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THE RESEARCH OF ANTIMICROBIAL EFFICACY AND CYTOTOXICITY OF MODERN QAC-ANTISEPTICS

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Nowadays, the research of antimicrobial effectiveness and biosafety of modern cationic surface-active antiseptics quaternary ammonium compounds (QACs) has gained significant importance.

The aim – the study of antimicrobial effectiveness of the QAC antiseptics ophthalmodec (OD, decamethoxin 0,02%), okomistin (OM, miramistin 0,01%): their influence on the DNA fragmentation, cycle of the anterior corneal epithelium (ACE).

Materials and methods. Minimal inhibitory, microbicidal concentrations of OD, OM against clinical strains of the microorganisms were studied (serial double dilution method). In vivo cytotoxic effect of OD, OM on the ACE cells was investigated after two week daily instillation of these QACs into the male rat's eyes. The flow-cytometric parameters of epithelial cell cycle, DNA fragmentation and apoptosis under the influence ophthalmic QAC antiseptic agents were registered, analysed.

Results and discussion. The high microbiostatic, microbicidal effects of OD, OM against wide spectrum of the pathogens (*S.aureus*, *E.coli*, *E. faecalis*, *A.baumannii*, *K.pneumoniae*) were proved, with significant advantages of antimicrobial effectiveness of OD ($p < 0,001$).

After OD two-week instillation, there were estimated flow-cytometry parameters of the insignificant (1.3 times) decrease of ACE proliferation index, low increase of apoptosis index (0.68%), no difference of mitotic activity, in comparison with intact eyes ($p > 0.05$, fig 1). The prolonged use of OM resulted in the increase of cells in the G0G1 phase comparably to cells managed with OD and intact ones (4.63% and 3.69%, respectively); significant increase of DNA fragmentation in the nuclei of ACE cells, 1.3 times decrease of proliferative activity, no significant difference between the content of ACE cells (4.12 ± 0.57)% in the S-phase in comparison with intact eye ($p < 0.05$) were proved.

Conclusion. Ophthalmodec provides 1.8–6.0 times higher antimicrobial effect against a wide list of pathogens than the okomistin ($p < 0,001$); under its prolonged use no flow-cytometric signs of cytotoxic and pro-apoptotic effects on the corneal epithelium were found

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