

## An update on human trichinellosis in Romania – a 15 years retrospective study on the epidemiology and clinical signs

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**Abstract.** Despite all current progress in the diagnosis and therapeutics, human trichinellosis continues to be a major public health issue. We performed a 15 years retrospective study to evaluate the epidemiological and clinical particularities of all the human trichinellosis cases admitted to the Clinical Hospital of Infectious Diseases of Cluj-Napoca, between 1994 and 2009. Our study included 390 patients, aged between 1 and 87 years. The majority of the cases (60.25%) came from the rural area. The diagnosis was based on epidemiological and clinical criteria and had been confirmed using ELISA determination of IgM (14%) and/or IgG (86%). We noticed: (1) the increased number of cases in 1999, 2004, and the last 2 years studied, compared to constancy in number in the rest of the interval; (2) new possibilities of onset of the disease due to extended hunting, new commercial-sourced outbreaks caused by selling meat that was not inspected; (3) the existence of a 33% of severe forms of disease, with the main organ affected being the central nervous system (CNS) and the myocardium. This high percentage is explained by a late diagnosis (up to 14 days after the onset of the symptoms) and consequently a late treatment initiation. Trichinellosis can be considered as a re-emerging infectious disease, thus requiring hardening and renewing the programs and/or developing new programs to supervise and instruct the people on the severity of this disease.

**Keywords:** *Trichinella*; re-emerging disease; epidemiology; symptoms.

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### Introduction

Despite the intensive measures to control the meat for *Trichinella* infection, cases of human trichinellosis continue to be highly prevalent (Jongwutiwes et al., 1998). In the countries

where trichinellosis is endemic the condition is rapidly diagnosed and treated, but in the countries where the cases are rare the diagnosis and the treatment is frequently delayed (Taylor et al., 2009).

Moreover, many studies highlight the persistence of increased morbidity rates due to trichinellosis, alarming enough to bring to our attention new epidemiologic issues (i.e. ingestion of game non-inspected commercial meat) (Proulx et al., 2002; Ranque et al., 2000).

This is the context that made us assess the cases of trichinellosis admitted to the Clinical Hospital of Infectious Diseases of Cluj-Napoca in the past 15 years. Our aim was to assess the epidemiological and clinical particularities and also the evolution of these cases under the complex treatment given: agents active against nematodes (Mebendazole, Albendazole), anti-inflammatory steroids (HHC, Prednisone, Dexamethasone) and non-steroid anti-inflammatory products (Pozio et al., 2001).

### Materials and methods

The study was approached as a clinical retrospective study of trichinellosis cases admitted to the Clinical Hospital of Infectious Diseases between January 1<sup>st</sup> 1994 and 31<sup>st</sup> December 2009. The total number of patients studied was 390, with the age between 1 and 87 years, with an average of 34.81 years.

The diagnosis of the cases was based on the following criteria:

#### Epidemiological data

- ingestion of raw/undercooked pork/game meat or pork products (smoked), affecting one or more persons (family and/or

- entourage) 14 days before the clinical manifestations onset;
- confirmation of the parasitic infection of the meat by (if the meat was available).

#### Clinical data

- infectious syndrome;
- myalgic syndrome;
- cutaneous syndrome;
- edematous syndrome;
- malaise;
- diarrheic syndrome;
- cardio-vascular syndrome (including ECG);
- neurological syndrome.

#### Laboratory data

- ELISA method: positive IgM and/or IgG;
- eosinophile count determined on admittance, during the hospitalization and on discharge;
- biochemical determination of the protein synthesis function;
- muscle biopsy (in some cases).

### Results

#### Epidemiological data

All the epidemiological data is shown as graphs or tables: yearly distribution (figure 1), age distribution (figure 2), urban/rural distribution (figure 3), source of infection (figure 4), age of patients (table 1).

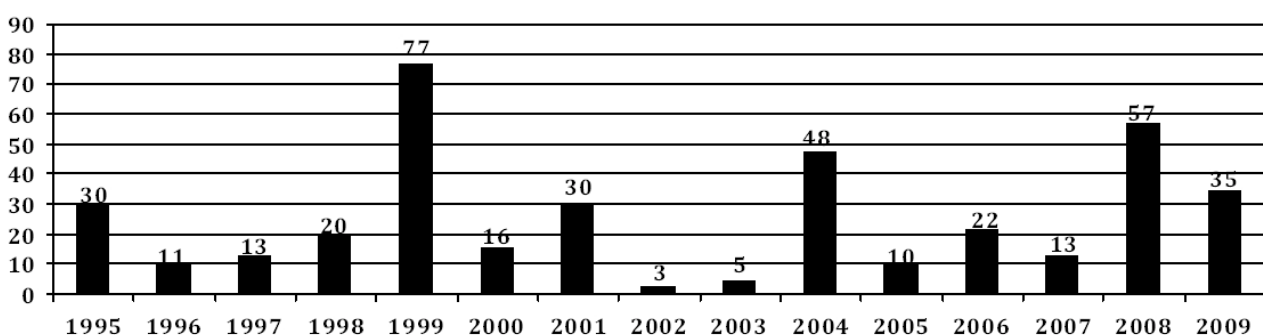
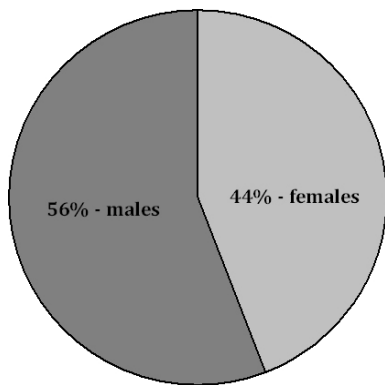
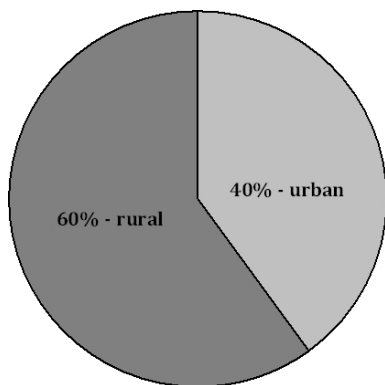


