

Streszczenie w języku angielskim

Acne rosacea is a chronic, inflammatory skin disease with an incompletely understood pathophysiology. It is presumed that microbial factors, although not thoroughly characterized, contribute to the development of this condition. The first paper reviewed current literature focused on changes in the composition of the skin, blood and gut microbiome in patients with rosacea. All of the reviewed publications showed significant changes in the composition of the skin, blood or gut microbiome in rosacea patients. However, the findings were highly inconsistent and sometimes even contradictory.

Atopic dermatitis (AD) is a chronic, inflammatory and relapsing skin disease. The bacterial microflora of the skin, especially *Staphylococcus aureus*, plays an important role in the pathogenesis of the disease. Fifty patients with AD were included in the analysis of the first research study. The severity of the disease was assessed using EASI (Eczema Area and Severity Index) and SCORAD (SCORing of Atopic Dermatitis) indices and the intensity of pruritus with NRS (Numerical Rating Scale). The presence of *St. aureus* on the skin was confirmed from skin swabs in 82% of patients. Patients with *St. aureus* strains were characterized by higher disease severity than those with negative cultures and experienced more intense itching. The majority (n=40, 97.6%) of *St. aureus* strains were methicillin-susceptible strains. In 3 cases (7.3%), the presence of an inducible resistance mechanism of the MLSB type was detected. As for topical antibiotics: 22% of strains were resistant to erythromycin, 17.1% to clindamycin, 14.6% to gentamicin, 9.8% to fusidinic acid, 7.3% to chloramphenicol and 4.9% to mupirocin.

The second study evaluated the effect of sodium hypochlorite on AD severity and *St. aureus* eradication. Fifty-four patients with AD participated in the study; half of the patient received sodium hypochlorite baths in addition to standard therapy, while the rest of the patients received only standard treatment for AD. All patients were assessed at inclusion and after 6 weeks for disease severity according to the EASI, SCORAD, PGA (Physician Global Assessment) and DLQI (Dermatology Life Quality Index) scales, as well as the intensity of perceived pruritus according to NRS. Skin swabs were taken for microbiological examination with pathogen identification and semi-quantitative evaluation of isolated strains. Patients using diluted sodium hypochlorite baths showed greater improvement in local condition expressed by SCORAD and EASI scales compared to those not using this therapy. In addition, there was a greater reduction in pruritus and a significant improvement in quality of life in the study group compared to

the control group. However, the association of applied sodium hypochlorite therapy with *St. aureus* eradication was not confirmed.

The third study evaluated the diversity of the bacterial microbiome composition in the lesions of prurigo nodularis by targeting the V3-V4 16S rRNA region. The study included 34 patients with prurigo nodularis (PN), 15 patients with AD and 38 healthy volunteers (HV). Each patient underwent a thorough history and physical examination with an assessment of disease severity. The genetic profile of the microbiome was characterized in scrapings from 24 (70.6%) PN patients, 14 (93.3%) AD patients and 9 (23.7%) HV. After DNA extraction, the V3-V4 region of the bacterial 16S rRNA gene was amplified. Sequencing was performed using the Illumina platform on a MiSeq instrument. Taxon identification was performed using the Silva v.138 database. No statistically significant difference was noted in alpha diversity (diversity within a sample) in the PN, AD and HV groups. Beta diversity (diversity between samples) showed statistically significant differences between the three groups, both at the global level and between groups. *Staphylococcus sp.* were significantly more abundant in samples from PN and AD patients than in the control group. The difference persisted at all taxonomic levels.

Based on performed studies, it was shown that *St. aureus* is a common component of the cutaneous bacterial microbiota of AD patients and its colonization is associated with increased disease activity. A lower incidence of drug resistance has been demonstrated regarding antibiotics currently only used topically compared to antibiotics that are used both topically and systemically. Diluted sodium hypochlorite baths have been shown to reduce the severity of atopic dermatitis and improve quality of life while ensuring good tolerability and safety. However, no significant effect was shown on reducing the number of *St. aureus* colonies on the skin. Preliminary results support the theory that the composition of the skin microbiome in PN is altered and warrants further research into its role in this disease entity.