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Trichinosis - A New Twist on an Old Problem

After a 2 week history of gastroenteritis followed by myalgia and fever, a 21-year-old resident of Homer was admitted to South Peninsula Hospital with the diagnosis of trichinosis. On admission, the patient was febrile and diaphoretic, had pulmonary rales, and a white blood cell differential with 48% eosinophils. The admitting physician was aware that another Homer physician was treating a 23-year-old man for trichinosis who was a friend and co-worker of the 21-year old.

Methods: Starting from a list of 12 other persons who had eaten black bear meat with the 2 index cases, an epidemiologic investigation was initiated to determine the source and extent of the outbreak. A case of trichinosis was defined as a person with a positive serologic test for trichinosis who had signs (including eosinophilia) or symptoms compatible with the diagnosis.

Results: The diagnosis of trichinosis was confirmed for the 2 index cases, as well as 2 of the other 12 persons (Table 1). All four cases were treated with mebendazole; one person was hospitalized, and none developed serious complications such as pneumonitis, myocarditis, or encephalitis.

Two black bears were sources of meat which had been consumed during the month before the outbreak: Bear #1, a road kill, was made into hamburgers and served at a barbecue. Overall, 3 of 10 persons who ate meat from this bear, and 1 of 4 persons who did not, were cases (relative risk = 1.1; $p = 1.0$). A sample of meat from the bear was negative for *Trichinella* larvae.

Bear #2 was taken by subject #2; he subsequently used some of the meat to prepare jerky using a household dehydrator purchased by mail from a shopping channel on cable television. Four of 10 persons who ate jerky, and none of 4 who did not, were cases (relative risk = undefined; $p = 0.25$). All three persons who said the jerky they ate was either "raw" or "possibly uncooked" were cases, while only one of seven persons who ate jerky not described as raw or undercooked were cases (relative risk = 7.0; $p = 0.03$). Two samples of meat from this bear were positive for *Trichinella* larvae (284 and 286 larvae/gm).

Comments: Trichinosis is caused by consumption of meat containing viable *T. spiralis* cysts. Once ingested, the cysts develop into adult worms in the epithelium of the small intestine. Gravid females produce larvae which penetrate the gut wall, then disseminate via the bloodstream and become encysted in skeletal muscle. Patients with trichinosis usually develop gastrointestinal symptoms including diarrhea, abdominal pain, nausea, or vomiting about 1 week after consumption of tainted meat. After several more days, as the larvae disseminate, fever, prostration, myalgia, rash, and periorbital edema may occur. The severity of illness is directly proportional to the dose and can vary from inapparent infection to fulminating, fatal illness.

During the 21 years from 1974 to 1994, 203 cases of trichinosis have been reported in Alaska. Multi-case outbreaks accounted for 89% of the cases (181/203) and 51% of the outbreaks (23/45) during this time period. Of 34 outbreaks with complete documentation, 20 (59%) were caused by bear meat, 13 (38%) by walrus meat, and 1 (3%) by walrus or seal.

Trichinosis probably is frequently unrecognized. This may be particularly true in Alaska where bear or walrus meat is consumed by many individuals. Health-care providers should consider trichinosis in any patient with constitutional symptoms following a gastrointestinal illness if there is a history of recent bear or walrus consumption. Bear or walrus meat can be considered safe only if it has been cooked to a completely gray color. **The *T. spiralis* strain which infects bear and walrus in Alaska is cold-resistant; freezing (which effectively destroys *T. spiralis* in pork) does not render arctic meat safe for consumption.**

Most trichinosis cases occur as part of multiperson outbreaks. Single, unrelated cases are the exception. Investigations usually identify additional ill persons and locate contaminated meat which might have been consumed later, resulting in more illness. Because a single case of trichinosis implies that other people may be ill or at risk, trichinosis should be promptly reported when suspected to the Section of Epidemiology.

(Reported by Paul Eneboe, MD, William Bell, MD, and Paul Raymond, MD. The epidemiologic investigation was completed with significant assistance from Donna Fenske, PHN, Section of Nursing. Contributed by Michael Beller, MD, MPH, Section of Epidemiology.)

| No. Symptoms | Eosinophil count ¹ | <i>Trichinella</i> ELISA ² | | Bentonite flocculation ³ | |
|---|-------------------------------|---------------------------------------|---------------------------|-------------------------------------|---------------------------|
| | | acute ⁴ | convalescent ⁴ | acute ⁴ | convalescent ⁴ |
| 1. diarrhea, abdominal pain, fever myalgia | 48% | 0.204 | 0.870 | <1:5 | 1:5 |
| 2. diarrhea, abdominal pain, fever, myalgia, periorbital edema | 17% | 0.400 | -- | <1:5 | -- |
| 3. abdominal cramps, fever & chills, myalgia, periorbital edema, rash | 1% | 0.373 | 3.003 | ≥1:10 | ≥1:10 |
| 4. diarrhea, abdominal cramps, myalgia | 3% | 0.461 | 2.520 | >1:5 | ≥1:10 |

Notes:

- Eosinophil counts were performed on the same day as the acute blood draw.
- An ELISA result <0.4 is negative. A result from 0.4 to 1.0 may be due to a false positive, early infection, or residual antibody from previous infection. A result >1.0 is diagnostic of infection acquired within the previous year.
- A bentonite flocculation titer of ≥ 1:5 is positive.
- Acute specimens were obtained during November 1-4, 1994; convalescent specimens 5-13 weeks later.