

# A Global Survey of Blood Eosinophil Distribution in Severe Asthma Patients: Data from the International Severe Asthma Registry (ISAR)

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## Introduction

- Severe eosinophilic asthma is characterized by frequent exacerbations, poor asthma control, and poor prognosis.<sup>1</sup>
- The eosinophilic severe asthma phenotype has previously been categorized by inflammatory, clinical, and functional parameters including high blood eosinophil count (BEC), adult-onset, upper airway comorbidities, and treatment.<sup>2</sup>
- Currently, there is lack of data describing the BEC distribution in a large international real-life cohort of patients with severe asthma.

## Aims

- To describe the distribution of BEC in a large cohort of severe asthma patients from the International Severe Asthma Registry (ISAR) according to treatment, presence of nasal polyps, and age of asthma onset.

## Methods

### Design

- A historical cohort study including patients enrolled into ISAR between 1 January 2015 and 30 September 2019.

### Patients

- Aged  $\geq 18$  years, with severe asthma (i.e., receiving treatment at GINA 2018 Step 5 or with uncontrolled asthma at GINA Step 4)<sup>3</sup> and  $\geq 1$  recorded BEC.
  - Pre-biologic BEC was used for patients on anti-interleukin 5 (IL-5) or anti-interleukin 5-receptor  $\alpha$  (IL-5R) therapy.

### Data

- Prospective, de-identified, standardized patient data collected from new and pre-existing severe asthma registries contributing to ISAR from 11 countries (i.e., Bulgaria, Canada, Denmark, Greece, Italy, Japan, Kuwait, South Korea, Spain, the United Kingdom, and the United States).

### Analysis

- The highest BEC recorded in the 12-month period prior to baseline was described by variables that characterize eosinophilic status, including:
  - Long-term oral corticosteroid (OCS) treatment
  - Anti-IL-5/5R treatment
  - Presence of nasal polyps
  - Age of onset of asthma (early onset:  $< 18$  years; adult onset:  $\geq 18$  years)
- For those already on anti-IL-5 or anti-IL-5R, the highest BEC prior to anti-IL-5/5R was used. For those not already on anti-IL-5 or anti-IL-5R the highest ever BEC was used.

## Results

### Patients

- Of the 7396 patients in ISAR, 75.2% (n=5562) patients had a BEC recorded.
- Prospective, de-identified, standardized data were available for 1716 patients.

