

Comparative evaluation of antimicrobial resistance among Enterobacteriaceae isolated from urine cultures in COVID-19 pre pandemic and pandemic period

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Introduction and Objective: Antimicrobial resistance (AMR) is a health concern globally as well as nationally. Urinary tract infections (UTI) caused by AMR organisms have risen over the past few years. According to some published data, the COVID-19 pandemic has aggravated AMR rates due to overuse of antibiotics. This study was conducted to evaluate and compare AMR rates of enterobacteriaceae isolated from urine cultures in patients from COVID-19 during the pre-pandemic and pandemic eras at the University hospital, Kotelawala Defense University, Sri Lanka.

Methods: Microbiology laboratory records were retrospectively analysed. April to October 2019 was considered as the pre-COVID-19 pandemic period while April to October 2021 was considered as the pandemic period. Enterobacteriaceae isolated from urine cultures which grew $\geq 10^4$ CFU/ml were included. Antimicrobial susceptibility data were analysed for a set of antibiotics. Chi-square test was applied to compare the difference between AMR rates of different antibiotics among enterobacteriaceae isolated from urine cultures during the COVID-19 pandemic and pre-pandemic eras.

Results: There were 162 coliform isolates in the COVID-19 pre-pandemic period and 192 in the pandemic era. There was a significantly higher rate of resistance to commonly used antibiotics in the COVID-19 pre-pandemic era when compared to the pandemic era (Ampicillin 88.3%, 80.6%; Co-amoxiclav 54.3%, 42.8%; Cephalexin 54.7%, 41.7%; Cefuroxime 48.6%, 36.9%; $p < 0.05$ for COVID-19 pre pandemic and pandemic periods respectively). During the pandemic era, AMR rates of COVID-19 patients were higher than that of non-COVID-19 patients. Males had significant higher resistance rates for ampicillin, co-amoxiclav, cephalexin and cefuroxime in the pandemic era ($p < 0.05$). In the pre-pandemic period, individuals aged over 40 years had higher resistance rates for co-amoxiclav, cefuroxime, and cefotaxime.

Conclusions: Overall, the antibiotic resistance rates to first line antibiotics were high in both periods but significantly higher rates were seen in the pre-pandemic period for ampicillin, co-amoxiclav, cephalexin, and ciprofloxacin. Higher resistance in COVID-19 patients when compared to non-COVID patients during the pandemic period is an important finding. Further studies involving multiple centres would gather more reliable data on this area for implementation of actions in Sri Lanka.

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Keywords: Antimicrobial resistance, pre pandemic period, pandemic period

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