lek. Katarzyna Gmachowska ,
Klinika Interny Dziecięcej i Alergologii
Ośrodek Pediatryczny im. J.Korczaka w Łodzi
katarzyna.gmachowska@stud.umed.lodz.pl

Determination of the importance of the microbiota profile and selected viruses of the upper respiratory tract and the profile of volatile compounds in the exhaled air in the prediction of asthma exacerbations in children.

Objectives:

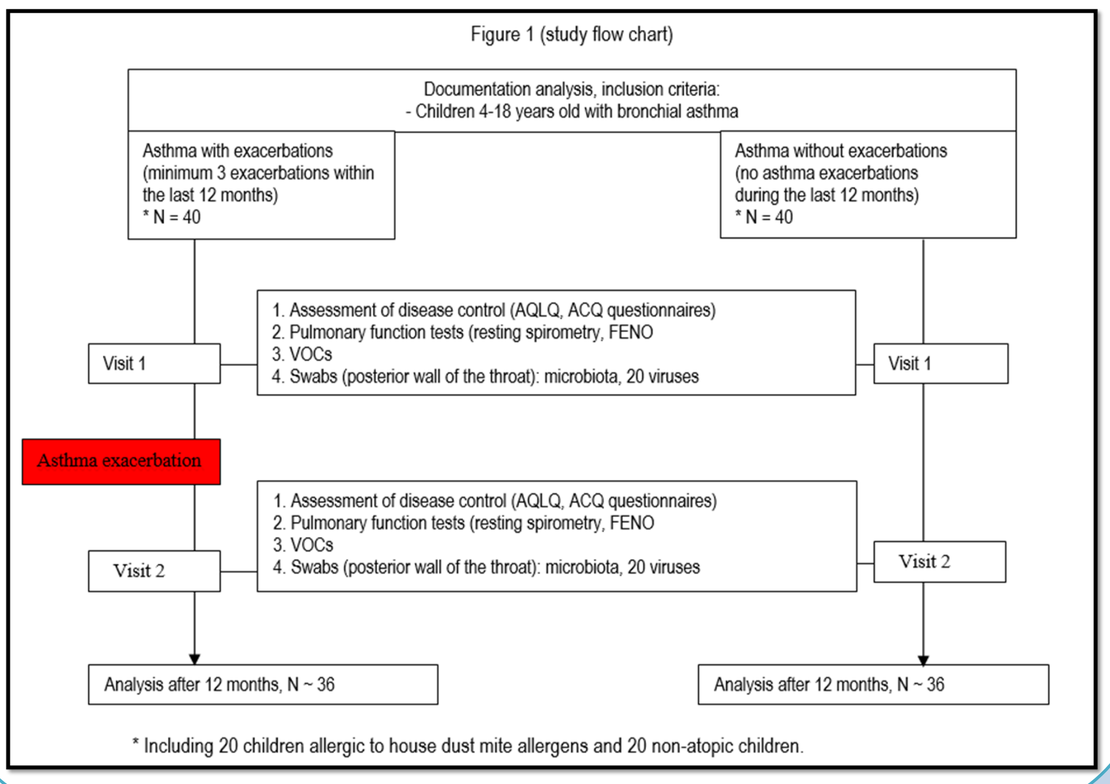
- Assessment of the relationship between the composition and biodiversity of the microbiota as well as the presence of selected viruses of the posterior pharynx and the clinical course of asthma, including exacerbations of the disease.
- Assessment of the relationship between asthma exacerbations and the metabolomic profile assessed using non-invasive test methods - the assessment of free volatile organic compounds in the exhaled air (VOCs).

Methods:

1. Medical examination, including detailed medical history using standardized asthma control questionnaires (AQLQ, ACQ).
2. Pulmonary function tests - resting spirometry, FENO.
3. Swab of the posterior wall of the throat for evaluation:
- microbiota composition
- genetic material of pathogenic viruses.
4. Measurement of volatile organic compounds (VOC) in the exhaled air.

Patients and Study Design

Figure 1 (study flow chart)



* Including 20 children allergic to house dust mite allergens and 20 non-atopic children.

