

Demographic and Clinical Characteristics of Patients with Severe Asthma who Continued, Stopped or Switched Biologic Therapy

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INTRODUCTION: Biologics, which are monoclonal antibodies targeting molecular intermediates, provide a promising therapy for severe asthmatics. Thus, biologics have quickly become integrated into the treatment regimen of severe asthma. However, there is limited knowledge of the pattern of use of biologic therapy in current clinical practice (i.e. continue, stop, switch) and the characteristics underpinning these patterns. This study thus aimed to explore baseline clinical and demographic characteristics of a real-life severe asthma cohort according to pattern of biologic use.

METHODS: This retrospective cohort study included patient-level data from 11 countries (Bulgaria, Canada, Denmark, Greece, Italy, Japan, Kuwait, South Korea, Spain, UK and USA) in the International Severe Asthma Registry (ISAR) between January 2015 – October 2019. This study includes adult severe asthma patients on biologics: Omalizumab (Anti-Immunoglobulin E); Dupilumab (Anti-interleukin 4 receptor alpha); Mepolizumab, Reslizumab and Benralizumab (Anti-interleukin 5/interleukin-5 receptor). Biologic utilization was categorised as: i) continued (i.e. use of 1 biologic for ≥ 6 months, with no indication of biologic therapy end); ii) switched (i.e. users receiving >1 biologic, ; iii) stopped (i.e. individuals on 1 biologic who discontinued). The distribution of baseline (closest to biologic initiation) demographic and clinical characteristics was described for each of these three biologic utilisation groups. Global statistical tests (Chi-squared, Fisher's exact, ANOVA, Welch-ANOVA, Kruskal-Wallis), as appropriate, were used to determine significant differences in the distribution of these characteristics.

RESULTS: Of the 2,208 ISAR patients on biologic therapy, 1664 (75.4%), 298 (13.5%) and 209 (9.5%), respectively, continued, stopped or switched biologic class. Age of asthma onset and smoking status were not significantly different by pattern of biologic use. Compared to continuing patients, stoppers were less likely to have nasal polyps, allergic rhinitis or eczema, while switchers had the highest prevalence of chronic rhinosinusitis (Table 1). Moreover, switchers had the highest health resource utilisation, maintenance OCS use and biomarker counts. The highest proportion of patients with fixed airway obstruction ($FEV_1/FVC < 0.7$) were in the stop group.

CONCLUSION: These results suggest that biologic switchers or discontinuers might have significantly different prevalence of comorbidities, higher health resource utilisation, as well as more impaired lung function than biologic continuers. As these results provide an overview of the potential differences in demographic and clinical characteristics among ISAR patients with different biologic utilisation patterns, the next analytical step is to leverage these results to examine the predictors of continuing, switching or stopping biologics.

Table 1: Baseline clinical and demographic characteristics of study participants, stratified by biologic utilisation pattern

Variable, N (%)*	Continued (N= 1664)	Stopped (N=298)	Switched (N=209)	p-value
Age				
Mean (SD)	54.2 (14.6)	53.6 (15.9)	51.5 (15.4)	0.047 [@]
Comorbidities				
Nasal Polyps	1543	296	193	<0.001^{\$}
Yes	376 (24.4)	25 (8.5)	33 (17.1)	
Chronic Rhinosinusitis	1231	263	160	0.001^{\$}
Yes	520 (42.2)	108 (41.1)	91 (56.9)	
Allergic Rhinitis	1122	262	158	<0.001^{\$}
Yes	429 (38.2)	30 (11.5)	40 (25.3)	
Eczema	1380	275	185	0.035^{\$}
Yes	76 (5.5)	5 (1.8)	10 (5.4)	
Exacerbations	890	120	109	<0.001^{\$}
0	280 (31.5)	14 (11.7)	7 (6.4)	
1 – 3	313 (35.2)	24 (20.0)	35 (32.1)	
≥4	297 (33.4)	82 (68.3)	67 (61.5)	
Health care resource				
Invasive ventilation	927	64	75	0.002[#]
≥2	14 (1.5)	3 (4.7)	1 (1.3)	
Hospitalisation	929	69	87	<0.001^{\$}
≥2	61 (6.6)	17 (24.6)	22 (25.3)	
Emergency department	810	71	86	<0.001^{\$}
≥2	131 (16.2)	19 (26.8)	33 (38.4)	
Biomarkers				
IgE	1104	152	150	0.49^{\$}
≥400	389 (35.2)	44 (29.0)	58 (38.7)	
Blood eosinophil count	1277	254	198	0.01^{\$}
≥0.3	887 (69.5)	184 (72.4)	160 (80.8)	
Fractionally exhaled NO	926	125	125	0.004^{\$}
Intermediate – High (≥25)	596 (64.4)	82 (65.6)	99 (79.2)	
Lung Function				
Post BD FEV1/FVC Ratio	746	102	89	0.008^{\$}
<0.7	239 (32.0)	48 (47.1)	34 (38.2)	
Maintenance OCS	369 (22.2)	68 (22.8)	63 (30.1)	0.036^{\$}

*Refers to number non-missing for each characteristic, and proportion exhibiting characteristic divided by number non-missing; p-values are from global

[#]Fisher's exact test, ^{\$}Chi-square, [@]ANOVA tests, which compare the proportions/mean of all 3 groups against each other

