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Prevalence of class 2 integrons in multidrug-resistant *Acinetobacter baumannii* in toxicological ICU patients in Tehran

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Background: *Acinetobacter baumannii* is an important opportunistic pathogen which causes complications in hospitalized patients, especially those in ICU. The aim of thisstudy was to determine the frequency of class 1 and 2 integrons in multi-drug resistant A. baumannii and to investigate the association between the presence of integrons and antibiotic resistance patterns.

Methods: A total of 40 A. baumannii strains were isolated from 372 ICU patients from June to Oct 2012. A. baumannii was detected in 50% of tracheal cultures, 15% in blood, 15% in urine samples and 22.5% in other locations. In accordance with CLSI 2011, 12 antibiotics were used through disc diffusion method. Existence of integron classes was investigated by PCR assay with the amplification of integrase genes.

Results: The most effective antibiotic against *Acinetobacter baumannii* was polymyxin B with 100% susceptibility, followed by meropenem, piperacillin, cotrimoxazole, ceftazidime with 100% resistance; this was followed by ciprofloxacin 97.5%, tetracycline, 92.5%, imipenem 62.5%, and gentamicin 60% resistance. The presence of integrin class 1 was 7.5%, class 2 was 67.5%, and non-integron was 20%.

Conclusion: The association between multidrug resistance and class 2 integron was not statistically significant. Other factors accounting for the lack of significance of thefindings may be the impact of other resistance determinants such as transposons orplasmids, not investigated in the current study. Considering the increasing trend of MDRinfections among ICU patients with critical problems in follow up, the use of appropriate infection control strategy and a regular surveillance system is necessary in our hospital.

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Phenotypic characteristic of THP-1 cell-derived microvesicles

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Microvesicles are small cell-derived membrane vesicles shed from cells during activation or apoptosis. In peripheral blood are found leucocyte-, thrombocyte-, and endothelial-derived microvesicles. Peripheral blood microvesicles are known to participate in coagulation, inflammation and immune response. In the present study phenotype and size distribution of monocyte-like cell line THP-1 microvesicles were evaluated. Microvesicles from intact, TNFα or IFNγ activatedTHP-1 were fractionated from cell conditioned media. Microvesicle fraction was analyzed by atomic force microscopy and also was stained forCD11a, CD11b, CD11c, CD18, CD31, CD29, CD49d, HLA-DR, CD47, CD54, VEGFR1, CD181, TRAIL, CD120a, CD120b and analyzed by flow cytometry. Atomic force microscopy showed a population of spherical objects characterized by the height distribution within 50-400 nm with a peak at 200 nm. Particle size analysis of a 2×2 nm field detected large 700 nm microvesicles in addition to that having the 230 nm mean size. Microvesicles derived from intact THP-1 bore CD11a, CD31, CD29, CD49d, CD47, VEGFR1, CD181, TRAIL, CD120a, CD120b. After TNFαactivation, THP-1 cellsproduced more CD11a+, CD18+, CD54+, VEGF-R1+, CD120b+ microvesicles than intact cells. Activation of THP-1 by TNFα or IFNγ led to the increase in CD54 fluorescence intensity on THP-1-derived microvesicles. Thus, intact or activated THP-1 cells produce microvesicles 50-700 nm in diameter, with the peak at 200 nm. Intact THP-1-derived microvesicles bear adhesion molecules, cytokine and growth factor receptors. Activation of THP-1 by TNFα or IFNγ leads to the increase in production of CD11a+, CD18+, VEGF-R1+, CD120b+, CD54+ microvesicles.

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