"Extended Spectrum Beta lactamases screening in Escherichia coli and Klebsiella isolates and confirmation by molecular method"

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ABSTRACT

Background: The prevalence of Extended Spectrum Beta Lactamase (ESBL) producing strains among clinical isolates has been steadily increasing over the past few years. ESBL producing organisms create a major problem for clinical therapeutics. Identifying organisms that ESBL producers are a major challenge for the clinical microbiology laboratory. An attempt to study ESBL production and drug resistance in clinical isolates of Klebsiella and E.coli in Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanyakumari district.

Aims and Objectives: To evaluate the prevalence of ESBL producing E.coli and Klebsiella in the clinical isolates at Sree Mookambika Institute of Medical Sciences, Kulasekaram, to study the present status of antibiotic resistance in E.coli and Klebsiella and to compare the results of phenotyping method with molecular typing.

Materials and Methods: Non randomized cross sectional study was contacted with convenient sampling technique. A total of 100 isolates (50 Esch.coli and 50 Klebsiella) isolated from various clinical samples were studied at the microbiology laboratory Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanyakumari
over a period of one year for ESBL production. The samples were processed and isolates were identified by standard laboratory methods. Antibiotic susceptibility testing was done on Muller Hinton agar by Kirby Bauer’s disk diffusion method. Among these isolates ESBL was detected by two steps as per CLSI guideline 2010: Screening by resistant to 3rd Gen. Cephalosporins and Combination disk diffusion using ceftazidim and cefotaxime alone and with clavulanic acid. All isolates positive in ESBL screening test was subjected to testing to detect the possible presence of SHV, TEM and CTX-M genes by conventional PCR.

**Result:** A total of 100 isolates (50 Esch.coli and 50 Klebsiella) isolated from various clinical samples were studied by phenotypic method, 35/50 (70%) of Esch.coli and 23/50(46%) Klebsiella were ESBL producers. It shows that Esch.coli has high prevalence than Klebsiella. When the ESBL producers subjected to antibiotic sensitivity testing they were observed that all the 58 isolates were resistant to 3rd Gen. Cephalosporins such as cefotaxime, ceftriaxone and ceftazidime. At the same time it was found the isolates were resistant to Cefoxitin and Ciprofloxacin. More than 70% of ESBL producers were sensitive to Amikacin and Imipenem, it shows that these drugs continue to be effective against ESBL producers. With PCR technique, \(bla-TEM\), \(bla-SHV\), \(bla-CTX\) genes were detected among 58 isolates 35 Esch.coli and 23 Klebsiella which was confirmed by phenotypically. \(bla-CTX-M\) was the dominant type among Esch.coli and Klebsiella. Other two genes \(bla-TEM\) and \(bla-SHV\) was detected in more number of Esch.coli than Klebsiella.
Conclusion: The prevalence rate of ESBL producing Esch.coli was significantly higher than Klebsiella isolates in our Institute. 2\textsuperscript{nd} and 3\textsuperscript{rd} Generation cephalosporins and ciprofloxacin shows high resistance. More than 70% of isolates were resistance to Amikacin and Imipenem. CTX-M gene was detected in more number of Esch.coli and Klebsiella isolates. Antimicrobial policy making and strict adherence in the need of the day can prevent drug resistance. Epidemiological studies of β-lactamases in each Institute and genetic environment of the clinical isolates would be useful to prevent bacteriological drug resistance.