Ciguatera: a type of food poisoning known in French as la gratte

Ciguatera is a type of food poisoning caused by eating fish contaminated with ciguatoxins. It is most often responsible for digestive, dermal, cardiovascular and neurological signs, the latter sometimes lasting several weeks. Although tropical and subtropical regions are known endemic areas, indigenous cases have also been recorded off the coast of Europe, mainly in Madeira (Portugal) and the Canary Islands (Spain). Toxin analyses in leftover fish, if available, can confirm the diagnosis. ANSES and the poison control centres conducted a review of cases in 2020, a year marked by the absence of ciguatera poisoning among tourists from metropolitan France visiting the overseas territories or foreign countries, due to the drop in tourism caused by the COVID-19 pandemic. Prospective monitoring was set up in 2021. Poisoning victims were asked to freeze their leftover meals in a plastic bag at -18°C, so that they could be analysed for toxins.

Balance disorders, visual hallucinations and even a depressive syndrome may be observed in some cases. While the digestive signs disappear on their own after a few days, the neurological symptoms may last for several weeks. Treatment is only symptomatic. The prognosis may be unfavourable in the case of paralysis of the respiratory muscles or heart attack; however, ciguatera is rarely fatal.

Patients are particularly susceptible to symptoms recurring after ingestion of alcohol or tropical fish flesh, even several months after poisoning. The mechanism of these resurgences is still poorly understood.

Northward extension of ciguatera risk areas

Ciguatera is endemic to tropical and subtropical regions where warm waters support coral reefs. It is therefore found throughout the year in the South Pacific (French Polynesia, New Caledonia, Australia, etc.), the North Pacific (Hawaii, Japan, etc.), the Indian Ocean (Madagascar, Reunion, Mayotte, etc.) and the Caribbean (Cuba, Haiti, Guadeloupe, Martinique, etc.) (Figure 1).
Ciguatoxins are grouped into three families according to their geographical origin: Pacific Ocean (P-CTX), Caribbean (C-CTX) and Indian Ocean (I-CTX)\(^1\).

In France, most French overseas territories are affected. Over the last 15 years or so, the range of ciguatoxins has also been spreading towards the Atlantic islands of Spain and Portugal, probably favoured by global warming. For example, several cases of ciguatera due to the consumption of groupers and amberjacks caught in the waters of Madeira and the Canary Islands (Macaronesia) have been reported. In addition, the microalga *Gambierdiscus spp.* has been found in different parts of the Mediterranean: in the Balearic Islands (Spain) and in the waters around Crete (Greece). Even if the presence of this microalga is not always synonymous with fish contamination, the emergence of ciguatera risk areas in Europe cannot be ruled out. The “EuroCigua” project, which was co-funded by the European Food Safety Authority (EFSA) and in which ANSES participated, sought to acquire new health and environmental knowledge on the risks of ciguatera in Europe [2].

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1. It should be noted that the initial digestive disorders most often occur in cases of poisoning related to fish from the Atlantic, and may be absent for those from the Indian and Pacific Oceans [3, 4].
Where commercial products are involved, the health authorities can then promptly report contaminated fish consignments to other European Member States\(^2\) in order to get them withdrawn from the market. Prefectoral orders are issued in the French overseas territories whenever a new fish species is identified as responsible for a case, in order to ban the fishing and sale of species from local areas at risk.

A retrospective review of ciguatera cases recorded by poison control centres identified 130 cases of poisoning between 2012 and 2019 [5]. Between one and 15 diners were involved in the 52 incriminated meals. The annual number of incriminated meals varied from two to 12 (on average 6.5 meals per year) and the fish mainly involved were groupers, snappers, jacks, parrotfish and barracudas.

In order to supplement knowledge of the occurrence of ciguatera poisoning, ANSES, which is responsible for the toxicovigilance scheme, conducted a specific review for 2020 and set up prospective monitoring of such poisoning cases.

