

Letter

Ciguatera on the coast of Northeastern Brazil: report of an outbreak in Fernando de Noronha Archipelago

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Ciguatera is an intoxication resulting from the consumption of marine fish contaminated by a neurotoxin (ciguatoxin) produced by dinoflagellates (protists), especially the species *Gambierdiscus toxicus*. It binds to sodium channels, causing a neuromuscular blockade (**Figure 1**). This toxin is heat-stable, odorless, colorless, and harmless to fish. Ciguatoxin accumulates in the fish food chain, with herbivores feeding on the algae where dinoflagellates settle. Carnivorous reef fish feed on herbivorous fish and possess the highest concentration of toxins. Using existing tests, these toxins are detectable in fish but not in human beings. The fish associated with ciguatera are groupers, barracudas, moray eels, and whiting (**Figure 1**), which are associated with approximately 50,000 cases worldwide annually, mainly in the Caribbean and other tropical regions¹⁻⁶.

After consumption of contaminated fish, the symptoms manifest between 10 minutes and 36 hours. Signs and symptoms include intense weakness, diarrhea, nausea, vomiting, muscular pain, perioral paresthesia, chills, intense sweating, metallic taste in the mouth, hypotension, bradycardia, muscle paralysis and, in severe intoxication, difficulty with breathing, cyanosis, cardiac arrhythmias, and rarely, respiratory failure with a risk of death. Absence of fever is an important parameter for distinguishing ciguatera intoxication from an acute bacterial infection¹⁻⁶.

The most important sign aiding in accurate diagnosis is paradoxical thermal sense: the patient reverses the hot and cold senses of water temperature (the onset is approximately two days after consumption). Severe itch begins in the palm and plantar regions, eventually spreading to the rest of the body. It may recur after the consumption of fish, seafood, nuts, or alcohol, for long

periods. Neurological symptoms, including involuntary movements and muscle weakness, may persist for years¹⁻⁶.

No specific treatment exists for the disease. Gastric lavage may be employed up to three hours after ingestion. Administration of mannitol IV is recommended, but clinical studies confirming its efficacy are lacking. It is suggested that the pain and itching respond to the use of amitriptyline or gabapentin.

A 61-year-old woman was on vacation in the Fernando de Noronha Archipelago in August 2023. She ate fish meat (white fish meat, but it was not possible to identify the species) at a local restaurant. She was accompanied by her daughter and her daughter's boyfriend. In approximately half an hour, the woman started vomiting intermittently, reaching 20 episodes. One hour after ingestion, the daughter experienced intense nausea, vomiting, and diarrhea. Our patient presented with similar symptoms as her daughter.

Owing to the intense feeling of discomfort, they were admitted at a local hospital and treated with intravenous saline solution, symptomatic medication, and 500 mg azithromycin PO (administration of azithromycin was not possible due to episodes of vomiting and diarrhea).

The daughter experienced intense muscle pain in her arms and legs and reversed thermal sensitivity to cold temperatures (an intense burning sensation when she exposed her extremities to cold water or ice, and concomitantly, intense itching in the lower abdomen). The hospital was notified that approximately 30 other individuals who ate fish in the same establishment were treated for manifestations similar to theirs.

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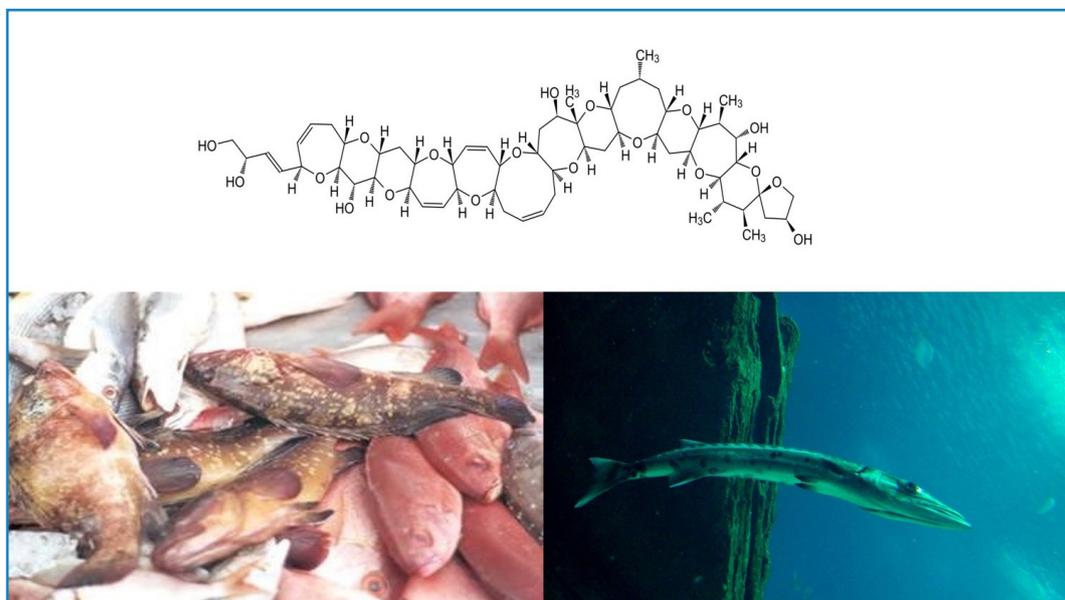


FIGURE 1: Above: Ciguatoxinw Molecule. Below: Main fish associated with ciguatera. Left: groupers (*Epinelephus* sp.) and red snapper (*Lutjanus* sp.); Right: Barracuda (*Sphyraena* sp.).

After returning to their hometown, approximately one week after eating the fish, the daughter's boyfriend still had extreme fatigue, leg pain and a feeling that his tongue was "burned." Our 61 year-old patient, in turn, reported nausea, diarrhea, intense fatigue, abdominal pain, "unbearable" generalized itching, particularly on the palms of the hands, soles of the feet, and lower abdomen and "burning sensation" on the tongue and on the hands and feet when exposed to water or cold objects (inverted thermal sensation).

Ten days after the intoxication, the symptoms persisted, and all three patients were medicated with amitriptyline along with the antihistamines and analgesics administered since the onset of the manifestations, and were awaiting clinical evaluation. One week later, the patient was started on amitriptyline (10 mg) both at night and in the morning. The itching greatly improved; however, the burning sensation in the hands and tongue, leg pain, and fatigue persisted.

The clinical manifestations presented by the patients are consistent with ciguatoxin intoxication, as were the reported history of fish ingestion and the time until the appearance of signs and symptoms. Identification of the fish consumed would have been useful in the final diagnosis; however, it was not possible.

Tests for the identification of ciguatoxin only detect the toxin in fish, with no supporting tests in humans, which reinforces the importance of identifying signs and symptoms in patients.

Carnivorous reef fish accumulate more toxins than other fish and are commonly served in restaurants located in tourist areas. The archipelago is located on the high seas, and the possibility of catching large carnivorous fish is greater in this area.

Ciguatera is a serious intoxication that can be fatal, albeit rarely. It causes intense and debilitating neurological symptoms with a

chance of chronification. The intoxication is very common in the Caribbean and other tropical areas worldwide, and there are no reasons to rule out its presence in Brazil. It is often misdiagnosed as food poisoning, viral infections, and other diseases. The therapy is symptomatic, and the patients described in our report showed improvement in some of the symptoms with the use of amitriptyline (20 mg/day), in addition to antihistamines and analgesics.

We believe that with the follow-up care of these patients, who present classic and virtually pathognomonic symptoms of intoxication (such as inverted thermal sensitivity), ciguatera should be included among the diseases caused by marine toxins present in Brazil.

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