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Molecular characterization of Extended Spectrum Beta Lactamases (ESBLs) producing clinical isolates of *Klebsiella pneumoniae* among Karachi population, Pakistan

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Objective: Resistance to antibiotics by Extended Spectrum Beta-lactamases (ESBLs) producing clinically significant bacterial strains has continuously been emerging and is a great threat to therapeutics. SHV and TEM derived ESBLs producing *Enterobacteriaceae* have been reported throughout the world but there is a limited data available for the molecular characterization of these enzymes in Pakistan.

Materials & Methods: A total of 214 clinical samples were collected from Liaquat National Hospital, a tertiary care hospital in Karachi, Pakistan, out of which 125 were males and 89 were females. Sample source included pus, blood, tissue swabs, urine, stool, sputum and wound. Differential identification of clinical bacterial isolates was done using a series of biochemical methods including MR-test, VP-test, Indole test, Citrate test and Motility test. Susceptibility and resistance against cefotaxime and ceftazidime antibiotics for *K. pneumoniae* isolates were detected using AST disk diffusion method and MICs were obtained using agar dilution method. Molecular characterization included plasmid extraction, ESBL screening as recommended in CLSI document, PCR amplification and DNA sequencing.

Results: The most common infection sites constituted were urological (39.23%; n=51) followed by blood infection (21.53%; 28). A total of (60.7%; n=130) isolates were found positive for *K. pneumoniae* by biochemical tests. Prevalence of *K. pneumoniae* was observed more in males (68.4%; n=89) than females (31.6%; n=41). MICs profile by agar dilution method showed that ceftazidime was (62.9%) susceptible and (37.0%) resistant to clinical isolates of *K. pneumoniae*. Susceptibility rate of cefotaxime was 48.8%. The most ineffective antibiotic found was cefpodoxime with a high resistance rate (97.7%). Through ESBL screening, a total of (45.3%; n=59) isolates were determined as ESBL positives which were then subjected to PCR assays with specific *bla*SHV primers. The result of PCR showed (11.8%; n=07) *K. pneumoniae* isolates producing SHV derived ESBL. BLAST of all nucleotide sequences retrieved from DNA sequencing showed a significant identity >90% to *bla*SHV-158 type ESBL.

Conclusion: We have reported the first case study of SHV-derived beta lactamase *bla*SHV-158 (57.1%; n=4) producing *K. pneumoniae* isolates among Karachi population, Pakistan.

Biography

Uzma Nadeem has completed her Masters in Biomedical Engineering from NED University of Engineering and Technology, Karachi, Pakistan. Since May, 2012, she has been working as a Laboratory Engineer in NED University of Engineering and Technology, one of the premier oldest institutions in Pakistan for teaching and producing Engineering graduates.

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