Type 2 biomarker expression according to age of asthma onset: an analysis of the German severe asthma registry (GAN)

ERS Congress Barcelona 2022

German Asthma Net e.V.

M. Lommatzsch[1], C. Taube[2], E. Hamelmann[3], K. Milger-Kneidinger[4], D. Skowasch[5], M. Jandl[6], F. S. Schmitz[7], C. Koerner-Rettberg[8], M. Idzko[9], R. Buhl[10], S. Korn[11]

[1] University of Rostock - Rostock (Germany), [2] University of Duisburg-Essen - Essen (Germany), [3] University of Bielefeld - Bielefeld (Germany), [4] University of Munich - Munich (Germany), [5] University of Bonn - Bonn (Germany), [6] Hamburger Institut für Therapieforschung – Hamburg (Germany), [7] Praxis für Pneumologie und Schlafmedizin - Kaiserslautern (Germany), [8] Marien-Hospital Wesel - Wesel (Germany), [9] University of Vienna - Vienna (Austria), [10] University of Mainz - Mainz (Germany), [11] University of Heidelberg - Heidelberg (Germany)

Sponsoring partners of the GAN: AstraZeneca, GSK, Novartis, Sanofi.

Background: The relevance of the age of asthma onset for type 2 biomarker expression in severe asthma is incompletely understood. Recent evidence suggests that type 2 biomarker expression might be higher in patients with severe adult-onset asthma than in patients with severe early-onset asthma (Lommatzsch et al., *Allergy* 2021).

Methods: Data of 1512 patients documented in the German severe asthma registry (GAN) were analysed according to age of asthma onset (severe early-onset asthma, SEA: age of onset <18 years of age; severe adult-onset asthma, SAA: age of onset ≥18 years of age). Parameters were compared using the Mann-Whitney-U-Test.

Results: There were 456 patients with SEA (30.2%, median age: 38 years, median age at asthma onset: 5 years) and 1056 patients with SAA (69.8%, median age: 56 years, median age at asthma onset: 40 years). There was no significant difference in the gender distribution (SEA: 59%, SAA: 56.2% females). SAA was characterised by a higher percentage of ever-smokers (SEA: 24.6%, SAA: 48.9%), a higher median BMI (SEA: 24.9 kg/m^2, SAA: 26.7 kg/m^2), a higher number of very frequent exacerbators (SEA: 4.7%, SAA: 8.3%) and a higher percentage of patients with chronic sinusitis (SEA: 39%, SAA: 56.5%), nasal polyps (SEA: 22.3%, SAA: 45.2%) and Aspirin-exacerbated respiratory disease (SEA: 17.8%, SAA: 23.8%) than SEA. In contrast, there was a lower median FEV$_1$ (SEA: 70%, SAA: 66% predicted), a lower median total serum immunoglobulin E (IgE, SEA: 201 IU/ml, SAA: 169 IU/ml) and a lower prevalence of allergic co-morbidities (SEA: 81.5%, SAA: 57.5%) in SAA than in SEA. Patients with SAA displayed higher median exhaled FeNO values (SEA: 23 ppb, SAA: 41 ppb) and higher median blood eosinophil counts (SEA: 200 cells/µl, SAA: 252 cells/µl) than patients with SEA.

Conclusion: Severe adult-onset asthma is characterised by a stronger expression of type 2 biomarkers than severe early-onset asthma.

	Early-onset asthma (onset <18 years of age)	**Adult-onset asthma (onset ≥18 years of age)**	
	median values or %	median values or %	p-value
Total number of patients	456	1056	
Female (% of pts.)	59.0 %	56.2 %	n.s.
Age (years)	38.0	56.0	p<0.001
BMI (kg/m^2)	24.9	26.7	p<0.001
Asthma duration (years)	30.5	14.0	p<0.001
Age at onset (years)	5.0	40.0	p<0.001
Ever-smoker (% of pts.)	24.6 %	48.9 %	p<0.001
Pack years	6	10	p<0.001
Very frequent exacerbations (≥1x/mon)	4.7%	8.3%	p<0.001
ACQ-5	2.4	2.8	p<0.01
FEV$_1$ (% predicted)	70.00	66.00	p<0.05
FeNO (ppb)	**23.0**	**41.0**	p<0.001
Blood eosinophils (cells/µl)	**200**	**252**	p<0.05
Total IgE (U/ml)	200.5	169.0	p<0.05
Any allergic comorbidity (% of pts.)	81.5%	57.5%	p<0.001
Chronic rhinosinusitis (% of pts.)	39.0%	56.5%	p<0.001
Nasal polyps (% of pts.)	22.3%	45.2%	p<0.001
NSAR-ex. respiratory disease (% of pts.)	17.8%	23.8%	p<0.05

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