Omalizumab Is Efficacious in Children With Allergic Asthma From Different Racial Backgrounds

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Jonathan Witonsky,[1] Jennifer R. Elhawary,[2] Peter F. Huang,[2] Lauren A. Millette,[3] Jinnie Ko,[3] Pranil Raut,[3] José R. Rodriguez-Santana,[4] Luisa N. Borrell,[5] Esteban González-Burchard[6]

[1]Department of Pediatrics, University of California San Francisco, San Francisco, CA, USA; [2]Department of Medicine, University of California San Francisco, San Francisco, CA, USA; [3]Genentech, Inc., South San Francisco, CA, USA; [4]CEO El Centro de Neumología Pediátrica, San Juan, Puerto Rico; [5]Department of Epidemiology & Biostatistics, City University of New York Graduate School of Public Health & Health Policy, New York, NY, USA; [6]Departments of Medicine and Bioengineering and Therapeutic Sciences, University of California San Francisco, San Francisco, CA, USA

Background

- In the United States, underserved racial and ethnic populations,[1] especially Black children,[2] experience an increased burden of asthma.
  - Compared with White children, Black children are 3 times as likely to be hospitalized and 7 times as likely to die from asthma.[3]
- Despite these disparities, Black patients are often underrepresented in clinical trials for asthma biologic therapies,[4] and make up only 5% of all clinical trial participants.[5]
- In addition, studies have suggested potential racial and ethnic differences in treatment efficacy of asthma medications in adults[6,7] and children.[8]
- Omalizumab, an anti–immunoglobulin E (IgE) monoclonal antibody, is approved for treatment of adult and pediatric patients aged ≥6 years with moderate-to-severe allergic asthma.[9]
  - Studies have demonstrated that omalizumab improves asthma exacerbations in both White and Black patients aged >12 years with moderate-to-severe asthma,[10] but potential racial and ethnic differences have not been evaluated in children aged 6 to <12 years.
- Based on the diversity of the pivotal pediatric study, IA05,[11] we were able to assess efficacy and safety in patients of different self-identified races.

Objective

- To assess the efficacy of omalizumab for allergic asthma in pediatric patients of different racial groups (Black, White, and Other).

Methods

- IA05 (NCT00079937) was a 52-week, international, multicenter, double-blind, controlled, parallel-group study of omalizumab treatment (75–375 mg subcutaneously every 2–4 weeks) versus placebo (2:1) in children aged 6 to <12 years with moderate-to-severe inadequately controlled allergic asthma (N=627).
- Post hoc subgroup analysis was conducted and participants were categorized into 3 groups:
  - Black (n=99; placebo, n=30; omalizumab, n=69)
  - White (n=325; placebo, n=113; omalizumab, n=212)
  - Other (Asian [n=2] or unknown/not reported [n=150]; placebo, n=49; omalizumab, n=103).
- Efficacy outcomes were defined as[11]:
  - Clinically significant asthma exacerbations: worsening of asthma symptoms requiring doubling of baseline inhaled corticosteroids and/or treatment with systemic corticosteroids for ≥3 days
  - Severe asthma exacerbations: clinically significant exacerbations requiring treatment with systemic corticosteroids and where peak expiratory flow of forced expiratory volume in 1 second (FEV_1) was <60% of personal best.
- A generalized Poisson regression model was used to evaluate clinically significant and severe asthma exacerbations during the 52-week treatment period in each subgroup.
- Safety data are summarized per racial subgroup; however, given the low numbers of patients, only high-level comparisons were completed.

Results

Baseline Demographics and Clinical Characteristics

- Baseline demographics and clinical characteristics were generally similar across races (**Table 1**).
  - Greater lengths of mean duration of asthma and percentage of positive skin prick test for mold were found in Black patients relative to White and Other patients.
  - In addition, % predicted FEV_1 trended lower in Black patients, and IgE levels trended higher in Other patients.

Table 1. Baseline Demographics and Clinical Characteristics

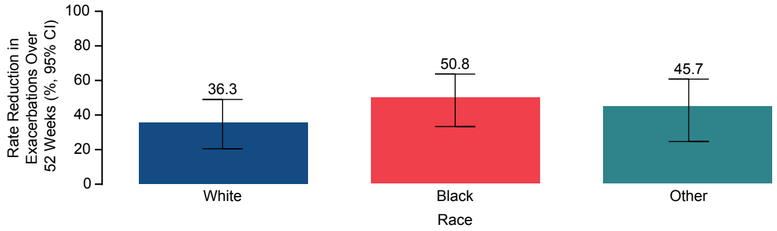
	Race and Treatment					
	White		Black		Other	
Characteristic, Mean (SD)*	Placebo n=113	Omalizumab n=212	Placebo n=30	Omalizumab n=69	Placebo n=49	Omalizumab n=103
Age, y	8.4 (1.7)	8.8 (1.8)	8.9 (1.6)	8.8 (1.7)	8.2 (1.7)	8.4 (1.7)
Male, n (%)	72 (63.7)	132 (62.3)	21 (70.0)	55 (79.7)	36 (73.5)	72 (69.9)
% predicted FEV_1	88.7 (16.8)	88.0 (17.6)	69.5 (17.9)	72.4 (12.1)	91.3 (17.4)	87.3 (17.3)
FEV_1 reversibility, %†	23.3 (14.4)	24.6 (15.6)	31.9 (15.8)	28.1 (18.9)	21.4 (15.2)	27.6 (19.5)
Historical reversibility, %‡	20.9 (7.8)	24.3 (13.4)	27.2 (13.8)	25.2 (14.0)	23.4 (12.8)	24.0 (14.5)
Serum total IgE, IU/mL	437.4 (340.9)	472.9 (351.4)	468.2 (276.4)	439.2 (304.0)	541.2 (365.0)	538.0 (342.1)
Duration of allergic asthma, y	5.3 (2.6)	5.7 (2.7)	6.7 (2.5)	6.3 (2.7)	5.8 (2.3)	5.7 (2.5)
No. of food or drug allergies, n (%)						
0	79 (69.9)	165 (77.8)	18 (60.0)	45 (65.2)	35 (71.4)	81 (78.6)
1	14 (12.4)	18 (8.5)	2 (6.7)	10 (14.5)	3 (6.1)	14 (13.6)
2	6 (5.3)	10 (4.7)	4 (13.3)	7 (10.1)	8 (16.3)	3 (2.9)
3	6 (5.3)	6 (2.8)	4 (13.3)	5 (7.2)	1 (2.0)	1 (1.0)
≥4	8 (7.1)	13 (6.1)	2 (6.7)	2 (2.9)	2 (4.1)	4 (3.9)
Positive skin prick/RAST test to mold, n (%)	45 (39.8)	108 (50.9)	23 (76.7)	52 (75.4)	23 (46.9)	37 (35.9)

