HOW TO TREAT CIGUATERA FISH POISONING (CFP)

To date, there is no vaccine or specific treatment to cure ciguatera. Currently, treatment of CFP remains symptomatic. With the advances in toxicology and ethnobotany future specific treatments should be discovered. Several compounds that could be able to specifically counteract ciguatoxins actions, have been identified (brevenal, monoclonal antibodies, rosmarinic acid ...). However, even if these leads may result in the development of effective and specific treatments, numerous complementary studies would be required before their commercialization. At present, “preventive actions” are the best-known treatment against CFP, i.e. combined actions of information/education, protection of coral reefs, integrated management and traceability reinforcement of lagoon fish sectors, algal blooms (HABs) monitoring, public health monitoring, etc.

IMPORTANT

Ciguatera treatment protocols and medications provided below are based on the following scientific literature:


This information is provided solely for guidance, and is subject to change depending on advances in knowledge.

If other protocols or medications have shown efficacy in your patient or yourself, please do not hesitate to share that information with us: contact@ciguatera-online.com

EMERGENCIES IN THE ACUTE PHASE

Following a case of CFP, hemodynamic and hydroelectric disorders, which could cause fatal shock in sensitive individuals, must be treated first. The use of large volumes of isotonnic fluids and amines vasopressors may then be necessary. Although very rare, endotracheal intubation may be necessary in case of coma or acute polyradiculoneuritis. Finally, to prevent a toxic/anaphylactic shock, administration of corticosteroids may be necessary.

TREATMENT OF GASTROINTESTINAL SYMPTOMS

In general, gastrointestinal symptoms are the first to appear. Antisecretory anti-diuretics like racecadotril (Tiorfan®) seem to treat diarrhea well; antiemetics for vomiting and antispasmodics for abdominal pains, could also be used. In severe cases, decontamination with activated charcoal (if administered within 3-4h after poisoning), and a gastric lavage could be done. However, these methods must be avoided in case of vomiting.

In general, these disorders resolve after a few days.

TREATMENTS OF CARDIOVASCULAR SYMPTOMS

These symptoms are found in severe cases and are relevant of an exposure to large amounts of toxins. Their occurrence usually requires emergency hospitalization.

Bradycardia and hypotension require IV or IM atropine (0.5 to 1 mg every 5 minutes, if necessary) to maintain a heart rate greater than 60 bpm. Atropine is also known to improve some gastrointestinal disorders (diarrhea, vomiting, nausea, spasms).
It can also be associated with cardiotonics (isoprenaline …) in case of persistent bradycardia, and pralidoxime (Contrathion® …; 200 to 1000 mg, slow infusion) for its cholinesterase reactivator property.

## TREATMENT OF NEUROMUSCULAR SYMPTOMS

- **Pain**
  Myalgia, arthralgia, headaches, etc. are treated with analgesics and nonsteroidal anti-inflammatory drugs (paracetamol, ibuprofene, aspirin, indomethacin …).

- **Pruritus**
  Ciguatera pruritus is relieved with pure H1 type antihistamine drugs: dexchlorphéniramine (Polaramine®,…), mixed H1 type antihistamines: cyproheptadine (Periactin®,…), hydroxyzine (Atarax®), cetirizine (Virlix®) and local anesthetics (lidocaine …).

- **Peripheral neuropathy and asthenia**
  A multivitamin cocktail with vitamins B (B1, B6, B12) and C associated with calcium gluconate is frequently suggested, although its efficacy has not been officially proved. In the acute phase, the treatment consists of a slow IV infusion (1h) of a glucose solution (250ml), containing 1g of vitamin C, 250mg of vitamin B6 and 1g of calcium gluconate.

  It has been shown that vitamin B12 active form (methylcobalamin), when administered at high doses, stimulates regeneration of damaged neural structures. Vitamins B are usually known for their neuroprotective properties. Vitamin C, is used for its anti-asthenic properties and as a chelator of free radicals. Finally, calcium salts are used, as a calcium rich medium, causes a decreased affinity of ciguatoxins for their receptors.

- **Chronic dysesthesia and paresthesia**
  Amitriptyline (Laroxyl®, Elavil®) and gabapentin (Neurontin®) are recommended for the relief of chronic paresthesia and dysesthesia. In fact, amitriptyline administered at a dose of approximately 50mg once a day, provided significant improvements (of neurological symptoms, and even pruritus) in some patients.

