Bronchial thermoplasty: Long-term safety and effectiveness in patients with severe persistent asthma

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Background: Bronchial thermoplasty (BT) has previously been shown to improve asthma control out to 2 years in patients with severe persistent asthma.

Objective: We sought to assess the effectiveness and safety of BT in asthmatic patients 5 years after therapy.

Methods: BT-treated subjects from the Asthma Intervention Research 2 trial (ClinicalTrials.gov NCT01350414) were evaluated annually for 5 years to assess the long-term safety of BT and the durability of its treatment effect. Outcomes assessed after BT included severe exacerbations, adverse events, health care use, spirometric data, and high-resolution computed tomographic scans.

Results: One hundred sixty-two (85.3%) of 190 BT-treated subjects from the Asthma Intervention Research 2 trial completed 5 years of follow-up. The proportion of subjects experiencing severe exacerbations and emergency department (ED) visits and the rates of events in each of years 1 to 5 remained low and were less than those observed in the 12 months before BT treatment (average 5-year reduction in proportions: 44% for exacerbations and 78% for ED visits). Respiratory adverse events and respiratory-related hospitalizations remained unchanged in years 2 through 5 compared with the first year after BT. Prebronchodilator FEV_1 values remained stable between years 1 and 5 after BT, despite a 18% reduction in average daily inhaled corticosteroid dose. High-resolution computed tomographic scans from baseline to 5 years after BT showed no structural abnormalities that could be attributed to BT.

Conclusions: These data demonstrate the 5-year durability of the benefits of BT with regard to both asthma control (based on maintained reduction in severe exacerbations and ED visits for respiratory symptoms) and safety. BT has become an important addition to our treatment armamentarium and should be considered for patients with severe persistent asthma who remain symptomatic despite taking inhaled corticosteroids and long-acting β_2-agonists. (J Allergy Clin Immunol 2013;132:1295-302.)

Key words: *Bronchial thermoplasty, asthma, bronchoscopic procedure, Alair System, asthma exacerbation*

Abbreviations used

AE: Adverse event
AIR2: Asthma Intervention Research 2
AQLQ: Asthma Quality of Life Questionnaire
BT: Bronchial thermoplasty
ED: Emergency department
HRCT: High-resolution computed tomography
ICS: Inhaled corticosteroid
LABA: Long-acting β_2-agonist
NAEPP: National Asthma Education and Prevention Program
OCS: Oral corticosteroid

More than 25 million persons in the United States have asthma.[1,2] Approximately 5% of patients have severe persistent asthma and continue to experience asthma symptoms, despite treatment with current state-of-the-art medications.[3] Poorly controlled and not well controlled asthma remain a significant social and economic burden[2,4] and lead to increased health care use, with negative effects on the patient's quality of life.

Bronchial thermoplasty (BT) is a nonpharmacologic treatment for asthma that has been shown to result in significant improvements in a number of asthma control measures in 3 randomized clinical trials in patients with moderate-to-severe persistent asthma.[5-7] The Asthma Intervention Research 2 (AIR2) trial, a double-blind, sham-controlled, randomized clinical trial of BT in patients with severe asthma, showed a 32% reduction in severe exacerbations, an 84% reduction in emergency department (ED) visits caused by respiratory symptoms, a 73% reduction in hospitalizations for respiratory symptoms, and a 66% reduction in time lost from work/school/other daily activities because of asthma symptoms compared with a sham-treated group in the year after the BT treatment period (day of first BT procedure until 6 weeks after the last bronchoscopy, approximately 12 weeks).[7] We previously reported safety out to 5 years in patients with moderate-to-severe persistent asthma through extended follow-up of 45 (86.5%) of 52 BT-treated subjects in the AIR trial.[8] The safety and durability of the treatment effect (reduced severe

exacerbations and ED visits for respiratory symptoms) were previously reported out to 2 years after BT in subjects with severe persistent asthma in the AIR2 trial.[9] We now describe the long-term safety and durability of BT out to 5 years after treatment in 162 of 190 subjects from the AIR2 trial.

METHODS

Study procedures

Subjects undergoing BT in the AIR2 trial were followed to 5 years. The study population and design of the AIR2 trial have been published.[7] Data collected during the 5-year follow-up and episodes of severe exacerbations were analyzed by using a noninferiority approach to demonstrate that the benefit of BT in the year after the procedure was maintained in each of the subsequent years out to 5 years (ClinicalTrials.gov no. NCT01350414).

On completion of the year 1 evaluation in the AIR2 trial, subjects in the BT group were instructed to maintain their use of controller medications (unless changes were medically indicated as determined by the investigator) and were contacted by telephone every 3 months. Information on adverse events (AEs; defined as any sign, symptom, illness, clinically significant abnormal laboratory value, or other adverse medical event that appeared or worsened in a patient during the clinical study regardless of whether it was considered related

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*A list of the members of the Asthma Intervention Research 2 Trial Study Group can be found at the end of this article.

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