A Case of Infantile Star Anise Toxicity

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Abstract: Chinese star anise (Illicium verum) is a popular herbal remedy for infantile colic. Contamination with a related species of Japanese star anise (Illicium anisatum) has been related to cases of toxicity in infants. We report the case of a 3-month-old infant girl who presented to the emergency department with signs and symptoms of toxicity after recent star anise ingestion. Her presentation is consistent with other reports of toxicity that include particular gastrointestinal and neurological findings. A discussion of the clinical aspects of star anise toxicity, differential diagnosis, and management follows.

Key Words: infant, seizure, star anise, toxicity

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The dried fruit of Chinese star anise (Illicium verum) is a popular spice used in foods, teas, and various herbal remedies (Fig. 1). It is frequently used as a home remedy for colic, especially among Hispanic and Caribbean populations. Chinese star anise contains biologically active compounds including Shikimic acid, a compound used in the synthesis of oseltamivir (Tamiflu), and veransatins toxins, which are generally regarded as safe for consumption in small doses.

Toxicity associated with the use of teas containing star anise led to a US Food and Drug Administration advisory against the consumption of such teas. The advisory came after 40 reports of toxic reactions to the spice, 15 of which occurred in infants.

Recent evidence suggests that infantile star anise toxicity may be related to contamination by a more toxic plant species—Japanese star anise (Illicium anisatum). Izé-Ludlow et al. reported 7 cases of star anise toxicity in the United States and used mass spectroscopy to analyze samples from 3 of those cases. Spectroscopy showed contamination of Chinese star anise with its close relative, Japanese star anise. Japanese star anise looks morphologically similar to Chinese star anise but contains a more potent neurotoxin called anisatin. Although the mechanism of Japanese star anise toxicity is not completely understood, anisatin toxins are shown to noncompetitively inhibit γ-aminobutyric acid receptors.

CASE

We report a case of infantile star anise toxicity at a children’s hospital in northern Virginia. A 3-month-old infant girl was brought to our emergency department (ED) for evaluation of possible “seizure.” Her parents stated that the child was irritable overnight, but otherwise asymptomatic and afebrile. They reported that their baby had been “colicky” earlier in the night with crying and had trouble falling asleep. There was no significant prior history of colic. A home remedy for colic was given to the infant by mixing tea brewed from star anise with her formula.

Within 3 to 4 hours after consuming the single dose of star anise, an episode of emesis occurred followed by “switching” of her arms and legs and “rolling” eye movements. The unusual behavior prompted her parents to proceed to the ED. Abnormal movements had ceased before they arrived in the ED, approximately 2.5 hours after the onset of symptoms, but was followed by lethargy. The parents noted that the infant became limp and somnolent on their way to the ED.

Past medical history was noncontributory. The patient was born at term with an uncomplicated vaginal delivery and was not taking any medications. No similar episodes had occurred before this event. There was no significant family history, including seizure or other neurological disorders. The infant had no recent sick contacts or travel.

On ED presentation, the patient was afebrile, and vital signs were within reference limits. She was noted to have a gray and ashen appearance and pulse oximetry recorded 100% saturation with room air. With stimulation and oxygen, she became more active and alert, and her skin color improved. Physical examination demonstrated no abnormalities, normal movements of all extremities, normal eye tracking and tone, and her pupils were equal, round, and reactive. Venous blood gas, complete blood cell count, and basic metabolic panel were unremarkable. A urine drug screen was negative for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, opiates, and phencyclidine. Her cerebrospinal fluid analysis showed no signs of trauma or infection.

Cerebrospinal fluid, urine, and blood cultures were sent, and a non–contrast-enhanced computed tomography (CT) of the head demonstrated no acute abnormalities. The patient was given intravenous fluids, and she was admitted overnight for observation. She remained afebrile and asymptomatic and was discharged the next day. Follow-up laboratory results revealed no growth of cerebrospinal fluid and blood cultures and less than 10^5 CFUs of Escherichia coli in the urine. Outpatient electroencephalogram obtained 1 month later was normal, and a neurology consultant agreed that her presentation was consistent with star anise neurotoxicity.

DISCUSSION

The use of Chinese star anise is widespread. Case reports of infantile star anise toxicity are published from various places around the world including Spain,11,12 South America,13,14 and France.15 In 1 study of Hispanics living in south Florida, a third admitted using star anise in the past year.16 Reported uses vary from gas reliever or expectorant to promoting menstruation and milk production. Although the US Food and Drug Administration recommends against its use in infants, star anise is also a popular therapy for colic. This is an important consideration for pediatric emergency room physicians who may encounter this type of ingestion.

Star anise toxicity is not well characterized in infants, and most reports are from outside the United States. Clinical descriptions of infantile star anise toxicity include neurologic and gastrointestinal symptoms. Neurologic abnormalities consist of seizure (Gil Campos et al12 described a patient in status epilepticus), abnormal extremity movements (including tremors, spasms, and hypertonia14), and ocular nystagmus or rolling.11–13,15 Gastrointestinal symptoms usually involve emesis. In a more severe case, Navarro et al13 presented a 9-month-old.
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With respiratory acidosis and upper gastrointestinal bleeding after drinking 2 L of star anise. A recent study of commercially available star anise in the United States showed contamination of Chinese star anise with Japanese star anise that may account for these toxicities.  

The clinical aspects of our patient’s presentation that strongly favor poisoning with contamination of Chinese star anise over other causes of seizure-like activity include close temporal relationship (within 4 hours) between ingestion and initial symptoms, emesis before the event, absence of fever or recent illness, and rapid resolution of symptoms with conservative management. It should be noted that, although Chinese star anise has been specifically linked to episodes of toxicity, several other Illicium species, which have not been studied in this context, exist.

The prognosis of infantile star anise poisoning seems favorable, and patients improve with supportive treatment. According to Ize-Ludlow et al., 7 all 7 patients were asymptomatic after 48 hours of supportive care, and our patient also showed symptom resolution within several hours of arriving to the ED. To our knowledge, there are no known long-term sequelae of star anise poisoning.

Many substances besides star anise are associated with sudden behavioral changes in an infant. For example, phencyclidine causes a toxicidrome very similar to the case presented: vertical nystagmus, tremor, opisthotonic posturing, and gastrointestinal symptoms. 17 It is important to check a urine toxicology screen and perform a detailed social history with emphasis on herbal ingestion for infants presenting with unexplained neurologic or gastrointestinal symptoms.

Pediciatric emergency care providers must be vigilant of complementary and alternative medicine practices in the ED setting. Herbal ingestion is an important consideration in the differential diagnosis of first-onset seizure-like symptoms. Although the use of star anise seems to be more prevalent in certain ethnic groups, our patient’s parents were both Caucasian. Therefore, ethnicity should not be a screening criterion for star anise.

Parents are advised against the use of star anise in infants though the use of star anise seems to be more prevalent in certain ethnic groups, our patient’s parents were both Caucasian. Therefore, ethnicity should not be a screening criterion for star anise. Parents are advised against the use of star anise in infants.

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REFERENCES


FIGURE 1. The dried, star-shaped fruit of Illicium verum (Chinese star anise).