

LETTER TO THE EDITOR

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Trichinellosis outbreak due to wild boar meat consumption in southern Italy

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Abstract

We report a *Trichinella britovi* outbreak investigated during February–March 2016 in southern Italy. The source of infection was meat from infected wild boars that were illegally hunted and, hence, not submitted to post-mortem veterinary inspection. Thirty persons reported having eaten raw dried homemade sausages; five cases of trichinellosis were confirmed. Wild game meat consumers need to be educated about the risk for trichinellosis.

Keywords: *Trichinella britovi*, Trichinellosis, Italy, Wild boar meat, Zoonosis

Letter to the Editor

In the European countries, the wildlife and domestic reservoirs of *Trichinella* spp. still pose a risk for humans, leading to outbreaks. Wild carnivore mammals are of particular importance since a large number of hunted animals escape veterinary control [1]. According to the epidemiological data the European Centre for Disease Prevention and Control (ECDC), trichinellosis is most prevalent in eastern Europe but also in Italy and Spain where outbreaks were reported in the past 10 years [2]. In Italy, from 1985 to 2016, *Trichinella* spp. were detected in 354 animals (both domestic and wild); 97.5% of these were identified as *Trichinella britovi*, 2.2% as *Trichinella pseudospiralis*, and 0.3% as *Trichinella spiralis* at the European Union Reference Laboratory for Parasites (EURL) [3]. Cultural traditional habits of eating raw or undercooked meat play a key role in the spread of the disease and were responsible for past outbreaks [4].

We report an outbreak investigation conducted in the city of Manfredonia, Apulia Region, located in the Gargano National Park, where currently only the sylvatic cycle of *Trichinella* spp. [4] is present and poaching is a common practice. The source of infection was meat from two infected wild boars illegally hunted on 12 December 2015, hence not sampled for post-mortem examination for the

presence of *Trichinella*, as per the EU legislation, and consumed as raw dried homemade sausages.

A 36 year-old hunter was admitted to the “Casa Sollievo della Sofferenza” Hospital, San Giovanni Rotondo city on 25 January 2016, suffering from fever (temperature 40–41 °C), myalgia, facial and periorbital swelling, diarrhoea, vomiting, abdominal pain and night sweating. These symptoms were developed 20 days before hospitalisation. Laboratory analysis showed marked eosinophilia (42%) and increased CPK (472 UI/l). The patient reported that his wife and son had similar symptoms after having eaten together wild boar meat derived from the same hunting trip (symptoms onset on 4 and 7 January, respectively). All three suspected cases were reported to the local public health authority, responsible for investigating the source of infection and limiting its spread.

On 28 January 2016, a diagnosis of trichinellosis was confirmed for the father and son by enzyme-linked immunosorbent assay (ELISA) on the patients’ serum specimens collected and sent to the EURL for parasites.

Between February and March 2016, an epidemiological investigation started to search actively the potentially exposed persons, using a questionnaire to gather information and trace-back the distribution of the suspected meat. Despite the initial hesitancy, due to the illegal behaviour, the index case provided a list of the consumers of the wild boar meat. The veterinary services obtained two samples of two different leftover sausages for laboratory examinations. *Trichinella* spp. larvae were detected using the magnetic stirrer artificial digestion

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method, which revealed 15 and 17 larvae/g of meat, respectively. *Trichinella britovi* was identified using the multiplex PCR method at the EURL for parasites.

A confirmed case was defined as a person who had consumed wild boar meat and/or meat products, had presented at least three of the following symptoms: fever, muscle soreness and pain, diarrhoea, facial oedema, eosinophilia, subconjunctival, subungual and retinal haemorrhages, and ELISA seropositivity.

Thirty persons reported having eaten raw dried sausages between 20 and 31 December 2015. A total of five cases were confirmed (including two 10-year-old children) in two different family clusters (Cluster 1: the index case, his wife and son; Cluster 2: a second hunter and his son) with symptoms onset between 4 and 15 January 2016, 15–21 days after eating the sausages. Four of the five cases had an ELISA positive result at the first time point (2–4 weeks after the onset of symptoms), while in the index case's wife the seroconversion occurred on 17 March 2016, at the second time point (6–8 weeks after the first time point). No other case than the index required hospitalization. All cases received anthelmintic treatment (mebendazole) within 38 days on average (range: 36–39) between exposure and treatment start, and had an uneventful recovery.

Compared to the cases who reported the consumption of sausages several times, the 25 non-cases ate them on a single occasion, suggesting a dose-response relationship. Serology was also performed on 22 out of 25 of non-cases (three refused testing): none of those tests were positive. Three non-cases had an eosinophilia level above the normal limits (range: 7.8–11.7%).

The long incubation period and the delay of seroconversion made the rapid response to this *Trichinella* outbreak difficult, as also highlighted in a recent article by Messiaen et al. [2]. Moreover, it is possible that we missed some additional cases with milder or no symptoms, not seeking medical attention, due to the reluctance of the people involved in providing more information. However, the combination of coordinate actions and communication among different authorities (hospital, local health unit, veterinary services) was essential in order to determine the extent of the outbreak, to identify its source and to implement control measures.

As the illegal nature of poaching makes veterinary control impossible, the cultural habit of consuming raw or undercooked meat continues to be the primary risk factor for acquiring trichinellosis. Hunters and wild game meat consumers need to be educated about the risk for trichinellosis and the importance of proper handling and cooking game meat. In addition, it is necessary continually raising the awareness on the epidemiological and clinical features of this zoonosis among healthcare personnel for an immediately suspicion of the disease.

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Availability of data and materials

The data used in the present study are available from the corresponding author on reasonable request.

Authors' contributions

IAT conceived and drafted the letter. MGC analysed the data and contributed to draft the letter. RO and RA conducted the epidemiological investigation. DM, RP, and FF acted as outbreak coordinators, contributed to the concept and edited the letter. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

The need for ethical approval for outbreak investigation in Italy is waived under the Italian Ministry of Health Circular no. 4 of 13/03/1998, Prot. 400.3/26/1189 (http://www.salute.gov.it/imgs/C_17_normativa_1467_allegato.pdf), in which it is stated that the primary aim of epidemiological investigations is to identify, characterize, and control disease in response to an immediate public health threat. All participants were explained the purpose of the investigation and participation was voluntary. Informed consent was collected from participants or guardians of the minors involved in the study through the first question of the case report form (questionnaire). Laboratory tests were performed following routine diagnosis and treatment procedures.

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