PERC-med
Pesticide Educational Resources Collaborative - Medical
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Case Study

PYRETHRINS 101: A PRIMER IN PESTICIDE EXPOSURE AND TOXICITY

BACKGROUND

A hurried mom presents to your Urgent Care clinic with her two young sons, ages 7 and 3. As she is checking in, you overhear that she was instructed to present to you, following the advice and instructions of a Poison Control Center, the bottle of pesticide. She reports that her older son was spraying the backyard with a mosquito pesticide when her 3-year-old ran face-first into the spray from the pump bottle her older son was using. She immediately removed her 3-year-old's clothing, and bathed him thoroughly, then called Poison Control.

EXAM

- On exam, both sons are happy, playful, interactive, and cooperative, consistent with age.
- The 3-year-old HEENT exam is without evidence of facial rash, conjunctivitis/scleral bruising, rhinorrhea, excessive lacrimation, or other facial trauma.
- Cardiac and pulmonary evaluations are without concerning findings and the patient is breathing with ease; phonation is clear.
- Medical history reveals that the patient has no prior medical concerns, no congenital or developmental concerns, and age-appropriate immunizations are up-to-date. He has no history of significant illness, allergies, surgeries, or hospitalizations.
- Evaluation of the bottle the mother provides allows verification that this is a pyrethrin, including its concentration.
- Call to Poison Control with the case number mother provides verifies instruction, that she sought appropriate care, and report of patient condition and prognosis.

DISCUSSION

Pyrethrins are a chemical class of pesticides originally derived from chrysanthemum flowers. They function as insecticides by impairing sodium channels in insect neural pathways, causing paralysis and death. Pyrethrins are commonly used commercially and residentially to control mosquitos, fleas, flies, moths, ants, and other insects. They are found in literally thousands of commercial products for use in a myriad of applications, including aerosols ("bug bombs"), dog collars, and lice shampoos. In humans, pyrethrins most commonly cause allergic reactions, including contact dermatitis, conjunctivitis, rhinorrhea, and asthma exacerbations which can be severe and even fatal. Pyrethroids are synthetic versions of pyrethrins and have a similar method of action. Pyrethroids are much more difficult to metabolize, and so are generally more toxic and have longer half-lives than pyrethrins.

The Pesticide Educational Resources Collaborative - Medical is a cooperative agreement (#X-83935901) between the U.S. EPA's Office of Pesticide Programs and University of California Davis Office of Continuing and Professional Education, in collaboration with Oregon State University.

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EXPOSURE ROUTES, SYMPTOMS, AND TREATMENTS

SKIN:

Pyrethrins are poorly absorbed through the skin. Clean skin and remove affected clothing immediately. They may cause a contact dermatitis which is commonly treated with topical steroids. Itching is treated effectively with oral antihistamines.

EYES:

Conjunctivitis and tearing are common symptoms. Irrigate/flush eyes immediately.

ORAL:

Pyrethrins are poorly absorbed by gastric epithelium, and are quickly hydrolyzed by liver enzymes. Symptoms are minimal and neurotoxicity is rare, even in large doses. Treatment is supportive only, unless a large dose is identified promptly and activated charcoal can be administered within one hour thereof.

RESPIRATORY:

If aerosolized pyrethrins are inhaled, they may cause cough, rhinorrhea, and asthma symptoms - even in people without a history of asthma. Treatment is supportive and may include inhaled albuterol, inhaled or oral steroids, and oxygen. For full anaphylaxis, treat with subcutaneous epinephrine and respiratory support.

OF CLINICAL NOTE:

Pyrethrins are commonly found in preparations with one or more chemicals that potentiate its effect, and toxicity may be caused by these or other excipients.

CONCLUSION

Our 3-year-old patient had no apparent injury or toxicity related to his pyrethrin exposure. Mom was assured that there were no acute or likely chronic-related concerns. Clinic staff reiterated advice provided by Poison Control and advised mom to monitor for any change in behavior or with the onset of concerning symptoms, as noted above. This patient was seen in Oregon, and per state law, the pesticide exposure was reported to the Oregon Health Authority.

CLINICAL PEARLS

- Pyrethrins are commonly encountered in patients' lives
- Pyrethrins are very rarely toxic to humans, even at large doses
- Presenting symptoms are most commonly atopic in nature
- Patient education at the time of presentation includes keeping pesticides in original containers and keeping them in locked or otherwise safe locations
- Pyrethrin exposure is reportable, by law, in many states

REFERENCES

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