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Selected Topics: Toxicology

BAPTISIA POISONING: A NEW AND TOXIC LOOK-ALIKE IN THE NEIGHBORHOOD

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□ **Abstract—Background: *Baptisia* is commonly found in residential gardens as an ornamental plant, in municipal "rain gardens" for water control, as well as in native and restored prairie habitat. Cytisine, an alkaloid with nicotinic acetylcholine receptor agonist properties, is a component of *Baptisia*. Case Report: Two patients poisoned after simultaneously ingesting *Baptisia* plant material are presented. In addition to findings of generalized nicotinic agonist toxicity, including generalized weakness and gastrointestinal symptoms, profound ataxia was present in both, consistent with recently described nicotinic subunit activity in the cerebellum. Why Should an Emergency Physician Be Aware of This?: *Baptisia*, a native prairie plant commonly found in restored prairie habitats and public spaces, has striking "look-alike" characteristics, in its immature state, to asparagus. As future exposures by foraging citizens will be likely, awareness of this relationship and the toxic manifestations of cytisine will be useful.** © 2015 Elsevier Inc.

□ **Keywords—*Baptisia*; cytisine; poisoning; nicotinic toxicity; ataxia; asparagus; look-alike**

INTRODUCTION

The clinical course of 2 patients who ingested *Baptisia* plant material that they had foraged is presented. *Baptisia*, a perennial native prairie plant, is commonly found in residential gardens as an ornamental plant, in municipal "rain gardens" for water control, and in native and restored prairie habitat. Cytisine, an alkaloid with nicotinic acetylcholine receptor agonist properties, is a component of *Baptisia* (Figure 1). Nicotinic acetylcholine receptor agonists have been long known to produce skeletal muscle weakness, but receptor subunits have also been more recently discovered in the cerebellum, consistent with the symptoms of the patients presented (1). *Baptisia* bears a striking similarity to asparagus for a brief period after its emergence in early spring, making its "look-alike" characteristic a risk for uninformed foragers, as the patients in this series demonstrate (Figures 2, 3). *Baptisia* herbal products have been described as having wide-ranging health benefits, especially for infections such as colds (2). *Baptisia* products are widely available in health food stores and online retailers. Although no toxic effects from its medicinal use have been reported to date, its use as a component to many health supplements could represent a potential second source of cytisine toxicity.

CASE REPORT

An 85-year-old woman (Patient 1) and her 48-year-old daughter (Patient 2) presented to the Emergency Department (ED) with abdominal discomfort, nausea, recurrent vomiting, diarrhea, and dizziness. Both patients had eaten dinner immediately prior to arrival. The family believed that "wild asparagus" was the culprit ingestion, as they had collected it from a municipal rain garden immediately outside their home and were assured by their housekeeper that the plant was safe to eat. Both patients'

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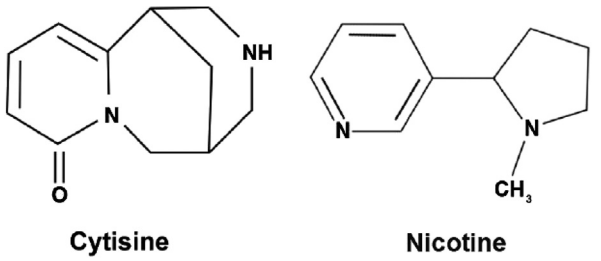

Figure 1. Cytisine (babtitoxine, sophorine), an alkaloid and nicotinic acetylcholine receptor agonist pictured with nicotine. In nature, cytisine is found in plants of the Fabacae (pea) family. Negative side effects can include headache, nausea, vertigo, vomiting, diarrhea, chest pain, and in higher doses, convulsions and respiratory failure.

symptoms began within minutes after ingestion. Patient 1 reported having eaten four or five 6-inch stalks, and her symptoms began within 15 min, consisting of severe vomiting, profound generalized weakness, inability to stand, and visual "blurring" but no vertigo. Patient 2, daughter of Patient 1, reported having eaten approximately half the amount, with symptoms starting within 15–30 min and described as severe vomiting, imbalance, inability to walk, and vertigo. No involuntary movements such as myoclonus were recollected by either patient. Past medical history in Patient 1 was notable for hypertension, a remote history of breast cancer, and a pacemaker. Her medications included amlodipine, triamterene/hydrochlorothiazide, and potassium supplement. Past medical history of Patient 2 included seasonal allergies and depression. Her medications consisted of loratadine and escitalopram.

Figure 2. *Baptisia australis*, at early spring emergence in a restored prairie habitat.

Figure 3. Stalk of common asparagus (*Asparagus officinalis*).

Vital signs of Patient 1 were: blood pressure 180/72 mm Hg; heart rate 70 beats/min, regular; respiratory rate 16 breaths/min; and temperature 37°C. Vital signs of Patient 2 were: blood pressure 129/74 mm Hg; heart rate 83 beats/min, regular; respiratory rate 16 breaths/min; and temperature 37°C.

Physical examination revealed severe truncal ataxia in each patient and inability to stand unassisted, but without lateralization. There was no nystagmus and no mydriasis. Laboratory data were notable for hypokalemia (3.1 mEq/L) and hyperglycemia (225 mg/dL) in Patient 1, and were completely unremarkable in Patient 2. Both patients were administered intravenous fluids, meclizine, ondansetron, and lorazepam without relief of symptoms. Two attempts were made at assessing both patients' gait after several hours of treatment, and neither patient was able to walk due to the ataxia. The patients were admitted to the hospital for further management. Of note, two male adult