State of Alaska Epidemiology **Bulletin**

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Paralytic Shellfish Poisoning - Alaska Peninsula, Kodiak

On June 25, 1990, at 9:30 p.m., members of a fishing boat at sea contacted King Cove health authorities to report that one of the three crew members was very ill from paralytic shellfish poisoning (PSP). During dinner that evening the crew member consumed 25-30 steamed butterclams and two teaspoons of butterclam broth at 7:00 p.m.. By 8:00 p.m., he had begun to complain of numbness and tingling around his mouth, face, and fingers. He took a short nap but upon awakening at 8:30 p.m. was unable to hold anything or stand up. By 9:00 p.m., he became short of breath and, at 9:50 p.m., suffered a cardiopulmonary arrest.

For the next two-and-one-half hours while the boat was heading to King Cove, the crew performed cardiopulmonary resuscitation. Emergency medical personnel continued cardiopulmonary resuscitation during the 30 minute helicopter flight from King Cove to Cold Bay. He died at 1:55 a.m. after cardiopulmonary resuscitation was discontinued in Cold Bay. One other crew member developed numbness, tingling of the face and hands, and dizziness at 8:30 p.m.; he recovered uneventfully.

The butterclams were collected in Volcano Bay near King Cove. A sample of butterclam broth from the meal was positive for PSP toxin (over 2,000 µg/100 gm), over 30 times the toxin level allowed for commercial shellfish products.

The crew reported that individuals from another fishing boat collected butterclams from the same area in Volcano Bay one day earlier. Three crew members from this boat became ill within two hours of eating steamed butterclams. They, in turn, had shared the butterclams with friends from a third boat; one crew member on the third boat also became ill. These individuals recovered uneventfully.

Discussions with community health aides, public health nurses, and hospital personnel on the Alaska Peninsula and Kodiak Island elicited information on three additional outbreaks involving seven individuals with illness consistent with paralytic shellfish poisoning.

- One individual became ill after consuming butterclams collected from a King Cove lagoon on June 17.
- One individual reported onset of illness one hour after eating mussels collected from a beach in Kodiak.
- Five people became ill on June 24 after eating mussels collected on a beach in Sand Point.

Because no shellfish from any of these three outbreaks were available for testing, samples of shellfish were collected from areas where the shellfish were originally harvested. Samples from Sand Point and King Cove are currently being tested for PSP toxin. Samples of shellfish from Kodiak were positive for PSP toxin (level over 2,000 µg/100 gm).

This is the first reported death due to PSP in Alaska since prior to 1976. During the 14-year period from 1976 to 1989, 42 outbreaks of PSP involving 105 individuals were documented in Alaska. Of the 42 outbreaks, 23 (55%) involved butterclams. Other shellfish implicated in Alaskan outbreaks included: mussels (9), cockles (6), steamer clams (4), sea snails (4), and razor clams (1). Of the 42 outbreaks, 14 (33%) occurred in May, 10 (24%) in June, and 7 (17%) in July. No outbreaks were documented during the months of September, November, and December.

Paralytic shellfish poisoning is associated with consumption of bivalve shellfish (oysters, mussels, and clams). PSP is caused by neurotoxic substances, known as saxitoxins, found in dinoflagellates.

Bivalve shellfish feed on the dinoflagellates and concentrate the toxins in their flesh. The toxins are moderately heat stable. Cooking will not destroy the toxin. Broth and nectars should not be consumed, because the toxin is soluble in water and becomes concentrated in them. The major shellfish involved in Alaska are mussels, butterclams, little neck clams, and razor clams. Crustaceans such as crab, lobster, and shrimp are not affected.

Although people often believe that a red tide (when temperature, salinity of water, and appropriate nutrients allow an explosive growth of dinoflagellates) is associated with PSP, dangerous levels of neurotoxin can exist in shellfish without the presence of a red tide. Some clams retain the toxins for many years and can accumulate toxin. Other clams, such as razor clams, will lose toxin at variable rates over 4 to 8 weeks. There can be wide differences in toxin levels in clams on the same beach, even in the same species. Toxin levels can be very high; death has occurred after ingestion of a single mussel.

Human illness is usually characterized by onset of symptoms within 10 minutes to several hours after ingestion of shellfish. Common symptoms include nausea, vomiting, and numbness and tingling around the lips and tongue which may progress to involve the hands and feet. Individuals may also experience dry mouth, tightness of the throat, generalized muscle weakness, slurred speech, dysphagia, and lack of muscular coordination. A floating sensation may occur. Coma, total muscular paralysis, and respiratory arrest with death may occur.

The key to preventing death is early diagnosis by a health care professional and vigorous respiratory support. Mouth-to-mouth resuscitation until recovery can be life-saving.

1. All Alaskan beaches are at risk at all times. There are no simple and reliable tests to determine if a particular beach is safe. Individuals should not eat shellfish collected from Alaskan beaches.
2. Shellfish taken from beaches by approved commercial operations are tested frequently--shellfish sold in stores from commercial beaches are safe.
3. Individuals should be aware of the symptoms of PSP and report to a health facility immediately if symptoms consistent with PSP develop. Remaining shellfish should be saved so that they can be tested for toxin.
4. All suspected cases of PSP should be reported immediately to the Section of Epidemiology, (907) 561-4406.

(We wish to thank the public health nurses, community health aides, and police departments of King Cove, Cold Bay, Sand Point, and Kodiak for their efforts in assisting us in our investigation. Reported by Carl Li, MD, Section of Epidemiology.)