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CASE REPORT

Anti-IgE therapy for allergic bronchopulmonary aspergillosis

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Allergic bronchopulmonary aspergillosis (ABPA) is a severe type of asthma. Some cases are resistant to treatment, even with regular use of antiasthmatic drugs and antifungal agents. The diagnosis of ABPA was made in a 40-year-old patient with ABPA according to the Rosenberg-Patterson criteria. Symptoms were not controlled despite regular use of antiasthmatic drugs, daily systemic steroids, and antifungal agents. Omalizumab, administered in an attempt to stabilize these uncontrolled symptoms, was effective with no adverse events. Our experience suggests omalizumab is a potential candidate drug for controlling steroid-dependent ABPA.

Introduction

The global prevalence of bronchial asthma in the adult population is approximately 4% and has been increasing in recent years.[1] Approximately 5% of patients experience severe asthmatic symptoms.[1] Allergic bronchopulmonary aspergillosis (ABPA) is a severe type of allergic asthma that occurs in approximately 10% of patients with severe asthma.[2]

ABPA, a complex clinical entity that results from an innate allergic immune response to *Aspergillus fumigatus* (AF), is mostly seen in patients with allergic asthma or

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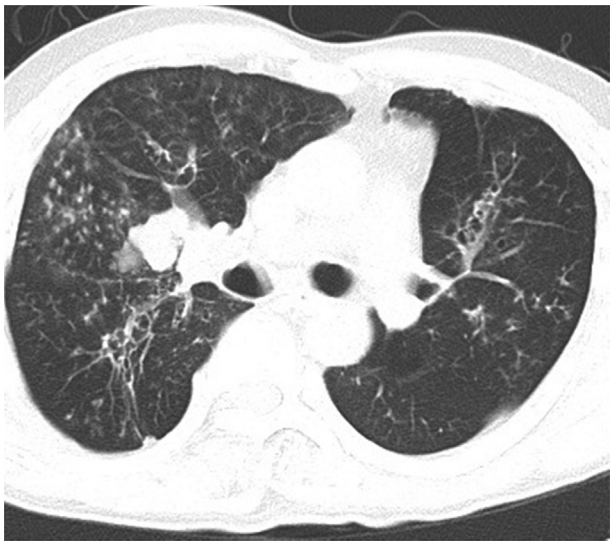

Figure 1. Chest computed tomography obtained at the time of diagnosis of allergic bronchopulmonary aspergillosis.

cystic fibrosis (CF).[3] Sensitization of the allergic host to AF leads to activation of Th2 lymphocytes, which play a key role in allergic diseases, including asthma, by recruiting inflammatory cells like mast cells and eosinophils.[4] The Rosenberg-Patterson criteria are most often used to diagnose ABPA.[5]

ABPA management starts with the avoidance of AF, with antiasthmatic drugs and itraconazole (ITCZ) also being effective in some cases.[6] Systemic prednisolone (PSL) also can be administered in severe cases. Recently, reports have described positive results with the administration of omalizumab, an anti-immunoglobulin (Ig) E drug, in adult patients with severe allergic asthma with or without CF.[7,8]

In this report, we describe an Asian case of non—CF-related ABPA given anti-IgE therapy for longer than 30 months.

Case Report

The current case was a 51-year-old Asian man in whom ABPA was diagnosed at the age of 40 years. He had never received a diagnosis of CF and had no familial history. At the time of diagnosis, his percentage forced expiratory volume in 1 second (FEV1.0) was 58.8%, reversible to 71.1% (253 mL in absolute value) after inhalation of a short-acting beta-agonist. All Rosenberg-Patterson diagnostic criteria were met, including bronchiectasis with pulmonary infiltrates, particularly in the right upper lobe (Fig. 1). At the time of diagnosis, his peripheral blood eosinophils were 1,358/mm^3, total IgE level was 1,500 IU/mL, and AF-specific IgE was 9.24 IU/mL. Precipitating antibody against AF antigen was also found. The patient took PSL regularly (10—20 mg/day) to control severe symptoms in addition to other asthmatic medications (fluticasone 800 μg/day, salmeterol 100 μg/day, pranlukast 450 mg/day, and theophylline 200 mg/day). We could not taper the PSL dose because of frequent exacerbations. Oral ITCZ (200 mg/day) was also administered for 6 months, but did not reduce the annual exacerbation rate and was discontinued because of resulting liver damage (even with the reduction of ITCZ to 100 mg/day). Because of frequent exacerbations, we began administering 375 mg of omalizumab every 2 weeks starting at age 50 years. Asthmatic symptoms improved after 2 months. After 4 months, we evaluated the frequency of exacerbations, the Asthma Control Test (ACT) score, pulmonary function, fraction of exhaled nitric oxide (FeNO), peripheral blood eosinophils, total IgE, and blood AF-specific IgE levels. The frequency of major exacerbations was reduced from three to zero per 4 months, the ACT score changed from 10 to 23, FeNO dropped from 43 ppb to 23 ppb, peripheral blood eosinophils changed from 1,011/mm^3 to 988/mm^3, total IgE elevated from 677 IU/mL to 972 IU/mL, and AF-specific IgE elevated from 7.73 IU/mL to 10.09 IU/mL. According to the patient's daily asthma self-assessment chart, frequency of daytime or nighttime symptoms was reduced from nine to three per fortnight, usage of a short-acting beta-agonist was reduced from five to one per fortnight, and asthma-related absentee rate improved from one incident to zero per 4 months. During this treatment course, the patient was not hospitalized for exacerbations, although his FEV1.0% did not change from 54.1%.

After 12 months of treatment, the skin-prick test became negative, serum total IgE decreased to 609 IU/mL, and AF-specific IgE declined to 6.07 IU/mL (Table 1). With levels of other antiasthmatic drugs remaining the same, we were able to taper the daily PSL dose from 10 mg/day to 5 mg/day without incident. After 30 months of omalizumab treatment, the exacerbation rate, ACT score, FeNO, peripheral blood eosinophils, total IgE, and AF-specific IgE were maintained at good levels without additional PSL administration.

Discussion

We have described an Asian case of ABPA without CF. The patient met the ABPA diagnostic criteria with proximal bronchiectasis, elevated serum IgE, serum precipitating antibodies to AF, positive skin testing to AF, and had FEV1.0

Table 1 Changes in laboratory and clinical findings after omalizumab treatment

	Prior to treatment	After 4 months	After 12 months
Eosinophils (/mm^3)	1011	988	964
Total IgE (IU/mL)	677	972	609
AF-specific IgE (IU/mL)	7.73	10.09	6.07
ACT score	10	23	23
FEV1.0 (L)	1.89	1.96	1.91
%FEV1.0	54.1	55.9	54.7
FeNO (ppb)	43	23	25
Skin test to AF	Positive	Positive	Negative

ACT = Asthma Control Test; AF = *Aspergillus fumigatus*; FeNO = fraction of exhaled nitric oxide; FEV1.0 = forced expiratory volume in 1 second; Ig = immunoglobulin.