

Sushi, nemotodes and allergies

Background and epidemiology:

New food safety regulations for commercial establishments in Ontario require fish that is intended to be consumed raw to be frozen before preparation and serving to a temperature of -20°C or below for 7 days or to a temperature of -35°C for 15 hours. Deep freezing kills the larvae of the nematode (roundworm) *Anisakis simplex* that may be embedded in the fish and prevents cases of anisakiasis (www.dpd.cdc.gov/dpdx/HTML/Anisakiasis.htm). Commonly infected fish include mackerel, rockfish, salmon, squid and true herring. Anisakiasis is most prevalent in cultures and regions in which consuming raw fish is popular (e.g., Japan, the Pacific coast of South America, the Netherlands). Known cases in Canada are exceedingly rare.

The adult nematodes normally reside in the mucosa of marine mammals such as dolphins and sea lions. The mammals excrete the eggs, which turn into larvae and are ingested by crustaceans. Fish ingest the crustaceans and become intermediate hosts with the larvae embedded in their flesh. Upon human ingestion of infected fish, the larvae can attach themselves to the gastric mucosa or penetrate the stomach or intestinal wall, leading to abscess formation or eosinophilic granulomatosis.

There is growing recognition that *A. simplex* ingestion can trigger severe allergic reactions. After witnessing a few sporadic cases of gastroallergic anisakiasis in Spain, where anisakiasis was thought to be very rare, a group of allergists and gastroenterologists undertook a prospective study that involved performing skin testing and gastroscopies on all patients who presented to the emergency department with allergic symptoms (urticaria, broncho-

spasm, angioedema or anaphylaxis) and a history of ingesting raw or undercooked fish within 24 hours of symptom onset. Over the course of the year the group diagnosed 22 cases of acute gastroallergic anisakiasis, with evidence in each case of a positive skin prick test and, upon fibre optic gastroscopy, a worm. The implicated foods included raw anchovies (16 cases), raw sardines and undercooked hake. The latency of allergic reactions ranged from 15 minutes to 26 hours after ingestion, with a mean of 5 hours after ingestion. In all cases the gastric symptoms were relatively mild (e.g., mild epigastric pain, fullness, diarrhea) and less of a concern than the allergic reaction.

More worms were reported in that 12-month study than had been reported in all of Western Europe over the previous several years, which caused the authors to conclude that acute gastroallergic anisakiasis is usually misdiagnosed and the burden of anisakiasis underrecognized and underreported.¹

Clinical management: Acute anisakiasis typically presents with abdominal pain, nausea and vomiting within hours of ingestion. Vomiting may quickly dislodge the larvae from the gastric mucosa. Occasionally the larvae are coughed up. If the larvae pass into the bowel a severe eosinophilic granulomatous response may also occur 1–2 weeks after infection, causing symptoms mimicking Crohn's disease. Gastroallergic anisakiasis seems to present with delayed, predominantly allergic symptoms usually several hours after ingestion.

Diagnosis can be made by fibre optic gastroscopic examination, during which the 2-cm larvae are visualized and removed, or by histopathologic examina-



tion of tissue removed at biopsy during surgery. The treatment of choice is surgical or endoscopic removal.

Prevention: More information on the descriptive epidemiology of anisakiasis and gastroallergic anisakiasis using sensitive case definitions is needed given the growing popularity of raw fish consumption and the proliferation of sushi bars. Freezing at -4°F (-20°C) for at least 5 days will kill anisakid larvae, as will blast-freezing to -31°F (-35°C) for 15 hours. Most fish consumed in North America has been frozen at these temperatures. Cooking thawed or fresh fish will kill the larvae. Most sushi chefs are trained to detect infected fish. It would be prudent to avoid home-prepared fresh raw fish dishes.²

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References

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