

# Seafood Poisoning

## Traveler Summary

### Key Points

- Seafood poisoning is usually caused by consumption of shellfish and warm-water, reef-dwelling fish (e.g., amberjack, grouper, mackerel, red snapper, or tuna) that have accumulated toxins, which cannot be eliminated by freezing, smoking, or cooking. Symptoms can occur within minutes to hours after ingestion of the responsible seafood.
- **Ciguatera** : Symptoms include diarrhea, cramping, and vomiting followed by numbness around the mouth and muscle aches. Severe cases may progress to seizures and coma. Symptoms such as heat and cold reversal (a burning sensation when touching something cold and a cold sensation when touching something hot) may occur and last for months.
- **Scrombroid** : Symptoms are short-lived and include those of an allergic or histamine-like reaction, such as flushing, itching, rash, headache, rapid heartbeat, diarrhea, and vomiting.
- **Shellfish poisoning** : Four types exist: *paralytic*, which includes symptoms such as tingling and numbness of face and limbs, progressing to drowsiness and respiratory paralysis; *neurotoxic*, which includes symptoms such as nausea, vomiting, and diarrhea and nervous symptoms similar to ciguatera; *amnesic*, which includes symptoms such as gastrointestinal (GI) illness, confusion, and short-term memory loss; and *diarrhetic*, which includes symptoms such as chills, nausea, vomiting, and diarrhea.
- **Tetradotoxin (*Fugu*)** : Symptoms occur after eating pufferfish and include tingling and numbness of the tongue, lips, and face, followed by difficulty swallowing, walking, and breathing. Symptoms usually resolve within 24 hours but can be fatal in persons who consume large amounts of *Fugu* prepared by unlicensed chefs.
- Prevention includes avoiding the consumption of seafood caught in known high-risk areas and the skin or organs of fish.
- Seek medical care if ciguatera is suspected or if experiencing any respiratory or prolonged GI symptoms.

### Introduction

Seafood-related illnesses can be caused by toxins, bacteria, viruses, and parasites. In particular, marine poisoning syndromes are caused by toxins that have accumulated in fish, shellfish, or turtles. Typical food preparation procedures (e.g., cooking, freezing, salting, drying, smoking, or marinating) will not eliminate them.

## Fish Poisoning

### Ciguatera Poisoning

**Risk and symptoms** : Ciguatera fish poisoning is the most frequently reported fish-borne illness worldwide, resulting in approximately 50,000 cases annually. Ciguatera is common in tropical or subtropical regions between 35°N and 35°S, especially throughout the Caribbean (especially in the east), Indian Ocean, around the South Pacific islands, and increasingly down the eastern coast of Australia. In the US, ciguatera is almost exclusively present in Hawaii, southern Florida, and the northern Gulf of Mexico; however, outbreaks have occurred from eating contaminated fish in restaurants in other parts of the country. The disease has been linked primarily to large carnivorous reef fish (such as barracuda, grouper, moray eel, parrot fish, red snapper, surgeonfish, triggerfish, amberjack, wrasse, Spanish mackerel, and mullet).

Symptoms can occur within minutes or up to 12 hours after eating fish, depending on the amount and parts of the fish consumed, as well as the species and size. Early symptoms include diarrhea, abdominal cramps, and vomiting followed within hours by numbness, tingling, and/or burning in the lips, tongue, mouth, throat, legs, or arms; tooth pain; itching; muscle aches; blurred vision; painful urination; depression; fatigue; heart symptoms (irregular heartbeat, low or fluctuating blood pressure, or shock); or heat and cold reversal (feeling a burning sensation when touching something cold and a cold sensation when touching something hot). In severe cases, problems with coordination, limb paralysis, respiratory failure, seizures, or coma may occur. Nervous system symptoms usually resolve within several weeks but may persist for months, especially poor memory, confusion, difficulty concentrating, weakness, and tingling, burning, and/or prickling feelings. Symptoms may recur after consuming saltwater or freshwater fish, ethanol, caffeine, or nuts for up to 6 months. Death occurs in 0.1% to 12% of reported cases.

**Seeking medical help** : If ciguatera poisoning is suspected, seek medical help. Obtain a sample of the fish for analysis, if possible. Treatment is targeted at controlling/minimizing symptoms and correcting life-threatening conditions.

**Prevention** : Avoid eating barracuda or moray eel and the flesh or organs of large carnivorous reef fish from warm waters where ciguatera is known to occur.

## Scombroid Poisoning

**Risk and symptoms** : Scombroid poisoning is the second most commonly reported fish-borne illness worldwide after ciguatera and most commonly results from eating spoiled fish (fresh or canned), including tuna, mackerel, skipjack, and bonito. Neither refrigeration nor cooking can prevent scombroid.

Symptoms occur rapidly, usually within an hour of eating spoiled fish, and typically include flushing, itching, rash, headache, rapid or irregular heartbeat, dizziness, sweating, burning of the mouth and throat, diarrhea, nausea, vomiting, and abdominal cramps. The rash usually lasts about 2 to 5 hours, and the other symptoms usually disappear within 3 to 36 hours.

**Seeking medical help** : Treatment is often unnecessary because the condition is short lived; however, antihistamines provide rapid symptomatic relief, which results in scombroid often being misdiagnosed as "fish allergy."

**Prevention** : Keep fresh tuna, mackerel, grouper, and mahi-mahi refrigerated. Avoid eating fish that have a peppery taste or cause tingling in the mouth after the first bite.

