Title: Detection of Pseudomonas aeruginosa producing Extended spectrum beta-lactamase (ESBL) isolated from clinical specimens in Tehran hospitals

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Abstract: Introduction: The emergence of antibiotic resistant P. aeruginosa especially ESBL producing isolates is one of the challenges in the cure of nosocomial infections caused by this microorganism. ESBLs are usually found as beta-lactamases that hydrolyze penicillins, cephalosporins, cefamycins and monobactams. The aim of this study was to determine the prevalence of ESBL producing P. aeruginosa from clinical specimens by combined disk method.

Materials and methods: The total of 200 clinical isolates of P. aeruginosa was collected from burned, blood, wound and trachea specimens from four hospitals in Tehran. Antibiotic susceptibility were determined by disk diffusion method as recommended by CLSI with regard to cefotaxime (CTX), ceftazidim (CAZ), imipenem (IMP), piperacillin (pip), aztreonam (ATM), cefepime (FEP), cefexim (CFM), tetracycline (TIC), tobramycin (TOB), gentamicin (GM), ciprofloxacin (CP), amikacin (AN). ESBL production was tested by combined disk method with CAZ and CTX with and without clavulanic acid.

Results: In this review a large proportion of specimens were related to burn ward (25%), urine (25/5%), blood (22/5%), wound (7/5%), tracheal (7/5%), eye (2%), sputum (3%), ear (3%), and peritoneal (4%). P. aeruginosa isolates were resistant to most drugs. High percentages of isolates were resistant to CTX (95%), CAZ (84/5%), CFM (96%), PIP (81/5%), FEP (79%), TIC (50%), ATM (59/5%), TOB (46%), AN (39/5%), GM (38/5%) and CP (34/5%). In combined disk test, a ≥5mm increase in zone diameter of CTX and/or CAZ tested in combination with clavulanic acid versus CTX and/or CAZ alone was considered positive for ESBL producing.

Out of isolates (22%) and (36/5%) were confirmed ESBL producing P. aeruginosa by combined disk method versus CTX and CAZ inhibitors respectively. Consequently out of isolates (58/5%) were confirmed ESBL producing isolates.

Conclusion: According to high resistance of separated isolates and due to inability to restraining 41/5% of this bacteria using ESBL inhibitors this resistances can be attributed to existence of carbapenemase enzyme. and the existence this enzymes can be assumed as an alarm for spread of resistance to metalobetalactamases. so far appropriated treatment, antibiotic sensitivity test and the identification of this enzyme with molecular methods are necessary.

Key word: Pseudomonas aeruginosa, combined disk, CTX, CAZ, ESBL

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