

## Puffer fish poisoning

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### SUMMARY

Seven Vietnamese boat-people in Tai A Chau Detention Centre in Hong Kong caught, barbecued and ate a puffer fish. After 2 h, two of them developed severe symptoms of numbness and vomiting, while the remaining five subjects developed symptoms about 18 h later. They were all transferred to Queen Elizabeth Hospital. One patient died, and the others made an uneventful recovery.

**Keywords:** poisoning, puffer fish, tetrodotoxin

### CASE REPORTS

#### *Patient no. 1*

A 17-year-old male consumed the major part of the abdomen of the fish and developed numbness of all limbs, vomiting and dyspnoea 2 h later. He was seen in the Detention Camp Clinic and a diagnosis of puffer-fish poisoning was made. During transfer to the hospital by helicopter, he developed cardiopulmonary arrest and resuscitation was initiated. On arrival he was asystolic. Although resuscitated to sinus rhythm, he remained hypotensive despite dopamine infusion, and he died 8 h after admission.

#### *Patient no. 2*

A 15-year-old male consumed the rest of the abdomen of the puffer fish. This patient also developed severe symptoms of limb numbness, vomiting, dyspnoea and later collapse with transient loss of consciousness while being transferred to hospital by helicopter. On admission there was mild muscle weakness and respiratory distress. Gastric lavage was performed. The patient regained full consciousness and muscle power 10 h after admission, and he was discharged after 48 h.

#### *Patient nos 3 to 7*

Five other male patients, aged from 15 to 21 years, developed symptoms of limb numbness, dizziness and abdominal pain about 20 h after consumption of the remains of the puffer fish. One patient developed slight muscle weakness, and one experienced vomiting. All were transferred to the hospital for observation. The mild symptoms subsided and these patients were discharged after 48 h.

### DISCUSSION

Most puffer-fish poisoning is reported in Japan, where Fugue (puffer-fish fillet) is a delicacy. Puffer fish have a worldwide distribution, and sporadic cases of poisoning occur all over the world.

In Japanese restaurants, Fugue are prepared by licensed chefs trained to select the right fish based on the sex of the fish and the season of capture. Such chefs must also know how to prepare the fish, as most of the toxin is concentrated in the viscera, gonads and skin.

Puffer fish contains the poison tetrodotoxin, a potent neurotoxin which is heat-stable and is not destroyed by washing, freezing or cooking. The toxin selectively blocks the sodium channels on the nerve cell membrane, interfering with the rising phase of the action potential.<sup>1</sup>

Patients with puffer-fish poisoning typically develop symptoms within 30 min of ingestion. The duration, rapidity of onset and severity of symptoms generally depend on the quantity of the tetrodotoxin consumed. The clinical features include headache, diaphoresis, body numbness, dysarthria, dysphagia, nausea, vomiting, abdominal pain, generalized malaise, weakness and lack of coordination. In more severe cases, hypotension, cardiac arrhythmias, muscle paralysis and cranial nerve dysfunction may develop. Death

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results from respiratory failure and cardiovascular collapse, and can occur as early as 17 min after ingestion.

The progression of tetrodotoxin poisoning is classified as follows.<sup>2</sup>

Grade 1: paraesthesiae around the mouth, with mild gastrointestinal symptoms.

Grade 2: paraesthesiae spreading to the trunk and extremities, with early motor paralysis and lack of coordination.

Grade 3: widespread paralysis, hypotension and aphasia.

Grade 4: impaired conscious state, respiratory paralysis, severe hypotension and cardiac arrhythmia.

With better recognition of the condition and improved supportive care, the case-fatality rate declined from 80% in the early 20th century to 33% in the period of 1974–79.<sup>3</sup> Patients who survive for more than 24 h are believed to have a good chance of recovery.

There is no specific treatment for tetrodotoxin

poisoning and the management of puffer-fish poisoning is largely supportive. Removal of unabsorbed toxin may be attempted by induced vomiting or gastric lavage; as tetrodotoxin is less stable in an alkaline environment, instillation of 2% sodium bicarbonate has been suggested.<sup>4</sup> Cysteine has also been claimed to be effective in individual cases of puffer-fish poisoning.<sup>4</sup>

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