What Toxicity May Result from Ingestion of the Plant Pictured Below? Answer: Cardioactive Steroid Toxicity from Common Milkweed

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Background

Ingestion of plants containing cardioactive steroids has resulted in detectable digoxin concentrations, toxicity, and even death [1, 2]. The common milkweed (*Asclepias syriaca*) is a plant known to contain cardioactive steroids, specifically asclepiadin, gomphoside, and afroside [3, 4] (Figs. 1 and 2). Milkweed commonly grows throughout the Midwestern and Eastern United States as well as Eastern Canada [4]. A review of the literature reveals scant human experience with ingestion of this commonly encountered plant. We present the case of a man who had an elevated serum digoxin concentration after eating fried milkweed.

Case Report

A 42-year-old man contacted Poison Control after consuming five pods of fried milkweed for lunch. He prepared the milkweed according to a recipe he had discovered on the Internet. At work, a colleague informed him milkweed could be toxic; he became alarmed and subsequently contacted his local Poison Center. His only physical complaint at the time

was nausea. He was subsequently referred to a healthcare facility and rode his bicycle there despite recommendations advising against this. In the Emergency Department, the patient's heart rate was 40–50 beats per minute though he reported this was his baseline based on self-measurements surrounding exercise. His electrocardiogram revealed sinus bradycardia without other abnormalities. His initial measured serum digoxin concentration was 0.5 ng/mL (Therapeutic range: 0.5–2.0 ng/mL) and was drawn 2 h after ingestion. Approximately, 7.5 h after ingestion, a second digoxin level was performed and was 1.0 ng/mL; his serum potassium at this time was 4.2 mEq/L and serum creatinine was normal. By this time, the patient's nausea had resolved and he was discharged home. Two days later, he remained asymptomatic when called at home.

Discussion

Previous reports have described patients who developed acute toxicity and even death following the ingestion of plants containing cardioactive steroids [1]. Though milkweed grows throughout most of the United States, human exposures are not well described in the literature. What is well described regarding milkweed toxicity occurs within the realm of ornithology where monarch butterflies (*Danaus plexippus*) have adapted a self-defense system that utilizes concentrated exogenous cardioactive steroids from milkweed to ward off predators. This occurs specifically with *Cyanocitta cristata*, the wild blue jay. When a blue jay eats a monarch, the blue jay experiences a dose-dependent emetic response secondary to cardioactive steroids contained within the butterfly. The monarchs are unable to synthesize these cardioactive steroids de novo; thus they accumulate them from consuming milkweed. Though the concentration of cardioactive steroids

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Fig. 1 The common milkweed (*Asclepias syriaca*)

Fig. 2 An open seed pod of milkweed

found in any one monarch varies, this becomes protective as the blue jays learn over time to avoid this noxious stimulus [5].

Although this patient's symptoms were minimal, his measured serum digoxin concentrations were elevated. This likely reflects cross-reactivity with other cardioactive steroids contained in milkweed. This case highlights the pitfalls of imperfect information available to the public on the Internet. It also has implications for the culinary arts, as some restaurants advertise the innovative use of milkweed in featured seasonal dishes [6].

Conclusion

Detectable serum digoxin concentrations and potential toxicity occur from milkweed consumption. Inadvertent poisoning may occur due to recipes available on the Internet and/or after consuming specialty dishes at restaurants that feature cardiac glycoside-containing plants. The potential hazards of this type of ingestion should be well known to healthcare professionals and the public.

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