

Effect of antipneumococcal vaccination on nasopharyngeal microbiota profile in preschool children in Poland

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Poland was one of the last countries in Europe to introduce in 2017 free-of charge, mandatory vaccinations against invasive pneumococcal disease. The aim of the study was to determine how Pneumococcal Conjugate Vaccines (PCVs) affected colonization of nasopharyngeal microbiota in healthy children aged 1-6 years who were vaccinated with PCVs in comparison to non-vaccinated children.

DNAs from nasopharyngeal samples were extracted using QIAamp DNA Mini Kit according to the manufacturer's instructions and analyzed with the Custom Microbial DNA qPCR Array (Qiagen, USA).

In molecular analysis with real-time PCR, from the 176 patients studied, 643 species/genes of 21 various microbial species tested were retrieved. In one sample 0-14 (mean 3.65 ± 2.96) species/genes were detected. Of 145 (82.4%) children were positive for at least one of the tested microorganisms. The prevalence of URTI pathogens in children, namely *S.pneumoniae*, *H.influenzae*, *M.catarrhalis* and *S.aureus* was 30.1%, 9.1%, 0.6% and 18.2%, respectively. The statistical analysis revealed the differences in prevalence of *Kocuria kristine* ($p=0.0046$), *S.sanguinis* ($p=0.028$) and *H.parainfluenzae* ($p=0.048$) which were significantly more frequently present in vaccinated group, whereas *S.aureus* ($p=0.0062$) was significantly associated with unvaccinated group. The relative abundance of bacterial species was found to be similar between the vaccinated and unvaccinated groups for the majority of species. Significantly different relative abundance in both groups confirmed positive association *K.kristinae* ($p=0.0063$) and *S.sanguinis* ($p=0.016$) with vaccinated group and negative association of *S.aureus* ($p=0.0088$) with this group. The $\Delta\Delta CT$ method was used for the relative profiling and comparison between two populations from vaccinated and unvaccinated children. Microbial DNA qPCR Array correlated increased amounts of *Streptococcus mitis* and *S.sanguinis*, with reduced amounts of *C.pseudodiphthericum*, *S.aureus* and *M.catarrhalis*. In conclusion, pneumococcal vaccination promotes decreasing of amount of pathogenic bacteria and also induces commensal bacteria colonization without substantially changing the nasopharyngeal microbiota.

Biography

Karolina Kielbik, is a PhD student at the Department of Pharmaceutical Microbiology, Medical University of Lublin, Poland. She graduated from pharmacy in 2016 in Lublin, works as a hospital pharmacist. Over 4 years of doctoral research focuses on the pneumococcal carriage in young children in Poland.

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