

# Was it something she ate? Case report and discussion of scombroid poisoning

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## Abstract

WE REPORT THE CASE OF A 51-YEAR OLD WOMAN who developed headache, nausea, palpitations, tachycardia and hypertension 30 minutes after eating a tuna fish salad. Elevated histamine levels in the salad helped to confirm a suspected diagnosis of scombroid poisoning. The signs, symptoms, pathophysiology and management of poisoning from spoiled scombroid fish are discussed.

A 51-year-old female physician with a history of migraine headaches but no known food allergies ate a tuna salad and drank bottled orange juice, both purchased at a coffee shop, after an exercise session. Within 30 minutes a “throbbing” headache, more severe than her usual migraines, developed along with nausea, palpitations and a feeling of impending doom. No vomiting, diarrhea or abdominal pain occurred. She had been taking acetaminophen (Tylenol) for migraines but no medication for hypertension.

Over the next 30 minutes her symptoms intensified and her face became flushed: both cheeks, as well as her forehead, chin and neck were erythematous. Her pulse rate was 90 (usually 50) beats/min and her blood pressure 190/105 (usually 125/85) mm Hg, as measured by a physician coworker. She was transferred to a local emergency department, where her pulse rate was 100 beats/min and her blood pressure 200/120 mm Hg. The patient advised the emergency physician that scombroid poisoning was a consideration. This possibility was discounted because the patient was hypertensive and the facial flushing had subsided. The emergency physician initially looked to rule out neurologic problems and intracranial bleeding: the results of neurologic examination and computed tomography (CT) of the head were normal. A CT scan of the abdomen, ordered to rule out an adrenal mass, was also normal. A complete blood count and serum electrolyte levels were within normal limits, as were serum creatinine and calcium levels. The serum creatine kinase level was minimally elevated. The plasma histamine level was not measured for evidence of scombroid poisoning,<sup>1</sup> because the regional laboratory was not equipped for this analysis.

When the patient was discharged, without a definitive diagnosis or specific treatment, her headache had lessened, as had her anxious feeling. She was referred to her family physician for follow-up. Within 8 to 10 hours after their onset, the headache and most other symptoms had resolved. However, fatigue and intermittent palpitations persisted for 5 days.

The patient’s physician coworker had reported the incident to the local public health department on the day the

patient was transferred to the emergency department as suspected scombroid poisoning. Environmental health officers sent the remaining tuna salad from the coffee shop and leftover canned tuna from the lot used by the caterer to prepare the salads to the Canadian Food Inspection Agency laboratory in Burnaby, BC, for histamine analysis. The salad contained 35 mg of histamine per 100 g; the leftover canned tuna contained less than 1 mg/100 g, the concentration typical of canned tuna. No pathogens were isolated from the food samples. No other cases associated with this product were identified.

The tuna can used for the implicated salad had likely been opened several days, and possibly more than a week, before preparation of the patient’s salad. Typically the caterer used only a small portion of a 1.88-kg can daily, refrigerating the unused portion after preparing each day’s order (6 to 12 salads). Tuna from freshly opened cans was observed being added to older, unused portions.

## Comments

Although concerns have recently been raised about the contamination of predatory fish by toxins including mercury<sup>2</sup> and organic pollutants,<sup>3</sup> scombroid poisoning is actually a more common cause of human morbidity.<sup>4</sup> Scombroid poisoning usually results from consumption of fish containing high levels of histamine, which accumulates when bacteria metabolize the amino acid histidine in the fish muscle.<sup>5</sup> The illness is considered an atypical foodborne illness because the predominant symptoms do not involve the gastrointestinal tract,<sup>4</sup> and the incubation period is relatively short (a few minutes to a few hours).<sup>6</sup> The families of fish most often implicated are *Scombroidea* and *Scomberesocidae*, which include dark-fleshed fish such as mackerel and tuna.<sup>7</sup> Dark-fleshed nonscombroid fish such as amberjack and mahimahi have also been implicated; thus, the condition is also termed simply histamine poisoning.<sup>8</sup>

Histamine concentrations in the associated food are usually at least 20 mg/100 g;<sup>9</sup> however, the levels in spoiled fish vary, and so does the toxic threshold. Urocanic acid, another byproduct of bacterial histidine metabolism, is likely also involved in producing illness, as it is a mast-cell degranulator.<sup>10,11</sup>

We report this case for three reasons. First, it was associated with canned tuna. Many recent reports have been related to consumption of fresh, not canned, fish.<sup>12,13</sup> Physicians may not consider canned tuna to be a high-risk food.

Second, this incident may have been the result of improper handling of canned tuna, rather than improper han-

dling of the fish prior to canning. Spoilage bacteria can produce substantial amounts of histamine in fish kept at temperatures above 4°C for even 3 to 5 hours.<sup>14</sup> Improper handling of canned tuna is rarely reported as a suspected cause of scombroid poisoning.<sup>15</sup> It remains possible in our case that the tuna was contaminated before canning; however, no other cases of scombroid poisoning related to the same lot of tuna were reported to the local public health agency.

Third, scombroid poisoning can mimic other conditions. In one outbreak all 3 people who sought medical care were considered to have a food allergy.<sup>12</sup> In our case, severe migraine, intracranial bleeding and pheochromocytoma were also considered. A correct diagnosis is important from a public health perspective, since prompt identification and reporting will assist officials in preventing others from becoming ill. Therefore, people presenting to an emergency department with acute symptoms suggestive of allergy should be questioned about consumption of dark-fleshed fish in the hours before onset of symptoms. The diagnosis is based on taking a good food history and ruling out other causes of the usually dramatic symptoms. Measurement of the plasma histamine con-

### Symptoms of scombroid poisoning<sup>3</sup>

- Flushing
- Rash
- Swelling of face or tongue
- Sweating
- Palpitations
- Nausea
- Vomiting
- Headache
- Dizziness
- Respiratory distress
- Diarrhea
- Vasodilatory shock

centration is not widely available in clinical laboratories. Treatment is supportive; antihistamines and sometime corticosteroids may relieve the symptoms. Symptoms usually resolve within a few hours, even without specific treatment. In severe cases urticaria and bronchospasm may occur, but mortality would be unusual.<sup>16</sup>

Scombroid poisoning can be prevented by keeping dark-fleshed fish (fresh or in opened cans) refrigerated and by ensuring that fish that has been kept in opened cans for several days is not consumed. The toxins that cause scombroid poisoning are heat stable;<sup>17</sup> thus, cooking of contaminated fish will not reduce the risk of illness.

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Although fresh tuna fish is most commonly associated with scombroid poisoning, canned tuna may also be a cause of the disease.

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