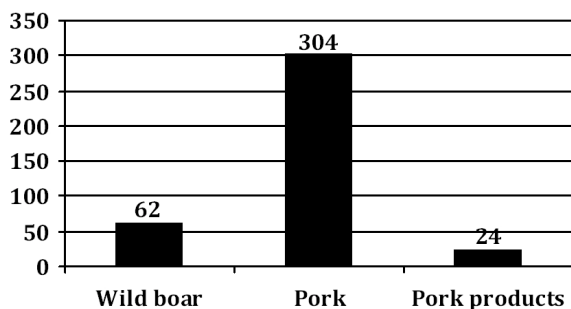
Figure 1. Distribution of cases based on the year



**Figure 2.** Distribution of cases based on the sex of patients



**Figure 3.** Distribution of cases based on the origin of patients



**Figure 4.** Distribution of cases based on source of infection

**Table 1.** Distribution of cases based on the age of patients

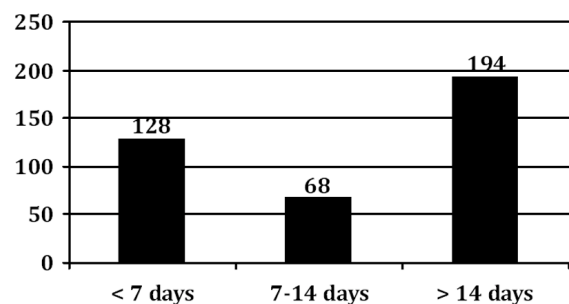
Age group	No. cases
< 16 years	61
17 - 30 years	97
31 - 40 years	77
41 - 50 years	81
51 - 60 years	38
> 60 years	36

*Clinical data*

The distribution of patients according to their clinical signs and incubation period (respectively) is shown in table 2 and figure 5. Seventeen percent of the cases were considered mild, 51% moderate and 32% severe. After therapy (using anti-parasitic drugs, corticosteroids, re-hydration), out of all cases, only 2 deceased and 388 recovered.

**Table 2.** Distribution of cases based on the age of patients

Symptom	No. of patients	Percent
myalgic syndrome	314	80.51
malaise	225	57.69
edematous syndrome	219	56.15
infectious syndrome	201	51.54
neurological syndrome	156	40.00
cutaneous syndrome	39	10.00
diarrheic syndrome	103	26.41
cardio-vascular syndrome	37	9.49



**Figure 5.** Distribution of cases based on the incubation period

**Discussions**

The traditional culinary customs specific to the Transylvanian area (consumption of smoked, uncooked pork meat) explains the high incidence of trichinellosis (Blaga et al., 2007). As expected, the majority of cases were adults. However, the high number of cases in children (under 16 years old) proves the lack of education in parents. Most of cases originated from the low social level (homeless people) and due to consumption of waste meat. The lack of medical education results also from the fact that out of the 390 total cases 194 of them were sent to our hospital for admittance after 14 days from the clinical onset. The overall

data suggests that trichinellosis is an endemic disease in Romania. This fact imposes the reevaluation of the meat control programs and also the need for new programs to inform the population about the severity and the complication of the disease.

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## References

- Blaga R., Durand B., Antoniu S., Gherman C., Crețu C.M., Cozma V., Boireau P. 2007. A dramatic increase in the incidence of human trichinellosis in Romania over the past 25 years: impact of political changes and regional food habits. *Am. J. Trop. Med. Hyg.* 76:983-986.
- Jongwutiwes S., Chantachum N., Kraivichian P., Siriyasatien P., Putaporntip C., Tamburrini A., La Rosa G., Sreesunpasirikul C., Yingyoud P., Pozio E. 1998. First outbreak of human trichinellosis caused by *Trichinella pseudospiralis*. *Clin. Infect. Dis.* 26:111-115.
- Pozio E., Sacchini D., Sacchi L., Tamburrini A., Alberici F. 2001. Failure of mebendazole in the treatment of humans with *Trichinella spiralis* infection at the stage of encapsulating larvae. *Clin. Infect. Dis.* 32:638-642.
- Proulx J., MacLean J.D., Gyorkos T., Leclair D., Richter A.K., Serhir B., Forbes L., Gajadhar A.A. 2002. Novel prevention program for trichinellosis in Inuit communities. *Clin. Infect. Dis.* 34:1508-1514.
- Ranque S., Faugère B., Pozio E., La Rosa G., Tamburrini A., Pellissier J.F., Brouqui P. 2000. *Trichinella pseudospiralis* outbreak in France. *Emerg. Infect. Dis.* 6:543-547.
- Taylor W.R., Tran G.V., Nguyen T.Q., Nguyen C.T., Nguyen L.T., Luong C.Q., Scott T., Dang T.C., Tran T.H., Nguyen T.D., Pham K.T., Fox A., Horby P., Wertheim H., Doan H.N., Nguyen H.H., Trinh L.M., Nguyen T.V., Nguyen K.V., Nguyen D.H. 2009. Acute febrile myalgia in Vietnam due to trichinellosis following the consumption of raw pork. *Clin. Infect. Dis.* 49:79-83.