

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.

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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

TABLE I. Der p 1 levels on garments according to fabric type. Results are means (dust weight) or geometric means (Der p 1) with 95% confidence intervals in parentheses

Fabric type	n	Dust weight (gm)	Der p 1	
			µg/gm	Total µg
Cotton	40	0.025* (0.019-0.030)	3.60 (2.74-4.73)	0.069† (0.049-0.097)
Polyester/ cotton	60	0.061‡ (0.052-0.070)	2.09‡ (1.67-2.62)	0.105‡ (0.079-0.139)
Polyester	47	0.080 (0.071-0.090)	2.62§ (2.08-3.30)	0.184 (0.137-0.249)
Wool	19	0.078 (0.063-0.092)	4.51 (3.05-6.66)	0.296 (0.172-0.508)

$p < 0.05$ compared with *polyester/cotton, †polyester and wool, ‡cotton and wool, §wool.

Confidence intervals are given in parentheses.

recovered in the 3-minute sampling period according to the fabric type.

Results from this study indicate that the type of fabric influences the amount of allergen on garments. We cannot exclude the possibility that woolen garments contain higher levels of Der p 1 because they are washed less frequently, but we did not ascertain when garments were last washed. The difference in Der p 1 could also be due to differences in electrostatic charges retaining allergen or differences in mite infestation of different fabric types.

More puzzling is why girls' clothing contains higher levels of Der p 1. There was no significant difference in the type of garment worn between girls and boys ($p = 0.66$), and the difference between boys and girls remained significant when fabric type was incorporated into a two-factor analysis of variance ($p = 0.0007$). It is possible that the girls' garments were washed less frequently. It could also be that girls spend more time in direct contact with carpets, furniture, and bedding, which are the main sources of mites and allergens.

We concur with Tovey et al. that clothing is an underrecognized source of house dust mite allergen exposure. Levels of Der p 1 found in our study are, however, considerably lower than those found in their study, even though Wellington bedding and floor allergen levels are similar to those in Sydney.³ The subjects the study by Tovey et al. were adults, there were some differences in the types of garments worn, and it seems likely that children's clothing would be washed more frequently than the adults' clothing. Patients allergic to house dust mite allergens should perhaps avoid woolen garments to further minimize their exposure to Der p 1.

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Reply

To the Editor:

We agree with the authors that clothing may be an unrecognized source of allergen exposure—particularly considering factors such as constant proximity to the source, thermal body drafts, and body movement disturbing dust. In our study higher allergen levels were associated with a lower frequency of washing. Such washing is less frequent for adult clothing used in formal occupations than for children's school clothing, which is subject to more activity, soiling, and regular washing. Studies in which aeroallergen measurements are used to compare the relative importance of different proximal sources of mite allergens are needed.

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Absence of modification of endogenous soy allergens

To the Editor:

We were interested to read Dr. Burks's assertions on the absence of modification of endogenous soy allergens in the genetically treated soybean varieties. He and Dr. Fuchs were able to demonstrate that immunoblots reveal similar IgE-binding patterns with normal soybeans and new varieties, meaning that the natural allergens are not modified.

However, they do not seem to share the need for awareness that such products might be noxious for