

Poisoned after Dinner: Dolma with Datura Stramonium

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SUMMARY

Datura stramonium, which is also known as Thorn Apple or Jimson Weed, is an alkaloid containing plant that is entirely toxic. The active toxic constituents of the plant are atropine, scopolamine and hyoscyamine. It has been abused worldwide for hundreds of years because of its hallucinogenic properties. Previous reports have shown that herbal medication overdose and accidental food contamination are ways it can cause poisoning. Herein we present a family that had three of its members poisoned after eating a traditional meal “dolma” made of datura flowers. None had fatal complications and all were discharged healthy. *Datura stramonium* may be used accidentally as a food ingredient. Since its poisonous effects are not known, people should be informed and warned about the effects of this plant.

Key words: Anticholinergic effects; *Datura stramonium*; plant poisoning; rhabdomyolysis.

Introduction

Datura stramonium is an annual, leafy herbaceous plant that is a powerful hallucinogen that causes delirium. Because of this, it is often used in “love potions and witches’ brews.” Since all parts of the plant are toxic, poisoning may occur after consuming any part of the plant.^[1-5] *Datura* causes anticholinergic toxicity since it contains atropine, scopolamine and hyoscyamine. The classical symptoms of poisoning are tachycardia, hyperthermia, dryness of skin and mucous membranes, reddening of skin, visual defect, speech disorder, a decrease in intestinal sounds, urinary retention, agitation, disorientation and hallucination. The symptoms generally occur 1-4 hours after ingestion and may continue 24-48 hours depending on gastric depletion.^[6]

Dolma is a traditional Turkish meal that is made by mixing rice and small chopped vegetables with the leaves of vari-

ous green plants (generally grapevine, cabbage, pumpkin flower, etc.).

Herein we present a series of *Datura stramonium* poisoning that occurred after eating dolma prepared with *Datura* flowers. Three patients in the same family were affected and cured successfully.

Case Report

A family was admitted to our university hospital-based Emergency Department (ED) with similar complaints after eating the same meal. The father had eaten nine pieces of dolma made with *Datura* flowers, while the mother and daughter had eaten one each. All three had anticholinergic symptoms and were managed as having anticholinergic poisoning due to herbal origination. All were discharged healthy.

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Case 1 (Mother) — A 58-year-old woman was brought to the ED with complaints of changes in consciousness, visual impairment and hallucinations. Her accompanying relatives indicated that she ate one piece of dolma made with the *Datura stramonium* flower six hours before the initiation of her complaints. Her past medical history revealed nothing pathologic, she did not take any ongoing medication, and she did not have allergies or substance addiction. In the first examination, her vitals were as follows: blood pressure, 110/60 mmHg; pulse rate, 124/minutes; respiration rate, 24/minute; and axillary temperature, 36.8°C. She had a Glasgow

Coma Scale (GCS) score of 12 (E4V2M6), her pupils were mydriatic, she had tachycardia and tachypnea, her mucous membranes and skin were dry and red, and her bowel sounds were decreased. There were no other pathologic physical findings. Sinus tachycardia with PR interval of 0.16 seconds, a QRS duration of 0.08 seconds, and a corrected QT interval of 0.46 seconds were seen in her electrocardiogram (ECG). The patient's laboratory results are summarized in Table 1.

The patient was assessed and diagnosed as having anticholinergic poisoning, and therefore, proper management with airway control, oxygenation, hydration and observation

Table 1. Initial laboratory results of the patients

	Normal values	Case 1 (Mother)	Case 2 (Father)	Case 3 (Daughter)
WBC (uL)	4-10	6.2	7.0	12.6
Hgb (g/dL)	11-18	12.3	14.8	13.1
Hct (%)	37-54	33.5	41.6	37.2
Plt (uL)	150-500	176	214	263
Glucose (mg/dL)	70-105	157	143	91
AST (U/L)	0-31	33	43	17
ALT (U/L)	<31	28	22	15
Amylase (U/L)	28-100	83	56	48
BUN (mg/dL)	8-25	9.5	16.9	12
Creatinine (mg/dL)	0.8-1.2	0.5	0.9	0.5
CPK (U/L)	<170	160	233	157
CK-MB (ng/mL)	0.97-4.97	3.43	2.41	1.56
Troponin T (ng/mL)	<0.1	<0.01	<0.01	<0.01
PTZ (sec)	11-15	12	12.8	12.7
INR	0.85-1.25	1.0	1.08	1.07
aPTT (sec)	25.3-34.6	21.7	24.7	23.5
pH	7.35-7.45	7.34	7.40	7.40
PaCO ₂ (mm/Hg)	35-45	43.8	34.1	38.4
PaO ₂ (mm/Hg)	98-100	95	98	98
HCO ₃ ⁻ (mEq/L)	22-24	23.6	20.07	23.4

