



> THE PATIENT

55-year-old woman

> SIGNS & SYMPTOMS

- Nausea
- Blurry vision
- Hallucinations

CASE REVIEW

> THE CASE

A 55-year-old Asian woman was brought to the emergency department by her husband, with symptoms of nausea, blurry vision, headache, and hallucinations. Her husband told us that he and his wife had flown to New Orleans to embark on a Caribbean cruise 5 days earlier. The next morning—their first full day on the ship—his wife became nauseous and her vision was blurred. She went to the ship's doctor, who treated her for motion sickness.

On Day 3, she developed a right-sided headache at the back of her head and neck. The patient refused to go to the hospital at the first Mexican port and waited until the ship arrived in Belize. She was taken ashore for a computed tomography (CT) scan, which was negative. She stayed the night in the hospital.

The next day, the patient developed weakness and numbness in her left arm. She was seen by a neurologist and given amitriptyline, and underwent a second CT scan. When this scan, too, was read as negative, she and her husband flew home to Phoenix and sought care at our emergency department. There, the patient had a third CT scan, which showed temporal edema suggestive of encephalitis.

A neurologist performed a lumbar puncture and found nonspecific pleocytosis in the spinal fluid. The patient was started on aggressive antiviral therapy, including intravenous acyclovir, as well as steroids, but she showed no improvement. The symptoms continued, and the patient had vivid hallucinations: She reported seeing mermaids waving in the windows and children running around the hospital halls and ceilings.

An extensive serological workup followed, and was negative for: cytomegalovirus, dengue virus, West Nile virus, Lyme disease, coxsackievirus, syphilis, *Cryptococcus*, *Coccidioides*, mumps, measles, antinuclear antibodies, lupus, malaria, and herpes simplex virus.

THE DIAGNOSIS

After ruling out the other possible etiologies, and noting that the patient had eaten fish the day before the symptoms developed, the hospitalist, neurologist, and infectious disease specialist agreed that the most likely diagnosis was ciguatera poisoning. A literature search revealed the recommended treatment: a mannitol infusion of a 20% solution, 1 g/kg, with a piggyback of 250 mL over 30 minutes,¹ every 6 hours as needed.

A dramatic improvement

The patient's headache and arm weakness improved within 24 hours of receiving the mannitol. Her mental status improved as well as the blurry vision.

Two days later, the patient received a second mannitol infusion and was discharged the next day, although she still had mild weakness in her left arm and lingering hallucinations. A 2-week follow-up appointment with the neurologist was scheduled so that she could have a third mannitol treatment for her persistent visual changes.

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Foodborne illness— or something else?

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➤ The patient was started on aggressive antiviral therapy, including intravenous acyclovir, as well as steroids, but she showed no improvement.

DISCUSSION

Ciguatera poisoning— a little-known marine toxin

Ciguatera toxin is a lipid-soluble, heat-stable marine toxin² made by dinoflagellates such as *Gambierdiscus toxicus* in tropical and subtropical waters. Larger fish eat the herbivore fish that have eaten the dinoflagellates and the toxin bioaccumulates until it reaches large predatory fish like barracuda, grouper, snapper, and sea bass.³ Although the toxin is harmless to fish, it can cause serious gastrointestinal (GI), neurological, and cardiovascular symptoms in humans. Cold allodynia—ie, cold stimuli experienced as painful or hot—is considered pathognomonic.

■ **Although the condition is rare, the incidence is on the rise.** There were an estimated 20,000 cases of ciguatera poisoning worldwide in 1997,⁴ and >100,000 cases in 2010.⁵ In addition, the Centers for Disease Control and Prevention reported 14 “ciguatera” outbreaks in the United States between 2009 and 2010.⁶⁻⁸ The endemic area of ciguatera seems to be spreading, as well. Once confined to fish caught in tropical waters like the Caribbean, ciguatera-laden fish have been caught off the coast of South Carolina and North Carolina.⁹

A triad of symptoms

Patients with ciguatera poisoning may present with the following triad of symptoms:

- GI problems (nausea, vomiting, diarrhea), which usually occur one to 2 days postexposure,
- neurological symptoms (hallucinations, headache, ataxia), which typically occur 2 to 4 days postexposure, and
- cardiovascular symptoms (bradycardia, hypotension), which are the least common and typically occur only in severe cases.¹⁰

Our patient’s eating history and onset of symptoms suggested that she ingested the ciguatera toxin in New Orleans the night before leaving on the cruise, yet she did not experience cold allodynia. Her medical treatment was prolonged, with multiple exclusion tests resulting in a 19-day hospital stay.

No consensus regarding Tx

The medical management of this rare condition is still in its infancy, and there is no consensus regarding treatment.¹¹ In addition, while there are specific assays for fish tissue,¹² there appears to be no diagnostic test for humans.

■ **Our patient’s immediate response** to a mannitol infusion was consistent with other reported cases of ciguatera poisonings.¹ However, mannitol therapy came into question in 2002, when a randomized trial comparing it with normal saline for ciguatera poisoning found that both provided immediate symptom relief.¹¹

THE TAKEAWAY

As tropical fish exports reach new markets and world travel increases, the number of ciguatera cases is likely to continue to rise. The lack of both a specific diagnostic test and an evidence-based treatment highlights the importance of taking a thorough food history—and considering this unusual toxin, as well as more common foodborne pathogens—in patients who present with GI and neurological symptoms. **JFP**

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