Phenotypic and Genotypic Detection of Extended Spectrum Beta Lactamase Klebsiella Pneumoniae Isolated from Intensive Care Units in Assiut University Hospital

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Abstract:

Extended spectrum β-lactamases producing Klebsiella pneumoniae (ESBL-KP) are an important cause of nosocomial infections in Intensive Care Units (ICUs). We conducted a prospective study on 650 patients who were admitted to different adult ICUs at Assiut University Hospital to determine the incidence of ESBL-KP by phenotypic and genotypic methods. Phenotypic tests for ESBL were combined disc method, double disc synergy test (DDST) and E-test. Genotypic detection of ESBL bla TEM and bla SHV genes was carried out by polymerase chain reaction amplification (PCR). The overall nosocomial infection incidence rate was 20% (130 patients). Klebsiella pneumonia was isolated from 44 patients (34%), in which 23 isolates were found to be phenotypically ESBL producers. ESBL-KP was most frequently isolated from chest ICU (47.8%) and blood was the most frequent site of infection (8 isolates, 34%). Based on Clinical and Laboratory Standards Institute (CLSI) screening test for ESBL, the combined disc method was the most sensitive (23/23, 100%) followed by the E-test (95.6%) and lastly the DDST (91.3 %). SHV gene was present in 8 isolates, TEM gene in 2 isolates, both SHV and TEM in 11 isolates and none of TEM or SHV in 2 isolates. Out of 950 environmental samples, Klebsiella pneumoniae was isolated from 48 samples (16.4%) in which 7 isolates (14.5 %) were ESBL and genotyping revealed SHV in 4 strains, and both SHV and TEM in 3 strains. Conclusion: This study revealed the high incidence of ESBL-KP in adult ICUs. SHV genotype was more prevalent than TEM type. Strict implementation of basic infection control measures seems to be the most effective means for controlling the spread of ESBL organisms.

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