**Noteworthy in 2020: no ciguatera poisoning cases linked to tourism**

Based on an expert appraisal of medical files by a toxicologist from a poison control centre, 13 cases of ciguatera that led to calls to poison control centres in 2020 were identified.

The poisoning victims, ten adults and three children (all siblings), had fallen ill after five meals: three meals involving one person (i.e. three individual poisoning cases) and two meals involving five people each (i.e. two multiple poisonings). Twelve of them were first-time poisonings and one person had a resurgence of symptoms following consumption of a tropical fish, four years after an initial episode in the Caribbean.

The poisonings were all reported after a fish meal in the French overseas territories: two meals consumed in Guadeloupe (including one in Marie-Galante), one in Martinique, one in Saint-Martin and one in Mayotte.

With four meals the fish were identified: two jacks and a barracuda caught locally, and wahoo imported from Vietnam. These species are already known to be vectors of ciguatera. For the fifth meal, the people involved had eaten fillets of an unknown species of fish in a restaurant.

The fish were grilled (short cooking time) for two meals and prepared in soup (very long cooking time including the fish heads, a part of the animal that can be more contaminated) for the other three. For one of the meals (wahoo imported from Vietnam), the presence of ciguatoxins was confirmed in the leftover fish by analyses carried out by ANSES’s NRL-MB.

Symptoms started with classic digestive disorders in 12 patients, and continued with general and neurological signs in all cases. The duration of symptoms varied from one to 10 days for the 12 patients with acute primary poisoning. They lasted one month for the patient with the resurgence.

All patients had mild to moderately persistent transient, non-life-threatening symptoms.

While the number of meals causing cases of ciguatera was comparable to those of previous years, 2020 was characterised by the fact that all the cases occurred in people living in the overseas territories. Indeed, between 2012 and 2019, 56% of contaminated meals had been consumed by tourists from metropolitan France exposed in tropical and subtropical regions (French overseas territories or foreign countries), 38% by people living overseas and exposed at home, and 6% by people exposed in metropolitan France to imported fish. In 2020, no tourists from metropolitan France fell ill after eating contaminated fish during holidays in endemic areas. This is likely due to the context of the COVID-19 pandemic, which severely restricted travel to tropical regions. The temporary closure of restaurants in metropolitan and overseas France may also have helped reduce the risk of food poisoning. The review for 2021, which is still in the same pandemic context, will confirm or refute this hypothesis.

**Establishment of prospective monitoring of ciguatera cases recorded by poison control centres**

Following this review, ANSES and the poison control centres set up "real-time" prospective monitoring of ciguatera cases from 2021 onwards, using a specific questionnaire to better document the characteristics of the incriminated fish (fish name, place where it was fished, place of purchase or consumption, etc.) and the circumstances of exposure (method of preparation, quantity consumed, etc.).

When a person calls a poison control centre to report clinical signs that could lead to a suspicion of ciguatera, they will be asked to keep the meal leftovers in a plastic bag in the freezer (-18°C) so that analyses can be carried out to screen for toxins.

Future annual reviews will thus help to update knowledge of ciguatera poisoning in order to limit its occurrence in the general population.

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2. Through notification to the Rapid Alert System for Food and Feed.

Vigil’Anses no. 16 • The bulletin for all of ANSES’s vigilance schemes • May 2022
**Recommendations to prevent the risk of ciguatera poisoning:**

- Do not eat the offal (liver, viscera, etc.), head, skin or eggs of fish from regions where the toxin is present.
- Do not eat fish that the locals do not eat.
- Ask a local fisher for advice before eating any fish caught.
- Pay attention to the origin of the fish you buy. favour known species.
- **In the event of suggestive symptoms following consumption of fish from a risk area, call a poison control centre immediately or consult a doctor.**
- **Immediately place the leftover meal in a plastic bag** in the freezer (-18°C) and store it for toxin analysis.
- Avoid eating tropical fish within days of the occurrence of poisoning symptoms.
- Avoid drinking alcoholic beverages as they can make symptoms worse.

**References**


