

Travel warning: eosinophilic meningitis caused by rat lungworm

Background and epidemiology: Cases of eosinophilic meningitis caused by the larvae of the rat lungworm *Angiostrongylus cantonensis* are rare in North America. A recent report describes an outbreak involving 12 people who had returned to the United States after travelling to the Caribbean.¹ The outbreak is a reminder that travellers heading to endemic areas, such as the Caribbean and Pacific Islands, should be warned to avoid eating unwashed produce and undercooked mollusks. It should also remind physicians to suspect eosinophilic meningitis when a recent traveller presents with headache, elevated intracranial pressure, a non-neutrophilic pleocytosis and paresthesia or hyperaesthesia.

The larvae of *A. cantonensis* are excreted in the feces of rats and picked up by intermediate or transport hosts such as snails, slugs and small mollusks. Humans become infected after eating these hosts or fresh produce contaminated by them. Upon ingestion the larvae penetrate the vasculature of the gastrointestinal tract and eventually reach the meninges, where they usually die. An eosinophilic reaction ensues, manifesting as aseptic meningitis. The incubation period is usually 1–3 weeks. Illness, in particular protracted headaches, may last from a few days to several months; death rarely occurs.²



AP Photo/Robert Meica

Rats spread lungworm larvae along the food chain.

The disease is endemic in the Pacific Islands, Vietnam, Thailand, Malaysia, China, Indonesia, Taiwan, the Philippines and the Caribbean Islands. Cases have also been reported in Japan, Australia and Africa,³ and occasionally outbreaks are observed in travellers returning to North America.

Clinical management: Patients may present with headache, visual disturbances, photophobia, nuchal rigidity, hyperaesthesia or paresthesia. Low-grade fever and an elevated cerebrospinal fluid (CSF) opening pressure are additional signs. Eosinophilia (at least 10% eosinophils in the total white cell count in CSF or an eosinophil count of at least $0.6 \times 10^9/L$ in peripheral blood) may also be observed, although not necessarily on initial laboratory testing. In the recently reported outbreak¹ the peripheral blood count peaked mid-course, 5 weeks after the presumed exposure. By then, most of the patients were improving.

The differential diagnosis for aseptic meningitis in the presence of eosinophilia includes infection with *Strongyloides stercoralis*, any member of the genus *Toxocara* and *Trichinella spiralis*.¹ A diagnosis can be made through serological analysis using the Western blot technique to identify the presence of antibodies against *A. cantonensis* in either the acute or convalescent phase of the illness. In the outbreak only 1 of the 12 serum samples collected from the travellers during the acute phase was positive for antibodies, compared with 10 samples collected during the convalescent phase.¹ Demonstration of the worms in CSF or at autopsy is confirmatory.²

Treatment is largely supportive and includes use of NSAIDs and opioid analgesics to treat headaches. Most patients recover. Those with severe headaches that do not respond to analgesics may be candidates for repeated lumbar punctures and corticosteroid treatment.¹

Additional tests, such as CT and MRI scanning, may also be indicated.

Anthelmintic agents (mebendazole and albendazole) have been found to be effective in children.^{2,3} However, because they carry the theoretical risk of exacerbating neurologic symptoms as a result of the death of larvae in the central nervous system, they were not used following the recent outbreak.¹

Prevention: Investigations into the recent outbreak revealed that all 12 people had eaten Caesar salad at a particular restaurant the night before their return home; this was the only item associated with a significant risk of illness.¹ The exact vehicle of transmission remains unclear, although the lettuce was the most likely source of contamination.

There is no vaccine to prevent this infection. The usual advice concerning protection against diarrheal disease should also protect travellers against *A. cantonensis*.⁴ In particular, travellers are advised to avoid eating fresh produce, such as lettuce, that may have been contaminated by snails or slugs. Thorough cleaning does not always eliminate the larvae. Undercooked or raw mollusks should also be avoided. Prawns, fish and crabs should be boiled for 3–5 minutes or frozen at -15°C for 24 hours to kill the larvae.²

Erica Weir
CMAJ

References

1. Slom TJ, Cortese MM, Gerber SI, Jones RC, Holtz TH, Lopez AS, et al. An outbreak of eosinophilic meningitis caused by *Angiostrongylus cantonensis* in travelers returning from the Caribbean. *N Engl J Med* 2002;346:668–75.
2. Chin J, editor. *Control of communicable diseases manual: a report of the American Public Health Association*. 17th ed. Washington: American Public Health Association; 2000.
3. Hwang KP, Chen ER. Clinical studies on *Angiostrongylus cantonensis* among children in Taiwan. *Southeast Asian J Trop Med Public Health* 1991;22(Suppl):194–9.
4. *Diarrhea associated with travel to the tropics*. Ottawa: Travel Medicine Program, Health Canada; 2001. Available: www.hc-sc.gc.ca/pphb-dgspss/tmp-pmv/travel/diarre_e.html (updated 2001 Jan 11; accessed 2002 Mar 29).