FEV_1, forced expiratory volume in 1 second; IgE, immunoglobulin E; RAST, radioallergosorbent.
*Unless stated. †Percent increase in FEV_1 over baseline within 30 minutes of rescue medication (taken anytime between Visits 1–6). ‡Historical reversibility within the last 12 months before entry. Due to a potential overlap in timing, historical reversibility and FEV_1 reversibility data are not mutually exclusive.

Exacerbations

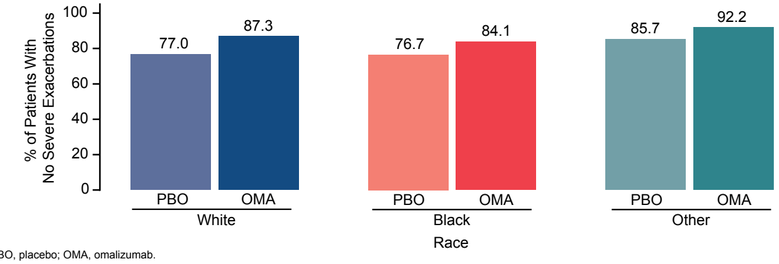
- Compared with White patients, greater placebo-corrected rate reductions in clinically significant exacerbations were seen in Black and Other patients (**Figure 1**):
  - White: 36.3% (95% CI, 20.5–49.0)
  - Black: 50.8% (95% CI, 33.4–63.7)
  - Other: 45.7% (95% CI, 24.7–60.8).

Figure 1. Placebo-Corrected Rate Reduction in Clinically Significant Asthma Exacerbations



- Low levels of severe exacerbations were recorded, regardless of race (**Figure 2**).
  - >80% of participants on omalizumab did not experience severe exacerbations, regardless of race.

Figure 2. Patients Without Severe Asthma Exacerbations



PBO, placebo; OMA, omalizumab.

Safety

- The incidence of treatment-emergent adverse events and serious adverse events was similar between White, Black, and Other patients (**Table 2**).
  - The number of severe treatment-emergent adverse events was low across all racial groups:
    - White: omalizumab, 19 (7.6%); placebo, 11 (8.6%)
    - Black: omalizumab, 6 (8.7%); placebo, 6 (20.0%)
    - Other: omalizumab, 7 (6.8%); placebo, 4 (8.2%).
- Overall safety results for this study were previously reported in Lanier et al.[11]

Table 2. Adverse Events

	Race and Treatment					
	White		Black		Other	
Characteristic, n (%)	Placebo n=128	Omalizumab n=249	Placebo n=30	Omalizumab n=69	Placebo n=49	Omalizumab n=103
Patients with treatment-emergent adverse events	120 (93.8)	216 (86.7)	26 (86.7)	64 (92.8)	48 (98.0)	100 (97.1)
Patients with serious adverse events	10 (7.8)	10 (4.0)	3 (10.0)	2 (2.9)	4 (8.2)	5 (4.9)

Limitations

- Our findings are limited by the post hoc nature of the analysis and the low patient numbers in some subgroups.

Conclusions

- In our post hoc analysis, omalizumab reduced clinically significant asthma exacerbations in children defined by racial background.
  - The incidence of treatment-emergent adverse events and serious adverse events was similar across different racial backgrounds.
- Although some studies have suggested potential racial differences in treatment efficacy of asthma medications,[5-7] our study found that omalizumab was efficacious regardless of race.

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Disclosures **JW, JRE, PFH, JRR-S, LNB, EG-B:** no conflicts of interest to declare. **LAM, JK, PR:** employees of Genentech, Inc.; stockholders in Roche.

Acknowledgments This study was funded by Genentech, Inc., a member of the Roche Group, and Novartis Pharma AG. We thank Kyle Anders and Sachin Gupta of Genentech, Inc., and Eric Wohlford of the University of California San Francisco for their contributions to this study and publication. Third-party writing assistance was provided by Nikolas Vann, PhD, of Envision Pharma Group, and funded by Genentech, Inc., a member of the Roche Group, and Novartis Pharmaceuticals Corporation.

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Presented at the American College of Allergy, Asthma & Immunology (ACAAI) 2021 Annual Scientific Meeting, November 4–8, 2021, New Orleans, LA