

In vitro Susceptibility of Carbapenem-resistant Gram-negative Organisms to the Novel Antibiotic Ceftazidime-avibactam

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The prevalence of carbapenem-resistant Gram-negative organisms is increasing globally and locally. Colistin is the only last-line antibiotic currently available in Sri Lanka for serious infections with carbapenem-resistant Gram-negatives. Alternative treatment options and colistin-sparing regimens for patients with serious infections caused by Multi-Drug Resistant (MDR) organisms are urgently needed. The study aimed to assess the sensitivity of ceftazidime-avibactam to previously identified carbapenem-resistant Gram-negative organisms isolated from urine cultures received at the microbiology laboratory at University Hospital KDU, Sri Lanka. Disc diffusion testing was performed on 59 Carbapenem-Resistant Enterobacteriaceae (CRE) and 19 Carbapenem-Resistant Pseudomonas (CRP) isolates using ceftazidime-avibactam, 30/20µg disc (Oxoid™), and Muller Hinton agar plates according to the CLSI method. Disc diameters were interpreted according to CLSI 2024 breakpoints. Quality control of the ceftazidime-avibactam disc was done using *Escherichia coli* ATCC 25922 strains. Of the 59 CRE isolates, 55.9% (33) were sensitive, while 44.1% (26) were resistant to ceftazidime avibactam. Among the 19 CRP isolates, only 10.5% (2) were sensitive, while 89.5% (17) were resistant. There were 04 CRE isolates, and a 01 CRP isolate among the resistant category which measured a disc diameter of 20mm each and needed to be confirmed by Minimum Inhibitory Concentration (MIC) testing according to CLSI 2024. According to this preliminary study in vitro. sensitivity of ceftazidime avibactam to CRE was relatively good compared to the CRP group. Species identification and molecular detection of different carbapenemase genes that are responsible for carbapenem resistance among each species will provide additional information in making decisions to target this novel antibiotic to the correct organism in treating serious infections caused by carbapenem-resistant organisms.

Keywords: *Ceftazidime-avibactam, antibiotic sensitivity, Carbapenem-Resistant Enterobacteriaceae, Sri Lanka*