

tive iohalamate patch test results suggest that this contrast could be cautiously used in subsequent catheterizations. However, alternatives should be considered first. This patient represents many children with chronic disease who require contrast administrations for diagnosis, treatment, and surveillance. Therefore, ioversol and contrast dye should be classified as etiologies of pediatric AGEF because reexposure can cause life-threatening complications.

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RETURNING THE ATHLETE TO SPORTS AFTER A NEAR-FATAL ASTHMA EVENT

Near-fatal asthma events in athletes present a significant problem to treating physicians, and a management strategy for safely returning athletes with near-fatal asthma exacerbations to sports has not been previously described. We describe a near-fatal asthma event in an elite adolescent athlete and our approach to returning him safely to sports.

A 16-year-old male runner with intermittent asthma and allergic rhinitis was at cross-country practice at an outdoor park. He was originally diagnosed as having asthma at age 5 years after 2 separate hospitalizations. During the past 11 years, his asthma

control had waxed and waned, with objective episodes of acute bronchospasm demonstrating significant reversibility (forced expiratory volume in 1 second [FEV₁] increase >12% and 200 mL) with bronchodilator use. He had been successfully weaned off inhaled corticosteroids 6 months before this event. He had also completed 5 years of allergy immunotherapy 2 years before this event. The day of the event, he denied asthma symptoms but reported a mild upper respiratory tract infection (nasal congestion and rhinorrhea) without dyspnea or symptoms of worsening asthma control. During his fifth 800-m interval run, at a 5-minute mile pace, he began experiencing progressive chest tightness and dyspnea that improved little with 4 puffs of levalbuterol. This progressed to severe dyspnea and an inability to walk short distances or speak full sentences. He was given 4 more puffs of levalbuterol without improvement. He continued to worsen and developed intercostal retractions, tachypnea, and a feeling of suffocation. An epinephrine autoinjector was administered, and emergency medical services were called. He rapidly improved and was evaluated and transported to the emergency department. He was back to his baseline and was symptom free by the time he arrived at the emergency department except for significant nasal congestion.

Because this young man was an integral member of his cross-country team and a high-level competition was less than 1 week away, a physician-supervised plan was developed that allowed him to return to exercise safely (Table 1). The day of the exacerbation he began a 5-day regimen of oral prednisone, inhaled fluticasone-salmeterol, montelukast, intranasal fluticasone propionate, and oral cetirizine. Four days after the near-fatal event, he had normal baseline spirometry values. He underwent skin prick testing (SPT) to a standard 45-aeroallergen panel, and the results were positive for several trees, grasses, weeds, dust mite, cat, and molds (including *Alternaria* and *Aspergillus*). Although his last meal was 5 hours before the event, he underwent SPT to the foods that he had eaten the day of this event as a part of an evaluation for food-dependent exercise-induced anaphylaxis (FDEIA). Results of this SPT were negative for the tested foods (wheat, egg, milk, peanut, and soy). His total IgE level at that time was 1,169 IU/mL. To assess his safe return to running, he performed an exercise treadmill challenge¹ while taking oral prednisone and inhaled fluticasone-salmeterol, with only a 4% drop in FEV₁. Five days after the exacerbation, as part of his safe return to sports, he underwent a supervised exercise challenge with an epinephrine autoinjector on hand. He began running 800-m intervals and slowly increased the intensity until he was at full exertion. Peak flow and FEV₁ were measured at baseline and between intervals, with no drops in lung function or symptom development noted. Seven days after the near-fatal event he was allowed to resume full cross-country training with serial FEV₁ measurements during practice; he did well, without further asthma symptoms. He completed the season without further exacerbations.

In the United States, more than 4,000 deaths occur annually from asthma. Near-fatal asthma is more common in younger patients than in adults, with 1 risk factor being exposure to high allergen levels, especially in patients who develop sudden-onset near-fatal asthma.² In addition, an increase in asthma-related deaths has been reported in *Alternaria*-sensitive asthmatic patients.³ The present patient's near-fatal asthma event occurred in

Disclosures: Authors have nothing to disclose.

Disclaimer: The opinions or assertions herein are the private views of the authors and are not to be construed as reflecting the views of the US Department of the Air Force or the US Department of Defense.

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doi:10.1016/j.anai.2010.07.005

Table 1. Summary of Timeline, Evaluation, and Interventions

Day from near-fatal event	Evaluations/interventions
0	In the field and at the emergency department: Levalbuterol, 8 puffs total Epinephrine autoinjector, ×1 Initiation of 5 d of oral prednisone, 50-mg/d burst; inhaled fluticasone-salmeterol, 500/50 diskus (1 inhalation twice daily); montelukast, 10 mg orally daily; INS (fluticasone propionate, 50-μg spray in each nostril daily), oral antihistamine (cetirizine, 10 mg/d)
4	Clinic evaluation: spirometry, aeroallergen skin testing, food skin testing, exercise treadmill challenge
5	Outdoor exercise challenge at the site of the near-fatal event using a portable digital peak flow meter to measure FEV ₁ and peak flow at baseline, 25% maximal exertion, 50% maximal exertion, 75% maximal exertion, and maximal exertion
7	Return to sports with serial FEV ₁ and peak flow measurements during practice

Abbreviations: FEV₁, forced expiratory volume in 1 second; INS, intranasal corticosteroid.

a park setting adjacent to a heavily wooded area during a time of elevated counts of molds to which he was sensitized. Additional triggers included an upper respiratory tract infection, nearby traffic exhaust, and intense exercise. FDEIA is a form of IgE-mediated food allergy that occurs in the setting of exercise.⁴ Although FDEIA was unlikely, the rapid and severe onset and his rapid response to epinephrine led us to SPT him to the items he had eaten. He has not had a similar event despite not altering his diet and exercise routine in the 4 years since this event.

Other fields of medicine have “return to play” guidelines covering various injuries/illnesses, from head injuries to infectious mononucleosis.^{5,6} Some guidelines exist to help with sideline evaluation and management of exercise-induced bronchoconstriction.⁷ However, review of the literature regarding elite athletes with asthma did not reveal guidelines/recommendations on how to approach returning an athlete to competition after a severe asthma exacerbation.^{8,9} In this case, we provided a plan of progressive clinical, laboratory, and field monitoring and aggressive pharmacologic intervention so that a safe return to sports was accomplished.

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