R019
Publication Only
Basic Science: Animal models including experimental treatment

Complex action of ultrasonic radiation and antimicrobial drugs with immunocorrectors on the phagocytic activity of neutrophils with NETs formation in *K. pneumoniae* experimental localised infection

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Objectives. The problems of *K.pneumoniae* chronic inflammatory processes treating remain one of the most topical problems in modern medicine. Research data analysis shows that number of patients with pyoinflammatory diseases and complications has no tendency to decrease, that causes major problems and requires improving efficiency and developing new approaches for therapy. The aim was to study the complex effect of ultrasonic radiation, antimicrobials, immunocorrectors on cellular immunity and phagocytosis in *K.pneumoniae* localized infection.

Methods. The experimental part was carried out on BALB/cJLacSto mice line. Phagocytic activity of neutrophils was investigated by ability to absorb the polystyrene latex particles. To determine Neutrophil Extracellular Traps (NETs) reaction with peripheral blood neutrophils cell suspension on gradient solutions and activated with *K.pneumoniae* and latex was carried out. Obtained results were analyzed using statistical program «Biostat».

Results. Cellular immunity parameters of infected animals were with statistically significant changes in reducing lymphocytes numbers of CD3+ in 2.8 times (23.2 ± 1.7 %), CD4+ in 2.4 times (16.1± 0.9 %) and CD8+ in 2.3 times (12.6 ± 0.4 %). Also in infected animals serum IgA level decreased in 3 times (12.4 ± 0.9 g/L) and IgM significantly increased (92.3± 2.9 g/L). Integral phagocytosis indicators in infected animals were lower than the control values (3.8 ± 0.2 units and 80.1 ± 1.3 %) and were as follows:neutrophils phagocytic number – 1.3 ± 0.5 units and their absorptive capacity –15.8 ± 1.4 %, respectively. Under using of ultrasonic radiation of low intensity from 2 to 3 W/cm^2, oscillation frequency of 26.5 kHz and vibration amplitude from 50 to 80 microns within 1 minute on infiltration region after administration of cefoperazon+sulbactam and amikacin with ronkoleukinum the lymphocytes rate of CD3+ increased in 3.5 times (81.2 ± 2.4 %), CD4+ in 2.8 times (45.8 ± 1.7 %) and CD8+ in 2.3 times (28.8 ± 0.7 %). Serum IgA level increased in 2.7 times (33.4 ± 0.4 g/L) and IgM decreased in 3.5 times (26.4 ± 1.3 g/L). Comparing unmodified neutrophils phagocytic activity and efficiency of *K.pneumoniae* capture in NETs it was determined that intensity of phagocytosis under the ultrasound influence was with latex 14.8 ± 0.9 units and *K.pneumoniae* 2.8 ± 0.7 units, these indexes were in 1.6-2 times lower then antigen content in NETs: 22.1 ± 1.3 units and 6,3 ± 0.7 units, respectively.

Conclusion. A scheme of complex therapy of *K.pneumoniae* localized infection with ultrasonic radiation of low intensity from 2 to 3W/cm^2, oscillation frequency of 26.5 kHz and vibration amplitude

from 50 to 80 microns within 1 minute on infiltration region after administration of cefoperazon+sulbactam and amikacin with ronkoleukinum was worked out that promoted activation of cellular immunity and phagocytosis with NETs formation.