



Mail

Fatal asthma in a child after use of an animal shampoo containing pyrethrin

To the Editor,

An 11-year-old girl had been diagnosed with asthma at age 6 years. She had never been hospitalized and had rarely received steroids. Her only medication was albuterol, which was taken by inhaler as needed. On the day of admission, she gave her pet dog a bath using a shampoo containing 0.2% pyrethrin. She had used this shampoo 2 years earlier, with a brief but mild increase in her asthmatic symptoms that lasted 48 hours. The dog had been in the family home for several years. She was asymptomatic when she started to bathe the animal. Within 10 minutes, severe shortness of breath with wheezing developed, and she was immediately transferred to a hospital. She was intubated and treated aggressively for an acute asthmatic attack. She did not respond to treatment and died about 2-1/2 hours after the initial exposure to the pet shampoo.

At autopsy, there was mucous plugging of the bronchioles with an inflammatory infiltrate composed of neutrophils and eosinophils. There was prominent vascular congestion, and many alveolar spaces contained homogeneous eosinophilic edema fluid. The cause of death was listed as "respiratory arrest secondary to acute asthmatic attack." The pathology findings were consistent with the literature on pathologic changes in acute asthma.¹

The pyrethrin class of insecticides was originally formulated from plants of the Compositae family, which includes daisies and chrysanthemums. Pyrethrum refers to both the crude plant extract and the marketed formulation of insecticide. Pyrethrin is the insecticidal chemical prepared from pyrethrum flowers, and it is also a market name for purified pyrethrum. A third term, pyrethroid, refers to insecticides of the same class, but these are synthetic compounds. Pyrethrum is known to cause allergy, including

asthma and allergic skin disease. A review in 1934 warned physicians about its allergenic properties.² Our case is the first documented case of allergy to pyrethrin. No cases of pyrethroid allergy have been documented.

Neither pyrethrin nor pyrethroids are currently classified as allergens by the Environmental Protection Agency. Techniques of extraction from the flower have greatly improved the purity of the original pyrethrum formulations, and a recovery of 95% to 97% pyrethrin is now achievable.³ The insecticide is, therefore, commonly marketed under the name of Pyrethrin, but it may contain small, but still allergenic, amounts of the impurities found in the crude extract. One suspected allergenic impurity is oleoresin, which may have been responsible for the allergic reaction in our case. The mechanism of allergy from pyrethrins is poorly documented. The marketing of pyrethrin is favored over that of pyrethrum, based on skin test studies suggesting that it is safer.⁴ Although physicians have access to crude pyrethrum for skin testing, its purified isomers or mixtures of isomers are available only in the research laboratory. They are too expensive for practical use.

The possibility of an acute allergic reaction occurring from the use of any currently marketed pyrethrum insecticide should be considered in any case of respiratory or dermal allergy of unknown cause. This case suggests that physicians should also be alert to formulations marketed as pyrethrin. Pesticides of this class are being used with increasing frequency in homes and are easily available to the public. Manufacturers are not required by the Environmental Protection Agency to state on the label that the pyrethrum formulations are allergens.

Sheldon L Wagner

Department of Environmental and Molecular
Toxicology
Oregon State University
Corvallis, OR 97331-7301
wagners@ucs.orst.edu

References

- 1 Roche WR. Inflammatory and structural changes in the small airways in bronchial asthma. *Am J Respir Crit Care Med* 1998;157(suppl):S191-S194.

- 2 Feinberg SM. Pyrethrum sensitization. *JAMA* 1934;102:1557-1558.
- 3 Carlson DJ. Pyrethrum extraction, refining, and analysis. In: Casida JE, Quistad GB, eds. *Pyrethrum. Flowers. Production, Chemistry, Toxicology, and Uses*. New York: Oxford University Press; 1995:97-107.
- 4 Zucker A. Investigation of purified pyrethrum extracts. *Ann Allergy* 1965;23:335-339.