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SCIENTIFIC LETTER

Ceftazidime-Avibactam for Hospital Acquired Pneumonia Due to Extended Drug-Resistant *Klebsiella pneumoniae*

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To the Editor: Emergence of extensive drug resistant and pan drug resistant *Klebsiella pneumoniae* (XDR-KP and PDR-KP) as nosocomial infection in Pediatric Intensive Care Unit (PICU) and treating these cases, is challenging for pediatricians as fewer data are available [1].

A 3-y-old boy was admitted to PICU in status epilepticus with history of sudden onset headache followed by generalized seizures without any fever. In view of low Glasgow coma scale (GCS), he was intubated and ventilated. MRI angiogram showed ruptured arterio-venous malformation. Initial laboratory parameters were normal. On third day, he developed high grade fever with increased ventilator requirement; tests were suggestive of sepsis, pneumonia, leucopenia and severe thrombocytopenia. Antibiotics were upgraded from ceftriaxone to meropenem and colistin was added after 2 d. Both blood and endotracheal tube culture showed KP resistant to all antibiotics, except fosfomycin. Child continued to be critical with progressive leucopenia and thrombocytopenia; film array (multiplex-PCR) of endotracheal secretion showed KP with presence of CTX-M (Cefotaxime), NDM (New Delhi Metallo-β-lactamase) and OXA-48 like (Oxacillinase). Child was treated with inj. ceftazidime-avibactam (62.5 mg/kg/dose 8 hourly), inj. aztreonam and inj. fosfomycin. Child was isolated; extubated and invasive lines were removed. After 14 d of antibiotics, he was discharged with normal clinical and laboratory parameters. On active surveillance, same organism was cultured from emergency department suction bottle and MRI bed. Suction bottle disinfection was done with 1% hypochlorite solution and staff were trained for reprocessing of suction bottle. As a policy, the MRI bed is cleaned with alcohol and glutaral based disinfectant after each patient.

Ceftazidime-avibactam has excellent activity against many extended spectrum β-lactamase, Amp-C, KP-carbapenemase and OXA-48 producing enterobacteriaceae; however it is not active against NDM strains [2]. Aztreonam is effective against NDM strains as NDM cannot hydrolyse aztreonam. Literature suggests combination of ceftazidime-avibactam, fosfomycin and aztreonam; as survival in combination therapy is better [3]. Avibactam inhibits the KP carbapenemase (KPC) enzyme, ensuring not only the activity of ceftazidime but also that of aztreonam. A potential synergistic effect in this β-lactam combination is also expected, as both ceftazidime and aztreonam binds to PBP3 [4]. Ceftazidime-avibactam is recently approved by USFDA for treating children with complicated urinary tract infection and intra abdominal infection. Literature is scarce on use of ceftazidime-avibactam in pediatric hospital acquired pneumonia as safety is not established. However, due to rapid deterioration of our patient, it was used as a salvage therapy. Presently, multicentric clinical trial is going on to assess the safety and tolerability of ceftazidime-avibactam in nosocomial pneumonia [5].

Ceftazidime-avibactam stands out as one of the most important additions in our armamentarium for management of XDR and PDR-KP infection.

Compliance with Ethical Standards

Conflict of Interest None.

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