A Descriptive Study on Antibiotic Resistant, Clinically Significant Coliform Species Isolated from the Patients at Colombo North Teaching Hospital (CNTH), Ragama, Sri Lanka

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Introduction: Antibiotic resistance (AR) is a great therapeutic challenge globally and locally today. The rate of development of AR is far ahead compared to the discovery of a new class of antibiotics, which has not been successful in last three decades. Of the antibiotic resistant coliforms, extended spectrum beta-lactamase producers (ESBLP) play a key role in life threatening infections. Moreover, emergence of carbapenem-resistant Enterobacteriaceae (CRE) has further limited the effective therapeutic options.

Objective: To investigate the AR of clinically significant Enterobacteriaceae isolated from patients in a tertiary healthcare setting.

Method: A descriptive, cross-sectional study was conducted involving patients with coliform infections at CNTH from 01/03/2018 to 31/08/2018. Demographic details, clinical data & antibiotic sensitivity test (ABST) patterns were analyzed. ABST was performed according to John-Stokes method & ESBLPwere identified by the keyhole method. Resistance to either meropenem or imipenem is used to identify CRE. Statistical analysis was done via R programming language (level of significance $P<0.05$).

Results: Of the 200 coliforms, 85.5% (171/200) were from inpatients & the rest were from outpatients. Of the studied patients, 53.5% (107/200) were females & 46.5% (93/200) were males. Of the Enterobacteriaceae spp isolated, 48.5% (97/200) were from urine, 34.5% (69/200) from pus / wound swabs, 9.5% (19/200) respiratory samples, 3% (6/200) sterile fluids & stents, & 3% (6/200) from blood & CVP tips. As per ABST, about 90% were resistant to ampicillin. Resistance was 61-70% against cefuroxime (oral), ciprofloxacin & nalidixic acid, 60% for amoxiclav, 41-50% for cefotaxime, cefuroxime (intravenous), co-trimoxazole, levofloxacin, norfloxacin & ofloxacin, 31-40% for cefepime, ceftazidime, ceftriaxone & nitrofurantoin, 21-30% for gentamicin & piperacillin tazobactam & 0-10% for amikacin & meropenem. Of the coliforms, 29% (58/200) were ESBLP & 8% (16/200) were CRE. None of the ESBLP was CRE. Of CRE, 37% (10/16) were resistant to amikacin. However, 93.8% (15/16) of CRE were colistin sensitive.

Conclusion: Majority of the isolates represented infections of the inward patients & there was no statistically significant difference between male & female proportions. Coliforms were detectedmostly from urine. Majority (>50%) of clinically significant Enterobacteriaceae were resistant to most of the oral antibiotics namely cefuroxime, ciprofloxacin, nalidixic acid & amoxiclav. Of the oral antibiotics, nitrofurantoin has the lowest resistance against Enterobacteriaceae. None of the antibiotics had 100% sensitivity against Enterobacteriaceae. Results indicate that ESBLP can be safely treated with carbapenems. Colistin will be an effective empiric antibiotic for CRE.

Keywords: Coliforms, Antibiotic Resistance

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