Table 2. CPK and cardiac biomarker levels of the Case 2

Day	CPK (U/L)	CK-MB (ng/mL)	Troponin T (ng/mL)
1	233	2.41	<0.01
2	221	9.97	0.001
3	1252	30.83	0.09
4	2666	34.84	0.20
5	1769	7.50	0.29
6	852	3.75	0.34

were performed. Sodium bicarbonate was started, and she had serial ECG and vitals evaluations. She was alert, her GCS score was 15, and all abnormal physical findings were resolved on the 24th hour of hospitalization. She was observed for a total of 48 hours and discharged with full recovery.

Case 2 (Father) — A 60-year-old man was admitted to the ED with complaints of changes in consciousness, visual impairment and hallucinating approximately an hour after eating nine pieces of dolma that was made with the *Datura stramonium* flower. His medical history indicated that he had hypertension and coronary artery disease, he was on antihypertensive and salicylate medication, and he had no allergies or addiction. The patient's vital findings were as follows: blood pressure, 160/100 mmHg; pulse rate, 129/minutes; respiration rate, 24/minutes; and axillary temperature, 38.1°C. His GCS score was 12 (E4V2M6). His physical examination revealed that his pupils were mydriatic and that his mucous membranes and skin were dry and red. He had decreased bowel sounds. In his ECG, there was a left bundle branch block and sinus tachycardia. His corrected QT interval was 0.48 seconds. He had rhabdomyolysis with normal urinary excretion and increased creatinephosphokinase (CPK) levels. His renal functions were normal. He was started on clindamycin due to aspiration pneumonia on the second day of hospitalization. The patient's laboratory findings are summarized in Table 1, and his cardiac enzyme and CPK levels are summarized in Table 2.

This patient was assessed and diagnosed with anticholinergic poisoning, and therefore, proper management with airway control, oxygenation, hydration and observation were performed. Sodium bicarbonate was started with serial ECG and evaluation of vitals. He was monitored closely because his cardiac markers were elevated. He was hospitalized for a total of 6 days and discharged with full recovery.

Case 3 (Daughter) — A 33-year-old female was transferred to the ED from an urban hospital because of visual defect and hallucinations after eating one piece of dolma that was made with the *Datura stramonium* flower. She was transferred to our clinic since her problems did not resolve in the first hospital, where she was observed for 19 hours.

Her medical history indicated that she did not have any illnesses and that she was not using any medication on a continuous basis. Her vital findings were as follows: blood pressure, 140/80 mmHg; pulse rate, 110/minutes; respiration rate, 23/minutes; and axillary temperature, 37.5°C. Her GCS score was 15, her pupils were mydriatic, and she had tachycardia. Her skin was not red and dry, her mucous membranes were normal and she was not experiencing confusion. There was sinus tachycardia in her ECG. Her PR interval was 0.20 seconds, her QRS duration was 0.08 seconds, and

her corrected QT was 0.40 seconds. The laboratory results for this patient are summarized in Table 1.

The patient was started on hydration with normal saline and observed for 12 hours. Her physical findings returned to normal and she was discharged the next day.

Discussion

Datura is one of the oldest and most frequently abused psychoactive plant species.^[7] All *Datura* plants contain tropane alkaloids such as scopolamine, hyoscyamine, and atropine,^[6] which has led to their use in some cultures as a poison and as a hallucinogen for centuries.^[8] It is widely used, especially by teenagers, for its mind altering properties, and the preferred way to consume it is by smoking its leaves.^[9]

