



Prevalence and Molecular characteristics of ESBL associated with the pediatric population in Qatar

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Abstract

Urinary tract infection (UTI) is one of the most common pediatric infections and it may cause permanent kidney damage. The β -lactam antibiotics have traditionally been the main treatment for Enterobacteriaceae, nonetheless, the emergence of species producing β -Lactamases has rendered this class of antibiotics largely ineffective. There are no published data on UTI etiological agents and antimicrobial resistance profile among children in Qatar.

The aim of this study is to identify the most common ESBL species associated with UTIs, to determine the phenotypic profiles of antimicrobial resistant Enterobacteriaceae and to characterize at the molecular level the genes encoding resistance in ESBL producing Enterobacteriaceae among pediatric patients in Qatar. A total of 635 Enterobacteriaceae were isolated from 727 urine cultures, collected between February and June 2017 from children (0-15 years) diagnosed with UTI at Pediatric Emergency Center, Doha, Qatar. Most of the UTI were reported among 0-5 years old (73.6%) children. Initial screening with phoenix revealed 201 (31.7 %) as Extended Spectrum β -Lactamases (ESBL) producing Enterobacteriaceae. The most predominant pathogen of these was *E. coli* 166 (83%), followed by *K. pneumoniae* 22 (11%). 110 isolates were included for further analysis. ESBL resistance was further confirmed by double disc synergy test and PCR. The highest resistance was encoded by *bla* CTX-M (59%) genes, primarily *bla* CTX-MG1 (89.2%), followed by *bla* CTX-MG9 (7.7%). 37% of bacteria were harboring multiple *bla* genes (2 genes or more). Analyzed samples were categorized into seven clonal clusters according to the presence and absence of seven genes. In conclusion, our data designate a high occurrence of CTX-MG1 indicating a high dynamic transmit-ability in the community that could have a significant impact on public health, mostly through horizontal transmission in healthcare facilities. In addition, our results indicate an escalated problem of ESBL in pediatrics with UTI, which mandates the establishment of the antimicrobial stewardship program. Moreover, our findings revealed that the use of cephalosporins, gentamicin and trimethoprim/sulfamethoxazole is compromised in Qatar among the pediatric population with UTI, leaving carbapenems and amikacin as the therapeutic option for severe infections caused by ESBL producers. The negative impact of the extensive use of carbapenemes could lead to carbapenamase resistant Enterobacteriaceae.

Biography:

DR. Nahla O Eltai, is a researcher of infectious diseases at the Biomedical Research Center (BRC), Qatar University. She has joined the BRC since March 2015. Dr. Nahla's research interests are multidisciplinary with emphasis on rapid diagnostic techniques, food safety, antimicrobial susceptibility testing and investigation of new alternative to current antimicrobial agents. She published relevant scientific papers in peer-reviewed journals. Her research has been conducted in institutions like London School of Hygiene and Tropical Medicine, University of the West of England, Humboldt University, Germany, Qatar University and Khartoum University. She has been awarded WHO and DAAD grants to conduct research in the field of infectious diseases. Dr. Eltai as a researcher at (BRC) has responsibility of a wide range of activities and programs including organizing and delivering lectures in career events promoting medicine and biological science disciplines, training courses for food inspectors in Qatar. She is adopting the one health system approach in Qatar by studying antimicrobial resistance in agriculture, Food animals, environment and human. Her special achievements include the establishment of microbiology lab at BRC. Dr. Eltai has been awarded the best poster award for Faculty members post doc and researchers at Qatar Annual Research forum 1-2 May 2018.