### BEC distribution

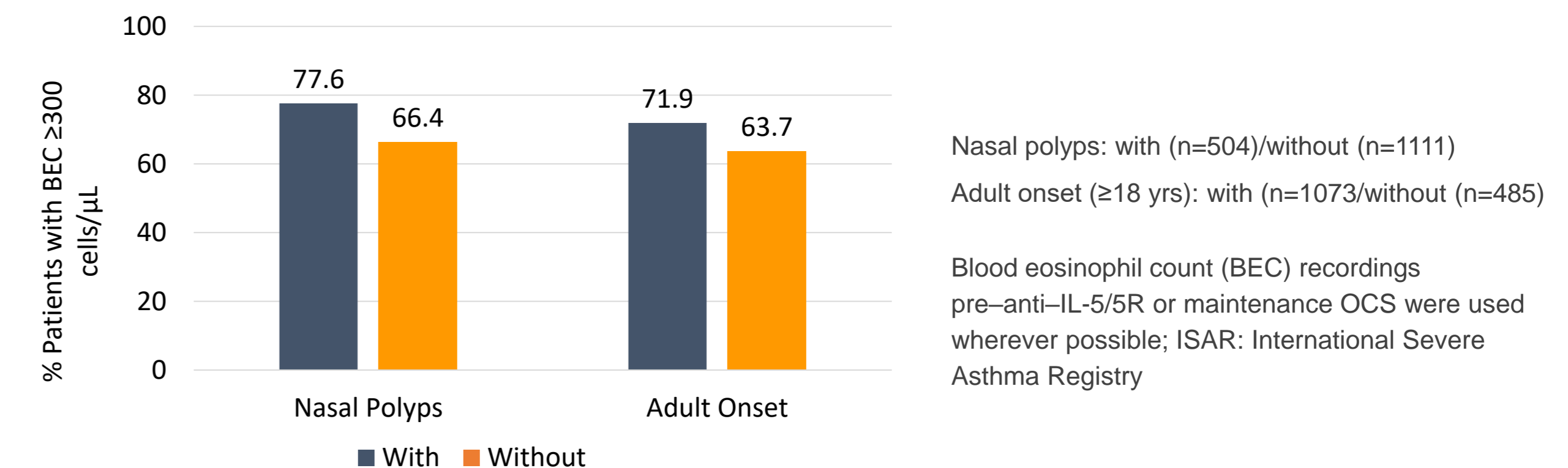
- Overall, 69.7% of patients had a high BEC ( $\geq 300$  cells/ $\mu$ L); 12.3% had a BEC  $\geq 150$  to  $300 \mu$ g/ $\mu$ L and 18% of patients had low BEC ( $< 150$  cells/ $\mu$ L) (Table 1).
- Numerically higher BEC was noted for patients with:
  - Nasal polyps vs. those without nasal polyps (Table 1; Figure 1)
    - 77.6% of patients with nasal polyps had highest BEC  $\geq 300$  cells/ $\mu$ L compared to 66.4% without nasal polyps.
  - Adult onset vs those with early onset (Table 1; Figure 1)
    - 71.9% of patients with adult onset asthma had highest BEC  $\geq 300$  cells/ $\mu$ L compared to 63.7% of patients with an early onset.
- For those patients who subsequently received anti-IL-5/5R therapy, highest BEC count was  $\geq 300$  cells/ $\mu$ L (at baseline) for 75.2% of them (Table 1).
- 65.8% of patients had a highest BEC  $\geq 300$  cells/ $\mu$ L despite long-term OCS therapy (Table 1).

Table 1: Distribution of highest BEC recorded at severe asthma center/clinic according to treatment, nasal polyps, and age of asthma onset

Highest BEC ever recorded in a severe asthma center/clinic	$< 150$ cells/ $\mu$ L	$\geq 150$ to $< 300$ cells/ $\mu$ L	$\geq 300$ cells/ $\mu$ L
All patients (n=1716)	309 (18.0%)	211 (12.3%)	1196 (69.7%)
Without Nasal Polyps (n=1111)*	224 (20.2%)	149 (13.4%)	738 (66.4%)
With Nasal Polyps (n=504)*	65 (12.9%)	48 (9.5%)	391 (77.6%)
With Early Onset (n=485)*	106 (21.9%)	70 (14.4%)	309 (63.7%)
With Adult Onset (n=1073)*	175 (16.3%)	127 (11.8%)	771 (71.9%)
Pre-anti-IL-5/5R Highest BEC ever (n=742)*	122 (16.4%)	62 (8.4%)	558 (75.2%)
On long-term OCS (n=697)*	163 (23.4%)	75 (10.8%)	459 (65.8%)

BEC: blood eosinophil count; IL-5, interleukin 5; IL-5R, interleukin 5-receptor  $\alpha$ ; OCS, oral corticosteroids  
\* % of total number of patients within each category; Long term OCS: prescription for maintenance OCS or  $\geq 90$  days of OCS exposure in the observation year; early onset:  $< 18$  years old; Adult onset:  $\geq 18$  years old

Figure 1: Percentage of prospective ISAR population with a high BEC ( $\geq 300$  cells/ $\mu$ L) with/without nasal polyps and adult onset (aged  $\geq 18$  years)



## Conclusions

- The majority of patients in this severe asthma cohort from 11 countries had a high BEC ( $\geq 300$  cells/ $\mu$ L).
- Patients with severe eosinophilic asthma (i.e. BEC  $\geq 300$  cells/ $\mu$ L) were more likely to have nasal polyps, adult onset asthma, and be on long-term OCS.
- Many patients have a high BEC despite long-term OCS use and may benefit from a more targeted treatment approach.
- Better characterization of patients with severe asthma moves us one step closer to precision medicine for this population.

## References

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