The baseline characteristics of all participants

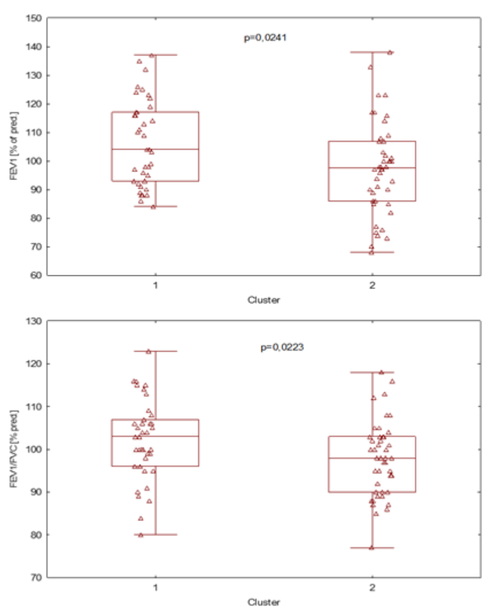
	cluster 1, n=38			Cluster2, n=42			P-level (Mann-Whitney)
	Median	Q25	Q75	Median	Q25	Q75	
Age, years	10,0	9,0	12,0	11,0	9,0	14,0	0,1831
Male gender, N(%)	30(78)			33(75)			0.7948
BMI. kg/m2	20,0	17,0	22,0	19,0	17,0	21,5	0,2299
HDM allergy, N(%)	18(47.4)			27(61.4)			0.2668
FEV1, % pred.	104,0	93,0	117,0	97,5	86,0	107,0	0,0236
FEV1/FVC, % pred.	103,0	96,0	107,0	98,0	90,0	103,0	0,0219
FeNO, ppb	39,8	30,0	65,0	39,7	33,2	54,0	0,9373
eosinophil blood count, %	5,0	3,0	8,0	4,0	3,0	6,0	0,5059
eosinophil blood count, cel/mm3	340	200	550	309	200	505	0.7497
ACQ, points	22,0	18,0	23,0	22,0	18,0	24,0	0,9889

Characteristics of the clusters

Cluster 1	Cluster 2	VOCs belonging to Cluster 1 and Cluser 2
(4E)-5-METHYL-4-HEPTEN-3-ONE 2-Oxabicyclo[2,2,2]octane, 1,3,3-trimethyl- 4-Hexen-2-one, 3,4-dimethyl- 5-HEPTEN-3-ONE, 5-METHYL-, (Z)- Benzene, propoxy- Cyclohexane P96 Dodecane Heptane, 2,2,4,6,6-pentamethyl- Hexanoic acid, butyl ester p-Xylene Undecane	1-Butanol, 2-methyl-, acetate 1-Propanol 2-Butanone, 3-hydroxy- 2-Pinen-4-one, (1S,5S)-(-)- 2-Undecanone 3-Heptanone, 5-methylene- (CAS) 3-Methyl-2(5H)-furanone 4-Hepten-3-one, 5-methyl-, (Z)- á-Pinene Benzaldehyde, 2-hydroxy- Benzene BENZENE, 1,2-DIMETHYL- Benzenemethanol, a,a-dimethyl- Benzothiazole Cyclohexanol, 5-methyl-2-(1-methylethyl)-, [1R-(1a,2á,5a)]- Cyclopentane, methyl- Decanal Heptane Heptane, 2,4-dimethyl- Hexadecanoic acid, methyl ester Limonene Methane, thiobis- N,N-Dimethylacetamide Nonane Pentasiloxane, dodecamethyl- Propanedioic acid, dihydroxy-	<alpha>-pinene 2-Pentanone, 4-methyl- Acetone aldehyd cynamonowy nHexane Octane, 4-methyl-

Results:

Figure 1



1.Cluster 1, defined as a nonexacerbation phenotype, included 47.5% (n=38) of the cohort with milder asthma and no exacerbations, e.g., cyclohexane P96, (4E)-5-methyl-4-hepten-3-one.

2. Cluster 2, defined as the exacerbation phenotype, included 52.5% (n=42) of the cohort with a predominant number of bronchial asthma exacerbations and worse lung ventilation parameters (FEV1/FVC and FEV1). Gases belonging to cluster 2 included 1-propanol, 1-butanol, cinnamaldehyde, benzaldehyde.

3.The results are independent of age, gender, BMI, FENO, house dust mite allergy, ACQ and the number of eosinophils in the blood of the children studied (Table 2).

Bioethics Committee of the UMED in Lodz - No. RNN/104/21/KE 11.05.2021