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LETTER TO THE EDITOR

Case Report of Successful Treatment of Extensively Drug-Resistant *Acinetobacter baumannii* Ventriculitis with Intravenous plus Intraventricular Tigecycline

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A 70-year-old woman was admitted to the hospital with a subarachnoid hemorrhage. The patient underwent a cerebral aneurysm embolization. On hospital day 14, the patient underwent a lumbar subarachnoid continuous drain insertion because of fever and the enlarged ventricles that were seen on computed tomography (CT) of the head. On hospital day 19, the patient presented with remittent fever (peak at 39.1°C) associated with an altered mental status. An evaluation of the cerebrospinal fluid (CSF) revealed a white blood cell (WBC) count of 53,484/mm^3 (polymorphonucleocytes,75.4%; monocytes, 24.6%), the red blood cells (RBCs) were triple-positive for haptoglobin (+++/HP), the glucose level was 1.26 mg/dl, and the total protein was 14.2 g/dl. The lumbar subarachnoid continuous drain was removed. The patient was started on meropenem 1 g intravenous (i.v.) every 8 h and vancomycin 1 g (i.v.) every 12 h. On hospital day 22, the patient's CSF culture showed *Acinetobacter baumannii* (polymyxin susceptibility was not tested) that was susceptible only to tigecycline (MIC $\leq$ 1 μg/ml) and cefoperazone sulbactam. The same strain of *A. baumannii* was isolated from the sputum and blood. With permission, the antimicrobial therapy was changed to intravenous tigecycline (100 mg first and then 50 mg every 12 h [q12h]) and cefoperazone sulbactam (3 g q8h). Head CT demonstrated enlarged ventricles compared with that from the previous studies, and an external ventricular drain (EVD) was inserted on hospital day 25. On hospital day 28, the blood culture was negative; however, the same strain of *A. baumannii* was still isolated from the CSF. With permission, tigecycline 2 mg intraventricular (i.v.t.) every 12 h was started and lasted for 10 days. On hospital day 38, the patient's CSF culture was negative. On hospital day 104, the patient was discharged. A continued 3-month follow-up showed no recurrence.

Acinetobacter baumannii accounts for 8.7% to 12.1% of clinical isolates in China (1). In recent years, *A. baumannii* has become an important cause of nosocomial postneurosurgical meningitis and ventriculitis (2). The mortality rates range from 15% to 71% for *Acinetobacter* meningitis (3). Colistin (polymyxin E or B) and tigecycline have been demonstrated to be the only antibiotics available for use against these *A. baumannii* carbapenem-resistant strains (4, 5). As they have a high molecular weight, they cannot pass the blood-brain barrier, and so the guideline suggests combining them with intraventricular colistin in central nervous system (CNS) infection therapy (5). The use of colistin in China was hindered by the unavailability of this drug in the market before 2018. With permission, the extensively drug-resistant *A. baumannii* CNS infection in our patient was successfully treated using i.v. and i.v.t. tigecycline without adverse effects.

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At first, the patient was treated with i.v. tigecycline and cefoperazone sulbatan, but the CNS infection was not under control until i.v.t. tigecycline was used. Thus, tigecycline may be a candidate for the treatment of carbapenem-resistant *Acinetobacter baumannii* CNS infection in some areas where colistin is unavailable, but only after permission for its use is obtained. While there are few data on the pharmacokinetics (PK) and pharmacodynamics (PD) of tigecycline, further research is necessary to determine the role of tigecycline in the treatment of multidrug-resistant (MDR) *A. baumannii* CNS infection. The safety of intraventricular injections of this drug needs to be verified in additional experiments.

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