A given plant's toxicity depends on its age, its location, and the local weather conditions. Scopolamine levels are much higher in young plants. There are 24 kinds of *Datura* related to the Solanaceae family. *Datura stramonium* is also known as Thorn Apple or Jimson Weed (Şeytan Elması, Boru Otu, Tatula, Mengilik are common Turkish names for the plant). It is an alkaloid-containing plant that is entirely toxic. The plant itself is dried and used as a decorative substance in many houses in Turkey. Many people use *Datura* as an herbal medication for the flu, common cold, asthma and diarrhea, since the anticholinergic activities of the constituents can lead to symptomatic healing. The seeds of *Datura stramonium* appear similar to tomato seeds. They are flat, disk shaped, brown, and nearly 3 millimeters in diameter. One hundred units of seeds contain approximately 6 mg atropine, which may be fatal.^[8] Half a teaspoon of *Datura* seeds contains approximately 0.1 mg atropine, on average. Although atropine is present in all parts of the plant, the highest concentration is in the seed and the root. To our knowledge, there are no data relevant to the frequency of *Datura stramonium* poisoning in our country. According to our clinical practice, *Datura* seeds or leaves are commonly consumed accidentally by children in Turkey. However, it is commonly used to treat illnesses such as the flu, common cold, asthma, diarrhea, abdominal or rectal pain and nocturia due to the popularity of botanical treatment.^[6,10,11] Accidental poisonings due to the use of street drugs adulterated with scopolamine have been reported reported.^[12]

In our cases, poisoning occurred as a result of using the *Datura stramonium* plant's leaves to prepare dolma, a traditional Turkish meal. Dolma is made with cabbage, grape, beet leaves or pumpkin flowers. The similar appearance of the *Datura* flowers and pumpkin flowers may have led to the accidental poisoning. Both are trumpet shaped, easy to fill with rice, and easy to find in nature. The patients were unaware of the toxicity and potential fatality of the plant.

The tropane alkaloids in *Datura stramonium* cause anticholinergic toxicity. Clinical features of this toxicity are both central and peripheral.^[13] Red, hot and dry skin, dilated pupils and tachycardia are the most frequent clinical findings. Irritability, disorientation, agitation, hallucinations, and jerks in the limbs are central features, while urinary retention, decreased peristalsis in bowels, and hyperthermia due to decreases in sweating are caused by a peripheral muscarinic blockade. Hyperthermia may lead to failure in all organ systems, cause rhabdomyolysis, and result in liver, kidney and brain damage. Seizures, hyperthermia, wide-complex dysrhythmias, and cardiovascular collapse are serious effects of poisoning that may cause death.^[13] The blockage of sodium and potassium channels can cause dysrhythmias, and treatment modalities target this mechanism. Similar to treatment for other overdoses, management of this condition includes maintaining airway patency and circulation, monitoring of vitals and urinary output, observation, and supportive care as a whole. Within the first hour of ingestion, gastric lavage and activated charcoal administration are suggested, as multidose activated charcoal is said to be effective in patients with dysmotility. Benzodiazepines are used to control agitation and can decrease hyperthermia, rhabdomyolysis and traumatic injuries. Arrhythmias are controlled with sodium bicarbonate boluses and infusions. Physostigmine, a cholinesterase inhibitor, is suggested by some authors for cases with severe delirium.^[13] None of our patients had intractable agitation or delirium, and we did not need any cholinergic agents for their treatment. Sodium bicarbonate was started in cases 1 and 2 (the mother and father).

There are many cases of *Datura* poisoning in the literature. J. Russel et al reported that six members of the same family who ate homemade stew that included *Datura* developed anticholinergic toxidrome. Two of these patients had increased CPK levels.^[14] In addition, Ertekin et al reported that fulminant hepatitis and rhabdomyolysis occurred in an 8-year-old child who ate *Datura* leaves. The patient's hepatic enzyme levels also increased, but they returned to normal ten days later.^[15] In 2007, Diker et al. reported that rhabdomyolysis occurred in two cases after drinking tea that was made with *Datura* *Stromonium*, and the CPK levels of one of the patients reached 6694 U/L. This patient underwent fatal metabolic acidosis.^[16] In a 2008 study published by Wiebe et al, delirium developed in four patients due to *Datura stramonium* poisoning, and rhabdomyolysis occurred in one of those patients whose CPK level was 1338 U/L.^[17] In our second case (father), the increase in CPK indicated rhabdomyolysis. The patient's hepatic and renal functions were normal. The presence of sinus tachycardia, left bundle block, aspiration pneumonia and rhabdomyolysis prolonged his duration of hospitalization, and his symptoms of *Datura* poisoning were more distinctive. However, he recovered with suitable treatment.

In conclusion, *Datura* *Stromonium* may be accidentally used as a food ingredient. Since its poisonous effects are not known to the public, they should be informed and warned. Ingestion of this plant can cause not only anticholinergic toxicity, but also the deterioration of cerebral functions, serious liver toxicity, cardiac conduction problems and decline in renal functions due to rhabdomyolysis. Public awareness is needed to prevent severe poisoning, morbidity and mortality.

Conflict of Interest

The authors declare that there is no potential conflicts of interest.

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