

Bulletin No. 18  
November 2, 2000

## Five Cases of Trichinosis - Why Bear Meat Must Be Thoroughly Cooked

**Introduction**

Trichinosis is caused by any species of *Trichinella* parasite. In arctic bear and walrus meat, the most common species is *T. nativa*. Nationally, only four cases of trichinosis were reported during the first 8 months of 2000 (1); the five cases reported here more than double that figure.

**Outbreak A**

On August 3, a 34-year-old Anchorage resident ate fried ground black bear meat that had been given to him by a co-worker. Less than a week later, he began to experience constitutional symptoms (Table 1). The bear, killed in Prince William Sound in June, had been processed at an Anchorage meat market. Approximately 35 additional persons ate meat from this bear at separate meals - none reported any illness. *Trichinella* larval cysts (599 / gram ground meat) were detected by the Department of Environmental Conservation (DEC) Laboratory. Accounting for fat added in processing, muscle from the bear would have contained about 750 larval cysts per gram.

**Outbreak B**

Four Wisconsin hunters traveled to a camp near Bethel, Alaska to hunt caribou. On August 13, they fried and ate meat from a black bear they killed that day. Two to 4 weeks later, all four began to experience constitutional symptoms (Table 1). *Trichinella* larval cysts (24 / gram muscle) were detected in bear meat by the DEC Laboratory.

**Pathogenesis**

Trichinosis infection has three phases - gastrointestinal, muscular, and convalescent. Once viable *Trichinella* cysts are ingested, they develop into adult worms in the epithelium of the small intestine within 5 days. Over the next 6 weeks, gravid females each produce 500-1500 larvae that travel through the peripheral circulation and encyst in striated muscle.

Within a week of consuming infected meat, patients can develop gastrointestinal symptoms including diarrhea, abdominal pain, nausea, or vomiting. Then, as the larvae disseminate, they may experience fever, myalgia, rash, and periorbital edema. Encysted larvae remain viable for years; calcification can occur in 6-24 months and may be detected on radiographs. Illness severity is directly proportional to dose and can vary from inapparent infection to fulminating, fatal illness.

**Diagnosis**

Trichinosis should be suspected in any patient with compatible symptoms and eosinophilia. An enzyme-linked immunosorbent assay (ELISA) for serum *Trichinella* IgG antibody is more sensitive than bentonite flocculation, especially in detecting early or mild infection. *Trichinella* larval cysts detected in muscle biopsies (preferably from gastrocnemius or deltoid muscles) are diagnostic, although negative biopsies do not rule out disease.

**Treatment**

Mebendazole (Vermox®) and albendazole (Zentel®) have demonstrated anthelmintic efficacy for gastrointestinal and muscular stages of *Trichinella* infection (2, 3). Corticosteroids are recommended for cases with central nervous system or myocardial involvement. While corticosteroids will reduce inflammation, their use delays intestinal clearance of adult worms. Rarely, persons who recently ingested contaminated meat have been treated presumptively with mebendazole (2).

**Discussion**

Two of the four hunters in Outbreak B had detectable *Trichinella* antibody. However, because larval cysts were detected in meat and all four hunters had compatible symptoms, all were considered to have trichinosis.

In both outbreaks, bear meat must not have been fully cooked. In Outbreak B, the hunters felt that strong winds prevented their camp stove from reaching a high temperature. In Outbreak A, the patient felt that rapid frying had not thoroughly cooked the meat.

Serologic surveys of Alaska bears have demonstrated *Trichinella* antibody levels ranging from 0 to 90% (4, 5). It is prudent to assume that all bears in Alaska are infected.

**Recommendations**

1. Healthcare providers should consider trichinosis in any patient with constitutional symptoms following gastrointestinal illness (often mild enough to be overlooked) and a history of recent bear or walrus consumption.
2. ***T. nativa* in Alaska bear and walrus meat is cold-resistant. Unlike pork, freezing arctic meat will NOT kill larval cysts. Bear or walrus meat is safe once the entire piece is completely cooked to a gray color. USDA recommends attaining an internal temperature of at least 160° F. Microwaving may not render meat safe as cooking may be uneven.**
3. Most trichinosis cases are part of multiperson outbreaks. Single unrelated cases are unusual as case investigations often identify additional patients and locate contaminated meat. As such, suspected cases of trichinosis should be reported promptly to Epidemiology.

**References**

1. CDC. Table I. Summary of provisional cases of selected notifiable diseases, United States, cumulative, week ending August 26, 2000 (34<sup>th</sup> Week). MMWR, 2000;49(34):783.
2. Chin J, ed. Control of Communicable Diseases Manual, 17<sup>th</sup> edition. 2000.
3. Watt G, Saisorn S, Jongsakul K, Sakolvaree Y, Chaicumpa W. Blinded, placebo-controlled trial of antiparasitic drugs for trichinosis. *J Inf Dis.* 2000; 182:371-74.
4. Zarnke RL, Gamble R, Heckeret RA, Ver Hoef J. Serologic survey for *Trichinella* spp. in grizzly bears from Alaska. J

5. Chomel BB, Kasten RW, Chappuis G, Soulier M, Kikuchi Y. Serological survey of selected canine viral pathogens and zoonoses in grizzly bears (*Ursus arctos horribilis*) and black bears (*Ursus americanus*) from Alaska. Rev Sci Tech. 1998;17(3):756-66.

Table 1. Characteristics of five persons with trichinosis, September 2000.

Outbreak	Symptoms	Onset Date	ELISA (date blood drawn)	% Eosinophils* (date blood drawn)	Treatment
A	Nausea, diarrhea, fever, myalgia, periorbital edema, urticaria, fatigue	8/9	+ (9/20)	21% (9/13)	albendazole
B	Nausea, myalgia, retrobulbar headache, fatigue	8/25	- (9/19, 9/22)	5% (8/28)	albendazole
B	Fever, intense myalgia, chills, fatigue	9/2	+ (9/20)	43% (9/3)	mebendazole prednisone
B	Mild fever, myalgia, lethargy	9/9	- (9/20)	not done	mebendazole prednisone
B	Diarrhea, fever, myalgia, periorbital edema, fatigue	9/11	+ (9/18)	31% (9/18)	mebendazole prednisone

\* normal range 0-3%, but varies depending on laboratory.

(Reported by Peter Wagner, MD, Saleh Obaid, MD, and Leslie Spitz, MD in WI; and Paul Steer, MD, Debbie Hurlburt, RNC, BSN and Dick Barrett in AK. Contributed by Louisa Castrodale, DVM, MPH, Section of Epidemiology.)