Streszczenie w j. angielskim

Voice prosthesis implantation with the surgical creation of a tracheoesophageal fistula is the most effective procedure for voice rehabilitation in patients after a total laryngectomy. The good condition of this silicone device is crucial for the effective rehabilitation and for the patient's safety. Voice prosthesis failure can lead to leakage from the oesophagus to the respiratory tract, what is a potentially life-threatening situation. Previous studies suggest that the main factor responsible for the destruction of voice prostheses is the biofilm growth on their surface.

The aim of this study was to perform microbiological identification and analysis of the failure voice prostheses' biofilm. In addition, the aim was to identify and describe the characteristics of silicone destruction a result of biofilm growth. In the next stage, the antifungal efficacy of ceragenins against clinical isolates of fungi from voice prostheses was tested. Their potential use as an antifungal modification of the silicone material for the device production was also evaluated.

During the research, the most common species forming the fungal biofilm on the voice prosthesis were identified, and the characteristics of surface and material structure destruction were described using microscopic techniques (AFM, CLSM, SEM). In addition, the relationship between them and the time of the device exploitation was analysed. In the second stage, the high antifungal efficacy of ceragenins (mainly CSA-131) was confirmed against clinical isolates of the most common fungal species identified on voice prostheses. Moreover, there was observed that CSA-131 has not any potential to induce drug resistance among the tested fungi. The incubation of the voice prosthesis with CSA-131 particles was confirmed in vitro as an effective inhibition method for the biofilm growth on the device.