Antimicrobial resistance patterns and ESBL production in community-associated (CA) and hospital-associated (HA) *Pseudomonas aeruginosa*

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Abstract:

The increasing frequency of multi-drug-resistant (MDR) *P. aeruginosa* strains is concerning because the efficacious antimicrobial options are severely limited. Extended-spectrum ß-lactamase (ESBL) producing microorganisms are a major problem in the medical area. **Objectives**: The purposes of this study were to detect and to compare the antibiotic resistance patterns and ESBL production in 70 *Pseudomonas aeruginosa* isolated from 50 patients of three public hospitals of Maceió, AL (hospital-associated-HA) and 48 *P. aeruginosa* isolated from oral cavity of 20 immunocompromised patients and diagnosed with oral or cervical-thoracic cancer (community-associated-CA). **Methodologies**: All isolates were biochemically identified. The antibiotic susceptibility was determined by Kirby-Bauer test (CLSI) using disks of Penicillins, Cephalosporins, Fluoroquinolones, Carbapenems and Monobactams. ESBL production was detected by phenotypic method of approach-disks. Data analysis was performed using the chi-square test ($p \leq 5\%$). **Results:** There was a high frequency (87 to 98%) of resistance to amoxicillin-clavulanic acid and cefoxitin (second-generation) among CA and HA-*P. aeruginosa.* Both groups showed a high rate of sensitivity to the piperacilin-tazobactam antibiotic (100% and 87,6%, respectively). CA-*P. aeruginosa* showed low frequency of resistant to third-generation cephalosporins: ceftriaxone (10,42%) and ceftazidime (2,08%) and all were sensible to Imipenem, Aztreonam and Ciprofloxacin. None of the CA-isolates was classified as MDR or ESBL producing strain. In contrast, the HA-*P. aeruginosa* strains showed high frequency of resistant to ceftriaxone (56,67%), ciprofloxacin (42,86%), ceftazidime (38,71%), cefepime (26,08%) and resistance increasing rate to imipenem (4,76%) and aztreonam (7,58%). In addition, among the HA-strains, 22 (31,42%) resisted to 4 or more antibiotics groups and were classified as MDR. Among the 18 strains resistant to carbapenems and cephalosporins, 11 (61,1%) produced ESBL. **Conclusion:** There is a high frequency of MDR and ESBL producing strains among HA-*P. aeruginosa* in comparing to CA-*P. aeruginosa,* due to higher selective pressure and frequent antibiotic therapy in nosocomial environment.

Key words: antibiotic resistance – MDR – ESBL – *Pseudomonas aeruginosa*

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