

Correspondence

Failure of a breath-actuated bronchodilator inhaler to deliver aerosol during a bout of near fatal asthma

To the Editor:

Pirbuterol (Maxair Autohaler), a short-acting β -agonist breath-actuated aerosol activated by an inspiratory effort of 30 L/min, delivers 0.3 mg of drug without the need to coordinate actuation with inspiration.^{1,2} Studies have shown that such breath-actuated inhalers can be activated by patients with severe airway obstruction and are easier for elderly subjects to use.³ This report suggests that this type of device may be disadvantageous to those patients with moderate to severe asthma who are prone to acute, severe bronchospasm or near fatal asthma.

A 34-year-old woman had chronic IgE-mediated asthma, which was well controlled for several years with inhaled corticosteroids and aerosolized β -agonists. Her most recent regimen consisted of round-the-clock twice daily dosing with flunisolide (AeroBid) and salmeterol (Serevent) and (Maxair Autohaler) as needed. The patient's condition was stable with this program (no nocturnal wheezing or exercise-induced bronchospasm).

In February 1995, she was vacationing at a ski resort in northern New England. After retiring at approximately 11:00 PM, she suddenly awoke at 4:00 AM with acute bronchospasm, which was so severe that she was unable to activate her Maxair Autohaler. The patient stated, "I feel like I am going to die." Acute respiratory arrest immediately developed, requiring on-site cardiopulmonary resuscitation, assisted respiration with a bag valve mask, and subsequent intubation by local emergency medical technicians. On arrival at a local hospital, arterial blood gases were relatively stable. She was placed on a ventilator, extubated 10 hours later, and discharged the following day. On her follow-up visit 1 week later, she was free of symptoms and had normal pulmonary function test results.

She had no history of repeated emergency department visits, hospitalizations, or bouts of near fatal asthma; and her asthma was very stable preceding the above event. She had absolutely no "lead time" or forewarning of her bout of severe nocturnal bronchospasm. It is of interest that after skiing all day, she felt so well on the evening preceding her near fatal episode that she omitted her nighttime dosing of flunisolide and salmeterol. Potential but unproven triggers of this event of near fatal asthma included ingestion of an herbal tea-wine mix and exposure to fireplace smoke.

The Maxair (pirbuterol) Autohaler requires an inspiratory effort of approximately 30 L/min to activate a release mechanism that delivers 0.2 mg of pirbuterol in a fine-particle suspension. Although this delivery mechanism is advantageous to patients with poor metered-dose inhaler technique, this patient experienced acute

respiratory arrest after being unable to generate enough inspiratory effort to deliver her rescue bronchodilator. This case illustrates the need to avoid treatment with these effort-dependent aerosolized or powdered breath-actuated bronchodilator devices (or provide supplemental pressurized aerosols) in patients prone to bouts of acute severe bronchospasm or near fatal asthma.

Paul J. Hannaway, MD
Naumkeag Medical and Dental Park
114R Highland Ave.
Salem, MA 01970

REFERENCES

1. Baum EA, Bryant AM. The development and laboratory testing of a novel breath-actuated pressurized inhaler. *J Int Soc Aerosols* 1988;2:219.
2. Fergusson RJ, Lenney J, McHardy GJR, Compton GK. The use of a new breath-actuated inhaler by patients with severe airflow obstruction. *Eur Respir J* 1991;4:172-4.
3. Chapman, KR, Love L, Brubaker H. A comparison of breath-actuated and conventional metered-dose inhaler inhalation techniques in elderly subjects. *Chest* 1993; 104:1332-7.

1/8/74669

Mite allergen (Der p 1) on children's clothing

To the Editor:

Tovey et al. (*J Allergy Clin Immunol* 1995;96:999-1001) present some interesting data regarding Der p 1 levels on adults' clothing. We report here results of a study of Der p 1 levels on children's clothing.

Dust was collected by a standardized method with a portable vacuum cleaner for 3 minutes from both sides of upper garments (sweatshirts, polar fleece tops, knitted jerseys, and long-sleeved shirts) of 166 school-children (75 male, 91 female) aged 7 to 9 years from primary schools in Wellington, New Zealand, during July 1995 (winter). Each garment's fabric type was recorded. All collected dust was sieved through a 425 μ m pore filter and extracted in phosphate-buffered saline before analysis for Der p 1 by a double monoclonal antibody ELISA method.¹ Statistical analysis was carried out by analysis of variance on log-transformed Der p 1 data.

The geometric mean (95% confidence interval) for Der p 1 was 2.77 μ g/gm (2.43, 3.23), and mean dust weight collected was 0.060 gm (0.054, 0.065). Only nine of the 166 garments contained more than 10 μ g/gm of allergen, 96 garments contained 2 to 10 μ g/gm, and 61 garments contained less than 2 μ g/gm. Geometric mean Der p 1 was 3.60 μ g/gm (3.04, 4.25) on girls' garments compared with 2.02 μ g/gm (1.66, 2.46) on boys' garments ($p < 0.0001$), with no significant difference in weights of dust collected (mean, 0.056 gm vs 0.064 gm; $p = 0.17$). Table I shows Der p 1 results in micrograms per gram of fine dust and micrograms of total allergen