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Effectiveness of Linezolid, ¹²⁷I-Linezolid and ¹³¹I-Linezolid Against Methicillin-Susceptible Staphylococcus Aureus by Time Kill Curve Methods

Hasan Demiroğlu¹, Uğur Avcıbaşı¹, Serhan Sakarya², Perihan Ünak³

¹Celal Bayar University Faculty of Arts and Science, Department of Chemistry, Manisa, Turkey

²Adnan Menderes University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology, Aydın, Turkey

³Ege University Faculty of Medicine, Institute of Nuclear Sciences, Department of Nuclear Applications, İzmir, Turkey

Abstract

Objective: Linezolid (LNZ) is one of the most effective treatments against Gram positive bacteria. However LNZ resistant intermediate strains have recently emerged in worldwide. The aim of the study was to compare the minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC) and minimum biofilm inhibitory concentration (MBIC) of LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ against methicillin susceptible Staphylococcus aureus ATCC 35556 (MSSA) biofilms.

Methods: LNZ radiolabeled with ¹³¹I and cold labeling study with ¹²⁷I was performed. Radiolabeling and inactive labeling quality-control studies of LNZ were carried out by using TLC (Thin Layer Radiochromatography) and HPLC (High Pressure Liquid Chromatography). LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ against biofilm-forming MSSA was investigated, using a twofold serial broth microtiter method, biofilm challenge, and bacterial count recovery.

Results: The binding yield was obtained to be about 86±2% for radiolabeled LNZ. Minimal inhibitory concentration (MIC) and minimal bactericidal concentration for LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ ranged from 1 to 2 µg/mL respectively. In time-kill studies LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ were bactericidal against staphylococci, producing ≥3 Log₁₀ decrease in viable counts (cfu/mL) within 6 h at 2xMIC. Following the biofilm formation on polystyrene U-bottom microtiter plates to investigate the minimal biofilm inhibitory concentration (MBIC) of LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ was defined as the minimal concentration of antibiotic required to inhibit the biofilm. None of the LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ killed 100% of biofilm associated cells. Mean cell survival in biofilms treated with 64 µg/mL LNZ, ¹²⁷I-LNZ and ¹³¹I-LNZ (64 µg/mL) was 48%, 49%, and 33%, respectively.

Conclusion: Our results show that radiolabeled Linezolid demonstrated that 24 h of exposure to 64 µg/mL, promise in treating biofilm producing Staphylococcus aureus.

Key words: Biofilm, iodine-131, linezolid, radiolabeling, staphylococcus aureus

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Congress Participation and Efficiency of Education of Nuclear Medicine Technologists

Burak Sönmezer, Hatice Durak, Emine Acar, Bağnu Uysal, Ebru Mendilcioğlu, Gamze Çapa Kaya

Dokuz Eylül University Faculty of Medicine, Department of Nuclear Medicine, İzmir, Turkey

Abstract

Objective: It's aimed to reveal the areas in which technologists have inefficiency.

Methods: The questionnaire is applied to 77 (32 women, 45 men) nuclear medicine technologists with a mean age of 37 (19-59), who are working at 11 different hospitals. The education of the staff was as follows; 6 (8%) high school, 57 (74%) undergraduate, 14 (18%) bachelors degree. 70 of them was working in state hospitals (91%), 7 (9%) working in private sector. 58 technologists (75%) were working at the imaging unit, 13 (17%) working at the laboratory and 6 (8%) working both imaging and laboratory. All hospitals were equipped with gamma cameras and PET/CT. There was SPECT/CT at 4 (36%), uptake device at 6 (55%), bone mineral densitometry at 2 (19%) centers.

Results: 46 technologists (60%) havent participated in any congress and/or educational activity. Almost all of the 31 technologists who have participated before (97%) declared that they benefited from the activities. 22 technologists (48%)