Abstract

Introduction

The global increase of multi-drug resistant *Enterobacteriaceae* infections has emphasize the necessity of alternative first-line therapy for UTIs. Fosfomycin, pivmecillinam and once daily parenteral ertapenem are effective for UTI caused by most of the MDRE. Knowing whether the infection is acquired in the hospital or community and associated factors for MDRE infections would be beneficial in guiding empiric therapy. This study was carried out to evaluate in-vitro susceptibility of MDRE uropathogens to fosfomycin, pivmecillinam and ertapenem.

Objectives

To describe in vitro efficacy of fosfomycin, pivmecillinam, and ertapenem for hospital-acquired and community-acquired MDRE uropathogens and to identify associated factors for UTI by MDRE

Methodology

Urine samples of symptomatic in and out-patients with UTIs received to microbiology laboratory of TH Ratnapura for culture, during a period of four months were processed according to laboratory manual SLCM. Presumptive coliforms with a pure growth of $>10^5$ CFU were tested for sensitivity to commonly used antibiotics according to CLSI - 2017 guidelines. Organisms with resistance to at least a single agent of three or more classes of antibiotics were identified to species level using the RapID ONE system. Antibiotic sensitivity testing and interpretation of the MDRE for fosfomycin, pivmecillinam, and ertapenem were performed according to CLSI 2017 extrapolating *Escherichia coli* break points to include all *Enterobacteriaceae.*

Results

Out of 145 MDRE isolates, *Escherichia coli* accounted for 109 (75%), 29 (21%) were *Klebsiella pneumoniae*, and there were 6(4%) other species, and most were from males 75 (51.7%). The sensitivity of all MDRE for nalidixic acid, co-amoxiclavv, cephalosporin, ciprofloxacin and co-trimoxazole was 5%, 6%, 6.8%, 15% and 20% respectively but nitrofurantoin had 68% sensitivity.

The sensitivity of all MDRE for fosfomycin, pivmecillinam, and ertapenem was 98%, 91%, and 84.8% respectively. *Escherichia coli* 99% and 93% *Klebsiella pneumoniae* were sensitive to fosfomycin. Pivmecillinam sensitivity of *Escherichia coli* and *Klebsiella pneumoniae* was 93% and 79%, while ertapenem sensitivity to *Escherichia coli* and *Klebsiella pneumoniae* was 91% and 58.6% respectively.

Conclusions

Most oral empirical antibiotics for UTIs showed >80% resistance to MDRE uropathogens but >90% sensitivity to fosfomycin and mecillinam which therefore are promising alternatives for UTI treatment. As a first line carbapenem 15.2% resistance to ertapenem in MDRE was an alarming sign.

Keywords – Urinary tract infections, *E. coli,* Multidrug-resistant *Enterobacteriaceae,* Fosfomycin, Pivmecillinam, Ertapenem