern Europe.¹ Although it seems to be quite rare, carbapenemase-producing *K. pneumoniae* meningitis can cause serious morbidity and mortality. In this paper, we report a case of carbapenem-resistant *K. pneumoniae* meningitis treated with colistin.

Fifty-years old female patient was observed in another centre's neurology intensive care unit with a diagnosis of cerebellar infarct on November 2013, six days later ventriculoperitoneal (VP) shunt was inserted and posterior fossa decompression was performed one day later. She was transferred to the neurosurgery department of our hospital. Ventriculoperitoneal shunt was removed after three weeks and extra ventricular drainage catheter (EVD) was inserted. She developed high fever, nausea and vomiting on the 3rd week of the follow-up. Cerebrospinal fluid examination revealed > 1000 leukocytes/mm³ and a protein level of 313 mg/dl. Serum white blood cell was 11400/mm³, CRP was 3.4 mg/dl. Ceftazidime 3 × 2 g and vancomycin 4 × 500 mg were started empirically. After three days of treatment the patient's CSF, shunt pump and shunt tip cultures revealed gram negative bacilli. The isolate was identified as *Klebsiella pneumoniae* by matrix-assisted laser desorption ionization time-of-flight mass spectrometry with Vitek MS (BioMérieux Inc., MercyL'Etoile, France). It was found to be susceptible to colistin and amikacin only and resistant to ampicillin, amoxicillin/clavulonate, piperacillin/tazobactam, cefuroxime, ceftriaxone, cefepime, ertapenem, imipenem, meropenem, amikacin, gentamicin, ciprofloxacin and tigecycline by disc diffusion method.² Ceftazidime was

stopped and colistin was started with a dose of 2 × 150 mg whereas vancomycin was continued. Vancomycin was switched to linezolid on day 16 due to recovery of MRCNS in catheter tip culture of the femoral catheter. Control CSF analysis revealed 30 leukocytes/mm³ on direct examination, protein was 87 mg/dl. Colistin was stopped on day 30. The patient was not reinserted VPS since she tolerated without shunt. Relapse or reinfection in terms of meningitis did not occur during 3-month follow-up.

Despite significant achievements in the antibacterial therapy, morbidity and mortality relevant to health-care-associated central nervous system infections are still quite important. The causative agents of health-care-associated meningitis (HCAM) differ according to the status of host immune system and underlying diseases. The most frequent aetiologic agents are Gram-negative bacilli (*Pseudomonas spp.*, *Acinetobacter spp.*, *Escherichia coli* and *K. pneumoniae*) and Gram-positive cocci (*Staphylococcus aureus* and coagulase-negative staphylococci). Treatment is problematic and limited in healthcare-associated infections as well as meningitis caused by carbapenem-resistant gram-negative pathogens.^{3,4} *Acinetobacter spp.* is the most common gram-negative bacteria in the aetiology of HCAM in Turkey whereas *K. pneumoniae* comprises about 5% of all HCAM.⁵ Carbapenem-resistance in *Acinetobacter baumannii* is endemic in Turkey and *K. pneumoniae* is an emerging problem.¹

Treatment of carbapenem-resistant Gram-negative bacilli is not standard but oriented according to susceptibility of the strain. Colistin, tigecycline, sulbactam and aminoglycosides are the most commonly used agents in susceptible strains.^{3,4} In a systematic review related to the use of polymyxin for Gram-negative bacterial meningitis by Falagas *et al.*,⁶ i.v. and/or intrathecal/intraventricular polymyxin was found to be able to cure 51 (80%) out of 64 published Gram-negative bacterial meningitis

Correspondence to: Oguz Resat Sipahi, Ege University, Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology, Bornova, Izmir, Turkey. Email: Oguz.resat.sipahi@ege.edu.tr

cases. In the presented case we also used intravenous colistin and treatment has been successful in terms of clinical and microbiological response. Intrathecal colistin was not added due to the possible side effects as well as since the case recovered without a need to it by removing the shunt which is essential for therapeutic success in such cases.^{2,3,6}

To our knowledge this is the first clinical report of a carbapenem-resistant *K. pneumoniae* meningitis case in the literature. Despite its relatively poor penetration into CSF, colistin seems to be an alternative that can be selected in the treatment of HCAM that occurs with carbapenem-resistant gram-negative pathogens.

Disclaimer Statements

Contributors ORS and SM wrote the manuscript, ORS and SM and EO followed up the case. SA performed the microbiological analysis.

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Conflicts of interest ORS received speaker's honorarium from Novartis, MSD and Alkem.

Ethics approval Since this was a case report and the treatment was the standard treatment, ethical approval was not taken.

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