Omalizumab as a new therapeutic approach for children with severe asthma

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Abstract

Omalizumab has been shown to improve asthma control when added to a regimen of guideline-based therapy for inner-city children and adolescents, nearly eliminating seasonal peaks in exacerbation and reducing the need for other medications to control asthma. Below, we describe a case of a 17-year-old non-smoker with a history of severe asthma admitted to our clinic after unsuccessful 10-year immunotherapy. The patient fulfilled the criteria for anti-IgE therapy, he was prescribed omalizumab 600 mg every 2 weeks. During therapy he was able to reduce his use of ICS and did not require any oral corticosteroids. He experienced an increase in his ability to exercise and noted no exacerbation of asthma symptoms. It is possible that in our patient, specific immunotherapy could be successfully continued after the initiation of omalizumab therapy.

Key words: omalizumab, severe asthma, immunotherapy.

Introduction

Omalizumab has been shown to improve asthma control when added to a regimen of guideline-based therapy for inner-city children and adolescents, nearly eliminating seasonal peaks in exacerbation and reducing the need for other medications to control asthma [1–5]. Omalizumab might also be a treatment option in patients who fail to achieve an optimal quality of life (QoL) due to severe asthma symptoms and the allergen immunotherapy (ITA), which improves quality of life in such patients, is impossible to be started [6, 7].

Here, we present a case of severe persistent asthma responsive to omalizumab in a child with a history of unsuccessful immunotherapy.

Case report

A 17-year-old boy, non-smoker with a history of asthma and allergic rhinitis since childhood was presented to his primary care provider's office with persistent asthma that was limiting his activities such as his ability to sleep and exercise regularly. The skin test results revealed hypersensitivity to *Dermatophagoides pteronyssimus* and *D. farine*. *In vitro* specific IgE levels for *D. pteronyssimus* and *D. farine* were found to be > 100 kU/l (class 6). The patient with severe controlled asthma was under long-term anti-asthma therapy with moderate-to high-dose inhaled corticosteroids (ICS). This boy had qualified for subcutaneous specific immunotherapy (SCIT). During SCIT his asthma symptoms were often aggravated by upper respiratory infections and asthma exacerbations and the maintenance dose could not be reached and SCIT was discontinued. He had used his medications regularly but had had to attend the emergency department about 3 times a year. Despite 10 years of SCIT, no effect of immunotherapy was achieved (data from medical history from another outpatient clinic). During that time evidence of osteopenia was noted on a bone dual energy X-ray absorptiometry scan. At that time he was referred to our Department of Pediatrics and Allergy.

On presentation, boy, who weighs 65 kg, was taking inhaled fluticasone/salmeterol 250/50 µg twice a day and oral montelukast 10 mg every day. In the past year, he required salbutamol rescue approximately 3 or 4 times weekly and short-course oral corticosteroid therapy twice over the past year. Clinical findings revealed a decreased lung function with FEV_1 forced expiratory volume in 1 s (FEV_1) level at 74% of the predicted level before bronchodilation; after bronchodilation, the FEV_1 was 88% of the predicted level. Fractional exhaled nitric oxide (FeNO) value was 80 ppb, other spirometric pa-

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rameters: FEV_1/FVC – Tiffeneau index was < 80% of the predictive value, Rint was 220%, sRaw 300%. Boy had a total serum IgE of 922 kU/l, specific IgE levels for *D. pteronyssimus* and *D. farine* were found in class 6. The patient fulfilled the criteria for anti-IgE therapy and in February 2013, he was prescribed omalizumab 600 mg every 2 weeks to treat persistent severe asthma symptoms. Four months later he had achieved better asthma control (no further need for rescue bronchodilator use) and a significant improvement of FEV_1 up to 95% of the predicted value. After 16 weeks of treatment with omalizumab, the Asthma Control Questionnaire score had fallen from 2 to 0 points, and the asthma-related quality of life questionnaire (AQLQ) revealed a score of 7. Before starting the anti-IgE therapy, he had a severely impaired quality of life, with an AQLQ of 3 points (4 points' improvement).

In October 2013, boy is taking inhaled fluticasone 100 µg twice a day and oral montelukast 10 mg every day. More importantly, during therapy he was able to reduce his use of ICS and did not require any oral corticosteroids. He experienced an increase in his ability to exercise and noted no exacerbation of asthma symptoms.

Discusion

For many children with asthma, treatment falls short of achieving the best possible management of symptoms and results with side effects such as osteopenia in our patient. The IgE blockers such as omalizumab have demonstrated clear and well-tolerated benefits in the management of moderate-to-severe asthma in children, reducing acute exacerbation and the need for ICS, as well as improving score of QoL [8]. The treatment with omalizumab was clinically effective in our patient: the frequency of exacerbations and the number of hospitalizations were reduced, and there was a significant decrease in steroid use. Only 8 months of therapy led to a significant steroid sparing effect by omalizumab; we observed a 50% reduction in the daily use of ICS in our patient. It is possible that in our patient SCIT could be successfully continued after the initiation of omalizumab therapy. Therefore, we recommend considering this therapeutic approach in a wide range of pediatric patients with severe asthma. There is an urgent need for a multicenter, randomized, placebo-controlled trial to measure the benefits of the combination of omalizumab and SCIT in reducing the dose of ICS required for severe asthma control in children.

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