  Finally, cholestyramine (Questran® …), an anticholesterolmic, which seem to be a ciguatoxins-antagonist, demonstrated some efficiency on neurological symptoms improvement in numerous patients.

- **Chronic fatigue**
  It has been demonstrated that fluoxetine (Prozac®), a selective serotonin reuptake inhibitor used as an antidepressant drug, leads to a significant improvement of the chronic fatigue syndrome associated with CFP.

## WHAT ABOUT MANNITOL?

Mannitol is usually indicated for treatment of neurological symptoms in the acute phase, and it may prevent the development of chronic neurological symptoms. The dose of mannitol which is recommended is 10ml/kg over a 30-45 minute period, administered within 48-72h of consumption of ciguatoxic fish for maximum efficiency. However, improvements have been observed, even up to several weeks after intoxication.

**Please note:** As mannitol causes intracellular dehydration, it should not be administered until the patient is adequately rehydrated, especially if he suffered from severe diarrhea or vomiting. In addition, mannitol should be avoided for patients with cardiac failure.

Many hypotheses have been suggested to explain mannitol mechanisms of action: its osmotic properties, a chelator of free radicals and/or an inhibitor of successive depolarizations induced by ciguatoxins.

Although controversial, the use of mannitol in the acute phase remains suggested in the majority of studies.
DIET

To prevent relapse or aggravation of CFP-related symptoms, patients are advised to avoid the consumption of marine products, animal proteins, alcohol, coffee and nuts for one month minimum. Please [click here](#) to consult the complete list of foods that may cause reactions.

This food « intolerance » can last several months, or years. So, it is recommended to ciguatera poisoned individuals to keep a journal of the “sensitive” foods and record the reactions (as well as their intensity) they trigger. These foods should be removed from their diet for several months. The individual will then try to reintroduce each food little by little. If there is still an intolerance for one of these foods, the experiment should be done again one or two month later.

AND TRADITIONAL MEDICINES?

As seen above western medicine is solely of a palliative nature, therefore many Pacific islanders willingly turn towards traditional medicine.

Also, ethnobotanical studies carried out in the Pacific resulted in the establishment of a list of some 100 plants used in traditional medicine to combat CFP symptoms. These plants may contain active substances, that could act on the symptoms and for some allow “detoxification” of the body. This hypothesis have been made on the basis of local people testimonies, who claim that they no longer feel CFP symptoms and that they can eat fish again the following morning after taking their remedy.

Among all these remedies, only the one base of *Heliotropium foertherianum* (Boraginaceae, vernacular name: “faux tabac” in New Caledonia and “tahinu” or “tohonu” in French Polynesia) leaves, have been studied up to the isolation of its active substance, the rosmarinic acid.
How “Faux tabac” or “Tahinu” traditional remedy is made?

This remedy is still frequently used in French Polynesia, especially in the Tuamotu archipelago, where many islands have no hospital, medical center or pharmacy.

Islanders, collect ten yellow leaves, ready to fall from the tree. They clean and boil them in 1 liter of water until the latter has been reduced to ½ liter. The beverage obtained is then drink hot or cold, in a single or several intakes. According to local custom, this remedy should not be taken more than 3 consecutive days.

To be effective, this remedy should be taken as early as possible after poisoning. Note that the effectiveness may vary from one tree to another, as they do not all contain the same concentration of Rosmarinic acid (F.Rossi).

Beneficial effect of this remedy, widely used in the South Pacific and even in Japan, has been demonstrated by various pharmacological studies, including an in vivo test on mice and several electrophysiology, neurophysiology, cellular physiology and neurotoxicity in vitro tests. These tests have shown that this traditional remedy counteracted the toxic effects of ciguatoxins.

**Rosmarinic acid** is one of the main products found in the infusion of *H. foertherianum* leaves. It is a phenolic compound having no significant toxicity and with antioxidant as well as anti-inflammatory properties. Its known beneficial effects on the cardiovascular system and on neurodegenerative diseases could also be of a great interest for the treatment of ciguatera. Its “detoxifying” capacity has been studied on cultured neuroblastoma cells and with a receptor-ligand detection test (displacement of the toxin from its action site).

Rosmarinic acid, but also the traditional remedy made from *H. foertherianum* leaves could therefore be a promising alternative treatment for ciguatera poisoning.