One Sip Can Kill: Helping Medical Professionals Recognize Paraquat Poisoning

PERC-med
Pesticide Educational Resources Collaborative - Medical

The University of Iowa College of Public Health

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PARAQUAT USE PROFILE

Paraquat dichloride is one of the most widely used herbicides in the world. It is used for weed control and defoliation in both agricultural and non-agricultural settings. It's low cost and its broad-spectrum activity contribute to its widespread use. Paraquat is classified by the U.S. Environmental Protection Agency (EPA) as a Restricted Use Pesticide due to its high toxicity. Paraquat has been registered in the United States since 1964 to control weeds. There are no homeowner uses and no products registered for application in residential areas.

HOW PARAQUAT WORKS

The extent of poisoning depends on the amount, route, and duration of exposure as well as the person's health status. It damages the lining of the mouth, stomach, and intestines on contact. After paraquat enters the body, it is distributed to all areas of the body. It causes toxic chemical reactions throughout many parts of the body, primarily the lungs, liver, and kidneys.

There is NO antidote for paraquat ingestion and 1-2 teaspoons can be lethal.

TRUE STORIES

- In 2003, a 49-year-old male took a sip from his coffee cup in which he had poured paraquat because the product's bottle was deteriorating. He realized his mistake and went to the hospital's emergency department. At that time, he was vomiting, cold and sweating profusely. Doses of activated charcoal were administered and his stomach was pumped; morphine was provided for esophageal pain; and he was intubated to support breathing function on the fourth day. Aggressive supportive care continued until he died on the tenth day.

- In 2013, a 70-year-old female ingested some contents of a re-used iced tea bottle that contained paraquat, unknown to her. She went to the hospital awake and alert with persistent vomiting. Over the course of a 16-day admission, she evolved the classic picture of paraquat ingestion: corrosive gastrointestinal injury plus kidney and respiratory failure leading to death.

SYMPTOMS

IMMEDIATE symptoms after ingestion of LARGE amounts:

- Pain and swelling of the mouth and throat likely
- Followed by gastrointestinal symptoms (e.g. nausea, vomiting, abdominal pain, diarrhea)
- Severe GI symptoms may result in dehydration, electrolyte abnormalities, and low blood pressure

In general, within a FEW hours to a FEW days:

- Acute kidney failure
- Confusion
- Coma
- Fast heart rate , Injury to the heart
- Liver failure
- Lung scarring
- Muscle weakness
- Pulmonary edema
- Respiratory failure possibly leading to death
- Seizures

Symptoms after ingestion of SMALL - MEDIUM amounts within SEVERAL days to SEVERAL weeks :

- Heart failure
- Kidney failure
- Liver failure
- Lung scarring

DANGER - ONE SIP CAN KILL

PELIGRO - UN SORBO PUEDE MATAR

Since 2000, there have been 19 DEATHS, including 3 children, caused by accidental ingestion of paraquat[1]. These cases resulted from the pesticide being illegally transferred to beverage containers and later mistaken for a drink and consumed.

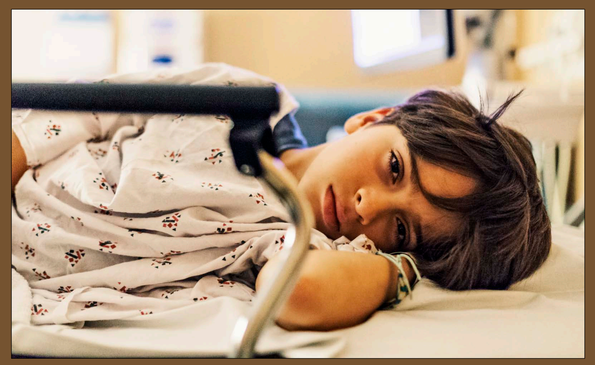
Product labels have prominently placed statements including **"NEVER PUT INTO FOOD, DRINK OR OTHER CONTAINERS"** and **"DO NOT REMOVE CONTENTS EXCEPT FOR IMMEDIATE USE."**

However, product labeling may not be accessible to health care providers and the initial clinical presentation depends on the route of exposure which may be not immediately known. Certified pesticide applicators who may use paraquat include crop-dusters, farm laborers, public land managers, and foresters. Health care providers may consider advising such patients to never transfer pesticides into food/beverage containers. Remember that pesticide exposure/poisoning is a reportable condition in many states.

[1]Fortenberry, G.Z. et al., (2016) Magnitude and characteristics of acute paraquat- and diquat-related illnesses in the US: 1998–2013, *Environmental Research,*146, 191-199. https://doi.org/10.1016/j.envres.2016.01.003

PERC-med

The **Pesticide Educational Resources Collaborative-medical (PERC-med) helps medical professionals prevent, recognize, and treat pesticide-related illness** by providing continuing education, training, and technical assistance (**www.pesticideresources.org/med**). It is a collaboration between the University of California Davis and Oregon State University through a cooperative agreement with the U.S. EPA.



REGULATION

New paraquat regulations require certified pesticide applicators to complete an EPA-approved paraquat training program before mixing, loading, and/or applying products with paraquat. This requirement will require increased monitoring and enforcement of paraquat label requirements**.**

Noncertified persons who are working under the supervision of a certified applicator are prohibited from using paraquat. This prohibition includes mixing, loading, and applying the pesticide, and other pesticide-related activities. Training must be completed every three years and applicators are required to retain certificates of training completion. Free training is available at **www.usparaquattraining.com**

Paraquat should never be put in unmarked containers or used at home.

https://www.epa.gov/sites/production/files/2019-03/documents/paraquat-dichloride-one-sip-can-kill-3-8-19.pdf

https://emergency.cdc.gov/agent/paraquat/basics/facts.asp

https://campus.extension.org/enrol/index.php?id=1660

2017 Annual Report of the American Association of Poison Control Centers' National Poison Data System: 35th Annual Report

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