

TRICHINELLOSIS ACQUIRED IN NUNAVUT, CANADA IN SEPTEMBER 2009: MEAT FROM GRIZZLY BEAR SUSPECTED

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Five cases of trichinellosis with onset of symptoms in September 2009, were reported in France, and were probably linked to the consumption of meat from a grizzly bear in Cambridge Bay in Nunavut, Canada. Travellers should be aware of the risks of eating raw or rare meat products in arctic regions, particularly game meat such as bear or walrus meat.

Case detection and description

On 5 October 2009, the French National Reference Centre (NRC) for *Trichinella* was informed about a possible case of trichinellosis in an individual returning from Nunavut, Canada. This very asthenic patient had high eosinophil counts and elevated plasma levels for muscle enzymes. Specific antibodies were detected by ELISA and Western-blot (Diasorin & LDBio, France). The patient belonged to a group of five marine navigators who had travelled from the Aleutian Islands to Greenland and crossed the North-West Passage in northern Canada. The NRC started an investigation and identified four more cases among these travellers. Case 2 presented primary symptoms of shivers and fever without diarrhoea on 7 September. At the time she had been diagnosed with influenza but symptomatic treatment did not improve her condition. As high fever (40.4° C), intense muscular and joint pain, extreme asthenia and bilateral inferior limbs oedema persisted, the patient was hospitalised on 22 September. She also had elevated levels of eosinophils and muscle enzymes and was serologically positive on 30 September for trichinellosis (ELISA and Western-blot). The third and fourth crew members also had asthenia, high levels of eosinophils and muscle enzymes; one had a lasting diarrhoeal disease at the end of August; these two cases were tested positive by ELISA and Western-blot by the NRC and Biomnis lab in late October. The fifth traveller, living in Brussels, was also investigated and found to have been initially diagnosed with influenza but subsequently revised as trichinellosis (particularly when the link was made with the other cases) with manifestations of fever, myalgia, increased eosinophils and muscular enzymes levels and positive serology. Serological assays were not performed on one of the two patients with mild symptoms. No cardiac or neurological complications were observed. Only case 2 was hospitalised, discharge occurring 11 days later. All patients were treated with albendazole (7.5 mg/kg twice a day for 10 days) and corticosteroids were used in the first case and in the hospitalised patient (case 2).

Outbreak investigation

During the travel expedition many stopovers were made in Inuit's villages, and, on these occasions, the crew consumed meat of various wild animals: caribou, walrus, seal, polar bear and grizzly bear. Considering the occurrence, onset and duration of signs and symptoms, the source of infection were probably grizzly (*Ursus arctos*) steaks which were consumed in the Cambridge Bay area (Iqaluktuuttiaq), Victoria Island, Nunavut, Canada between the 19 and 22 August 2009. Information obtained from residents of Cambridge Bay indicated the grizzly bear was shot at Elu Inlet Lodge, at the beginning of August, transported fresh to Cambridge Bay where it was frozen for about a week. A leg was thawed, cut into pieces and given to the travellers. The pieces were frozen again for two days. After departure, the meat was stored for two additional days in the boat. All five members of the crew consumed this meat, barbecued or pan-fried, on several occurrences after the 19 August. All the remaining meat from the bear was consumed locally in Cambridge Bay, but well cooked and no suspected cases were reported. The Centre for Food-borne & Animal Parasitology, Canadian Food Inspection Agency, in Saskatoon, Canada was contacted on 6 October 2009 and informed of the outbreak. In the course of the investigations, it was established that, for some time, the boat of the five travellers sailed together with another one with four persons on board and members of both crews ate at the same places. The second boat was on the way for Halifax, Canada in mid-October when the crew was contacted by email and alerted of the possibility of trichinellosis infection and of specific preventive and treatment measures that might be necessary. According to their blog, one of the crew members had been affected by a persistent flu during the same period as the travellers on the first boat. But no additional information could be obtained from this second crew.

Discussion

This report illustrates well the fact that trichinellosis can be misdiagnosed for influenza, which is particularly important in the context of the pandemic H1N1 influenza outbreak when health professionals and the general public are more inclined to suspect influenza. Misdiagnosis of trichinellosis for influenza is not unusual because the initial clinical symptoms of these diseases occurring at the acute stage of infection are not pathognomonic. In another occurrence, Laurichesse *et al.* [1] emphasized that "general

practitioners could have misdiagnosed cases of trichinellosis because they did not routinely order serological tests". The presence of specific clinical and biological signs (facial oedema, elevated levels of eosinophils and muscle enzymes, and specific antibodies) can readily confirm the diagnosis of trichinellosis.

Trichinellosis is a widespread helminthic zoonosis endemic in northern Canada where the incidence rate among the indigenous population was estimated at 11 cases per 100,000 [2], which is 200 times the national Canadian rate [3]. Walrus (*Odobenus rosmarus*) meat is the most frequent source of trichinellosis infection in humans; polar bear (*Ursus maritimus*) seems to be less important. *Trichinella nativa* and the genotype T6 are widespread in northern Canada [4,5]. The precise genotype responsible for this small outbreak could not be determined, as the infected meat was not conserved and no muscular biopsies were performed. In an extensive survey recently performed on wildlife across northern Canada, Gajadhar and Forbes found that 29.4 % of grizzly bears examined harboured *Trichinella* larvae [5]. The prevalence was 65.9% among polar bears, 40.6% in walrus and 7.3 % in black bears (*Ursus americanus*). There are no other recent survey reports for *Trichinella* in wild fauna in Nunavut, except for a survey of wolverines (*Gulo gulo*) which found 87.8 % of these animals positive [6]. Outbreaks of trichinellosis among Inuit population have been described earlier in Nunavut on Baffin Island [7] and Repulse Bay [8]. They occurred in the local residents after consumption of walrus meat. Apparently, Inuit populations consume bear meat thoroughly cooked whereas walrus meat is eaten frozen, fermented or air-dried [9]. An earlier study has shown that traditional northern foods used by Inuit can harbour infective *Trichinella* larvae [10]. Other outbreaks, linked mainly to walrus meat consumption have been described in neighbouring Nunavik (from Inukjuak on south Hudson Bay and as far north as Salluit) leading to the development and implementation of a prevention program for trichinellosis in Inuit communities [8,9]. We also described, in 2005, an outbreak of trichinellosis among French hunters and their families in France after consumption of black-bear meat obtained from northern Quebec [11,12]. Apparently, French tourists, especially hunters, are particularly fond of bear meat. Including the present report, a total of 25 cases linked to bear meat consumption have been reported to the NRC since 1995 [12]. The present outbreak appears to be associated with the most northern geographic area described to date in Canada with grizzly bear meat as source. As shown in this report, the arctic species of *Trichinella* (*T. nativa* and T6) are resistant to freezing and are killed by sufficient cooking at 67°C. Travel in endemic regions is a classical driver for acquiring trichinellosis, and travellers should be aware of the risks of eating raw or rare meat products, particularly game meat such as bear or walrus meat [13].

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