



Ciguatera fish poisoning

Seasoned fishermen in tropical areas use a simple test to determine whether a fish is fit for human consumption: if their gums tingle after rubbing fish organs on them, then the fish is not safe to eat. Between 1983 and 1987 the US Centers for Disease Control and Prevention reported over 90 000 cases of food poisoning.¹ Transmitted either by infectious or toxic agents,³ foodborne illnesses in the US involve seafood in about 11% of cases.² Among these, ciguatera fish poisoning is the most commonly reported, with the vast majority of cases occurring in Florida and Hawaii.¹⁻³ Worldwide, about 25 000 cases are reported annually, with the highest rates occurring in endemic tropical and subtropical areas, including the Caribbean and South Pacific.³

The disease is not limited to endemic areas, however. In October 1997, 17 crew members of a cargo ship docked in Freeport, Texas, developed symptoms of ciguatera fish poisoning after eating a contaminated barracuda caught near the Cay Sal Bank of the Bahamas, an area not usually associated with ciguatera.⁴ In November 1996, 5 people became ill after eating imported barracuda in a Montreal restaurant.⁵ A case of ciguatera fish poisoning due to farm-raised salmon has also been reported.⁶

Ciguatera fish poisoning, whose name comes from an 18th-century Portuguese biologist's description of symptoms following ingestion of *cigua* (Spanish for turban fish),⁷ is caused by a number of toxins produced by a unicellular organism of the species *Gambierdiscus toxicus*.⁸ The toxins become concentrated as the organism is passed up through the food chain, from small herbivorous fish that ingest it from dead coral surfaces to large carnivorous fish and finally to humans. Harmless in fish, the toxins produce illness in humans by interrupting the normal function of ion channels, principally in nerve and muscle tissue.⁸

Like many foodborne illnesses, ciguatera fish poisoning presents with a combination of gastrointestinal and neurologic symptoms.¹ Acute gastroenteritis with nausea, vomiting, abdominal pain and watery diarrhea usually occurs 3 to 6 hours after eating contaminated fish. Up to 3 days after exposure patients may report bizarre symptoms, including perioral numbness and tingling, per-

ceptions of loose teeth, reversal of the sensation of hot and cold temperatures, intense itching, paresthesias of the extremities and rashes on the palms and soles. Neurologic symptoms usually resolve within 3 weeks but can persist for months. Death is rare, occurring in less than 0.1% of cases, and is usually due to cardiovascular involvement resulting in hypotension.^{1,3,8}

Ciguatera fish poisoning is diagnosed clinically, when characteristic symptoms follow fish ingestion.^{1,8} Organophosphate poisoning, botulism and pufferfish and shellfish poisoning can present with similar features. Diagnosis can be confirmed by testing the fish for toxins, and new methods are currently under investigation.^{1,3,9}

Treatment, when needed, is largely supportive and symptomatic. Uncontrolled trials suggest that mannitol given intravenously may help to prevent or diminish neurologic symptoms if administered within 24 hours after symptom onset. Patients should avoid repeat exposure, which has been shown to result in more severe disease, and not consume nuts and alcohol, which are known to exacerbate symptoms.^{1,3,8}

Large predatory reef fish (e.g., barracuda, grouper, snapper, jack and moray eel) from endemic areas, particularly after a disturbance in the reef environment, are at high risk of harbouring toxins. Of particular concern are the fish organs and roe, where the toxins tend to concentrate. Since ciguatoxins cannot be detected by sight, taste or smell and cannot be destroyed by cooking or freezing, the best prevention is to avoid eating these fish.^{1,3,8}

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References

1. Mines D, Stahmer S, Shepherd SM. Poisonings: food, fish, shellfish. *Emerg Med Clin North Am* 1997;15(1):157-77.
2. Epidemiologic report: illness associated with seafood. *CMAJ* 1992;147(9):1344-7.
3. Beadle A. Ciguatera fish poisoning. *Mil Med* 1997;162(5):319-22.
4. Ciguatera fish poisoning — Texas, 1997. *MMWR* 1998;47(33):692-4.
5. Ciguatera fish poisoning linked to the ingestion of barracuda in a Montreal restaurant — Quebec. *Can Commun Dis Rep* 1997;23(20):153-6.
6. DiNubile MJ, Hokama Y. The ciguatera poisoning syndrome from farm-raised salmon. *Ann Intern Med* 1995;122(2):113-4.
7. Watters MR. Organic neurotoxins in seafoods. *Clin Neurol Neurosurg* 1995; 97:119-24.
8. Lange WR. Ciguatera fish poisoning. *Am Fam Physician* 1994;50(3):579-84.
9. Hokama Y, Asahina AY, Shang ES, Hong TW, Shirai JL. Evaluation of Hawaiian reef fishes with the solid phase immunobead assay. *J Clin Lab Anal* 1993;7(1):26-30.