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ORIGINAL ARTICLES

Outbreak report

HUMAN TRICHINELLOSIS DUE TO *TRICHINELLA BRITOVI* IN SOUTHERN FRANCE AFTER CONSUMPTION OF FROZEN WILD BOAR MEAT

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Six patients were infected with *Trichinella britovi* in southern France following consumption of frozen wild boar meat, which had been frozen at -35°C for 7 days. Microscopic examination of a sample of frozen wild boar muscle revealed the presence of rare encapsulated *Trichinella* larvae, identified as *T. britovi*.

People eating wild boar must follow individual prophylactic rules such as efficient cooking of meat (at least 65°C at the core for 1 minute) as recommended by the International Commission on Trichinellosis, or freezing exceeding four weeks at -20°C.

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Key words: freezing, *Trichinella britovi*, trichinellosis, wild boar

Introduction

Trichinellosis is a zoonotic disease caused by a nematode of the genus *Trichinella*. Numerous mammal species as well as birds and crocodiles [1,2] can harbour the parasite worldwide, but the sylvatic cycle is mainly maintained by wild carnivores. Human represents only a possible host and the parasite is exclusively transmitted through consumption of raw or rare meat. In Europe, pork, wild boar meat and horse meat are the main sources for human infection. Eight trichinella species have been identified so far: *Trichinella*

spiralis, *T. nativa*, *T. britovi*, *T. murrelli*, *T. nelsoni*, *T. pseudospiralis*, *T. papuae*, and *T. zimbabwensis*. All species (besides *T. zimbabwensis*) have been involved in human cases [1].

This article describe an outbreak of trichinellosis associated with eating frozen wild boar meat. Although trichinellosis epidemics have been repeatedly observed in France [3], infection due to frozen wild boar meat has not been reported until now.

Material and methods

We report here six cases of human trichinellosis [4]. Patients were infected during a communal meal on 12 October 2003 that included wild boar meat. The animal had been killed 8 days previously at Villeneuve d'Entraunes (Alpes-Maritimes, south of France), a small village located at 950 m above sea level. After dressing, the meat was frozen at -35°C for 7 days, without veterinary control. Within 5 to 24 days after consumption, 6 of the diners who had eaten their meat cooked medium rare presented with the classical clinical symptoms of the disease: fever, myalgia, facial oedema, asthenia and cutaneous rash. All six were started on a course of albendazole (15mg/kg/day for 10 days) and of prednisone (1mg/kg/day for 4 days). Two days after the start of therapy, clinical symptoms increased, but then rapidly decreased, and three months after the end of treatment, the patients had recovered fully.

Results

Typical but not specific modifications of biological parameters were observed, including hyper eosinophilia above 1350/mm³ and elevated aldolases, creatine kinases and lactate dehydrogenases.

Serum obtained from all patients tested positive belatedly for *Trichinella* antibodies, within 15 to 59 days following infection.

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Antibodies were firstly detected by western blotting (WB) (LD Bio, Lyon, France) and few days later were detected by enzyme linked immunosorbent assay (ELISA) (Biotrin International, Lyon, France). A seventh person who shared the meal with the 6 patients but who ate the meat cooked well done, did not develop any clinical or biological symptoms. This person's serology was negative.

Microscopic examination of a sample of frozen wild boar muscle revealed the presence of rare encapsulated *Trichinella* larvae in the striated muscle tissue. Muscle peptic digestion yielded 3 larvae per gram of muscle. These larvae were identified as *T. britovi* by polymerase chain reaction analysis (PCR) carried out at the International *Trichinella* Reference Centre (Rome, Italy).

Discussion

T. britovi, already identified in a previous outbreak in France [4] and elsewhere in Europe and Asia [5,6,7,8] is a species mainly found in wild animals such as foxes and wild boars, in biotopes at 500 m above sea level [1,6]. However, an outbreak in Caceres (Spain) following the consumption of insufficiently cooked meat from a domestic pig [8], suggests a possible change in the epidemiology of trichinellosis Nowadays, because of the mandatory veterinary controls in slaughterhouses, large trichinellosis outbreaks due to horse meat consumption are rare in France, but cases in hunters and their families after raw or rare wild boar meat consumption are regularly reported, with over one hundred cases since 1975 [9].

These cases confirm the occurrence of *T. britovi* in wild boar in southern France and its relative resistance to freezing, already described by Pozio et al. [10]. Indeed, they observed that larvae from naturally infected wild boar meat frozen for three weeks at -20°C remained infectious, whereas they were not viable after four weeks. To prevent trichinellosis, an official European directive [11] recommends the freezing of meat at -25°C for at least 10 days for pieces of less of 25 cm thickness. Our patients froze their wild boar steaks at -35°C for seven days, but this freezing time appears insufficient to kill larvae, since *T. britovi* is a species relatively resistant to freezing [1]. Consequently, we recommend complete heating of wild boar meat at 80°C for 10 minutes in our area. (South of France). According to the International Commission on Trichinellosis, meat should be heated at 65°C at the core for at least 1 minute to kill *Trichinella* larvae; larvae die when the colour of the meat at the core changes from pink to brown [12].

It seems difficult, however, to bring to an end the tradition among some hunters of consuming wild boar steaks immediately after shooting and dressing the meat. Therefore, despite all the recommendations, the risk of trichinellosis is likely to continue.

Wild boar consumers should be urged to follow individual strict prophylactic rules such as freezing at -25°C for at least 10 days (or -20°C during four weeks according to Pozio et al. [10]) or sufficient heating.

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ORIGINAL ARTICLES

Outbreak report

AN OUTBREAK OF *CAMPYLOBACTER JEJUNI* ENTERITIS IN A SCHOOL OF MADRID, SPAIN

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An outbreak of gastroenteritis caused by *Campylobacter* infection was identified in May 2003 in a school in Madrid, Spain. Eighty one cases were identified in a total of 253 people studied. A retrospective cohort study showed that a custard made with ultra high temperature (UHT) milk was associated with illness (RR: 3.15; 95% CI: 1.25-7.93). The custard was probably contaminated with *Campylobacter jejuni* from a raw chicken prepared a day previously in the

same kitchen. Our recommendations were to periodically remind the school's authorities how to act if an outbreak should be suspected, to include the monitoring of a food handler's working day in each environmental investigation in order to detect any risk behaviour; to implement microbiological analysis from the surfaces and utensils of the collective kitchens and improve the sanitary education of food handlers.

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