

Epidemiology **Bulletin**

REPUBLIC OF CHINA

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Outbreak of Scombroid Fish Poisoning – Kaohsiung City

On July 4, 1986, 41 employees of a Kaohsiung City department store were hospitalized shortly after eating lunch in the employee cafeteria. Onset of illness occurred within a few minutes to a few hours of eating lunch and symptoms consisted of facial flushing, dizziness, headache, palpitations, and perioral numbness. Several hospitalized employees were treated with antihistamines and showed immediate improvement. Duration of illness was short; all recovered within 24 hours. Rectal swabs collected from 22 persons were negative for routine bacterial pathogens.

Questionnaires were administered to all 800 store employees; 500 were returned for a response rate of 63%. Among respondents, 115 were ill for an attack rate of 23%. Symptoms included dizziness (78%), facial flushing (62%), headache (51%), nausea (37%), perioral numbness (35%), palpitations (30%), pruritus (28%), fever (24%), and diarrhea (13%). The median time of onset was 40 minutes after eating lunch (minimum=10 minutes, maximum=4 hours). Lunch consisted of 4 food items: fried fish (white-tipped mackerel), fried pork with vegetables, boiled bean curd, and vegetable soup. Only fish was significantly associated with illness: 115 (56%) of 204 persons who ate fish compared to none of 136 who did not eat fish were ill (chi square=112.3; $p < 10^{-6}$).

On July 3, 200 kg of mackerel was purchased by a department store cook from a fishing vessel in Kaohsiung Harbor. The fish was caught the previous day and stored on ice. Fish was distributed to kitchens of two stores owned by the same company. In both stores, fish was placed in large walk-in refrigerators and left overnight at 4°C. In store A (the store in which the outbreak occurred), fish was removed from the refrigerator at 7 am on July 4, eviscerated, and soaked in salt water for 20 minutes. After standing at room temperature for approximately 3 hours, fish was fried and served to employees from 10:30

am to 1:30 pm. Because the incubation time was short, employees became aware of the outbreak around noon and fish was discontinued from the menu. In store B, fish was removed from the refrigerator at 9 am, eviscerated, and boiled within 1 hour. None of the employees in store B became ill. Uncooked leftover fish from store A was found to contain histamine in a concentration of 10 mg per 100 g of fish.

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Editorial Note: Scombroid poisoning results from ingestion of spoiled fish of the scombroid family (mackerel, bonito, tuna, and related species), however, non-scombroid species (e.g., Mahimahi) have also been implicated in outbreaks¹. As spoilage occurs in scombroid fish, histamine concentration increases. Histamine is produced by the action of bacterial decarboxylation enzymes on the amino acid histidine which is found in abundant quantities in scombroid fish, but not in other species. It is unclear whether histamine itself or some other histamine-like toxin is responsible for the symptoms. Antihistaminic drugs relieve symptoms while amine oxidase inhibitors (e.g., isoniazid) cause exacerbation. Diagnosis is based on clinical symptoms and demonstration of high levels of histamine in implicated fish. Fresh fish usually contains less than 1 mg of histamine per 100 g, and 20 mg or more is likely to be associated with toxicity². Outbreaks have been reported, however, in which the concentration of histamine was less than 20 mg². Duration of illness is short, and symptoms are self-limited. Antihistamines provide symptomatic relief, and gastric lavage should be considered in patients with severe symptoms if vomiting or diarrhea have not occurred. This illness is the only form of fish poisoning caused by bacterial spoilage and should therefore be completely preventable. The "toxin" is heat-stable, and once formed, is not destroyed by cooking.

This outbreak probably resulted from improper refrigeration of fish by store A foodhandlers; fish from an identical catch cooked within one hour of cleaning did not result in illness in store B. Food sanitation personnel should be aware of the problem of scombroid fish poisoning and continue efforts to educate foodhandlers about the importance of proper food hygiene.

References

1. Kim R. Flushing syndrome due to Mahimahi (scombroid fish) poisoning. *Arch Dermatol* 1979;115:963-5.
2. Gilbert RJ, Hobbs G, Murray CK, Cruickshank JG, Young SEJ. Scombrototoxic fish poisoning: features of the first 50 incidents to be reported in Britain (1976-9). *Br Med J* 1980;2:70-2.