## Shellfish Poisoning

**Risk and symptoms** : Four types of shellfish poisoning can occur after eating mussels, oysters, scallops, or hard- and soft-shelled clams that have fed on toxic algae. Outbreaks occur periodically around the coasts of the North Atlantic Ocean, Japan, Chile, and South Africa, generally in association with algae blooms ("red tides").

*Paralytic shellfish poisoning* (PSP), the most severe form of poisoning, occurs worldwide. Symptoms appear within 30 minutes to 4 hours of shellfish consumption and include tingling and numbness of the face, lips, tongue, arms and legs. Severe cases may progress to drowsiness and respiratory paralysis.

*Neurotoxic shellfish poisoning* (NSP) occurs off the coast of Florida, the Gulf of Mexico, the Caribbean, and New Zealand. Symptoms appear within 30 minutes to 3 hours of shellfish consumption and include nausea, vomiting, diarrhea, abdominal pain, and minor nervous system symptoms resembling ciguatera poisoning.

*Amnesic shellfish poisoning* (ASP), a rare form of poisoning, occurs on the Pacific and Atlantic coasts of Canada and the US and the Atlantic coast of northern Europe. Symptoms appear within 24 hours of shellfish consumption and include nausea, vomiting, diarrhea, and abdominal pain followed by headache, short-term memory loss, and confusion.

*Diarrheic shellfish poisoning* (DSP) occurs worldwide, especially around the Atlantic coasts of northern Europe and in the Mediterranean. Symptoms appear within 2 hours of shellfish consumption and include chills, nausea, vomiting, diarrhea, and abdominal pain and usually resolve within 3 days.

Additionally, some species of marine snails in Southeast Asia and the Pacific islands, many species of crabs mostly found on coral reefs of the Indo-Pacific, and improperly prepared sea cucumbers for the East Asian trepang market can be poisonous and cause a variety of sometimes serious syndromes.

**Seeking medical help** : Persons experiencing symptoms such as tingling, numbness, weakness, or respiratory distress should be transported rapidly to a hospital. Persons with diarrhea and vomiting may require fluid replacement.

**Prevention** : Commercially grown and marketed shellfish are usually safe to eat in developed countries. Elsewhere, only consume shellfish in reliable restaurants or when caught in waters known to be free of red tides and away from sewage outlets. Do not eat shellfish sold as bait.

## Tetrodotoxin Poisoning and Fugu

**Risk and symptoms** : Tetrodotoxin is one of the most potent toxins known and is found in a variety of marine and terrestrial animals but most importantly in pufferfish in Indo-Pacific waters. Japan reports the greatest number of cases (about 50 per year), with an average case-fatality rate of 7%. *Takifugu* species, which are used to make the Japanese delicacy *fugu*, is a highly prized dish of raw pufferfish meat, cut into thin slices. The taste is normal, but just the right quantity of *fugu* induces burning, tingling, and numbness of the tongue, mouth, and genitals. Too much *fugu* may prove fatal.

Symptoms develop 10 to 30 minutes after eating pufferfish but may be delayed for hours. Tingling and numbness of the tongue, lips, and face is followed by difficulty swallowing, walking, speaking, and breathing, due to muscle paralysis. Mild cases will

usually resolve after 24 hours, but in severe cases, death can occur with minutes or hours by suffocation due to paralysis of the diaphragm.

**Seeking medical help** : Persons with trouble swallowing, speaking, walking, or breathing should be taken to the hospital immediately. Artificial respiration may be required en route. Treatment is supportive. No antidote exists.

**Prevention** : Avoid eating any kind of pufferfish. Puffer fish can usually be recognized by their globular or elongated globular shape, eyes set high on the head, skin covered in prickles, and teeth fused into a beak. In Japan, travelers who want to try the "thrill" of eating *fugu* should choose a registered restaurant where pufferfish are expertly prepared by a licensed *fugu* chef.

## Bacteria

The class of bacteria that causes cholera is an important cause of bacterial seafood poisoning. Cholera is often acquired from unhygienic food handling in the home and on the street where cholera is prevalent. Other bacteria related to cholera can cause diarrhea or even a fatal infection in those with liver disease or compromised immunity.

## Viruses

Shellfish harvested in waters contaminated with raw or inadequately treated sewage are extremely efficient carriers of seafood pathogens because shellfish are filter feeders that concentrate the organisms. Hepatitis A virus is the most common cause of seafood-associated viral hepatitis and is most often acquired from the consumption of raw or inadequately prepared shellfish. Norovirus, the most common viral cause of gastroenteritis, is not reliably eliminated by cooking shellfish.

## Parasites

Parasite infections from eating inadequately cooked fish are relatively uncommon and preventable. Roundworm infection due to anisakiasis ("the sushi worm") is acquired by eating raw fish, especially cod, herring, mackerel, and salmon; symptoms usually include nausea, vomiting, diarrhea, abdominal pain, and mild fever. Fish tapeworm infection is acquired by eating raw salmon, herring, and gefilte fish; most infected persons are symptom-free, but symptoms may include vomiting, diarrhea, and abdominal discomfort.

## Prevention

In addition to preventive measures mentioned above, do not eat raw or undercooked fish or shellfish (including sushi, sashimi, or ceviche) or any fish considered to be dangerous by the local population. Receive hepatitis A vaccination if at risk of seafood-associated viral hepatitis due to medical conditions, travel habits, or destination.