TRICHINOSIS-EPIDEMIOLOGICAL ASPECTS IN BIHOR COUNTY

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Abstract

Trichinosis is a potentially serious parasitic disease which affects millions of people each year, although most of those cases now occur in developing countries. According to the International Commission on Trichinellosis survey in 2004, Romania has the most cases of trichinellosis in the world. The objective of this study was to provide epidemiological data on trichinellosis from Bihor County during the period 2005-2010. The most of hospitalized forms were medium forms (56,65%), followed by the easy forms (30,04%), existing a small number (13,30%) of severe forms without deaths. The last Bihor county death was registered in May 2009, when a woman, aged 48, from Oradea, died with fulminant trichinosis form with the myocardial and neurological complications, following consumption of meat pork infected with Trichinella in Batar outbreak.

Key words: trichinosis, parasitic disease, Bihor county.

INTRODUCTION

Trichinosis is a potentially serious parasitic disease which affects millions of people each year, although most of those cases now occur in developing countries. Trichinosis develops when undercooked flesh contaminated with infective larvae of *Trichinella* is eaten. Most infections are asymptomatic, but heavy exposure may lead to diarrhea, periorbital edema, myositis, fever, and prostration. The principal source of trichinellosis in Romania is insufficiently cooked pork that is infected especially with Trichinella spiralis. Pork and traditional food prepared from pork (ham, bacon, blood pudding, mosaic salami, scraps) are eaten in a very high percentage by the population of Bihor county especially during the winter holidays when a lot of pigs are slaughtered.

Life Cycle (Fig.1): When raw or inadequately cooked meat containing viable larvae of *Trichinella* is eaten, the organisms are freed from the cyst walls by acid pepsin digestion in the stomach and pass into the small intestine. Larvae invade the small intestine and develop into adult worms. They are obligate intracellular parasites occupying the cytoplasm of a row of enterocytes. The number of larvae released by a fertilized female varies with the species of both parasite and host. *T. spiralis* probably produces about 500 larvae over a period of 2 to 3 weeks and then the adult worms are expelled in the feces. The newborn larvae seed the skeletal muscles via the bloodstream. They burrow into individual muscle fibers and

over the *next* 3 weeks increase 10 times in length; they then coil and become capable of infecting a new host. In many species, a cyst wall develops around the larva that may eventually calcify. Larvae may remain viable for several years.

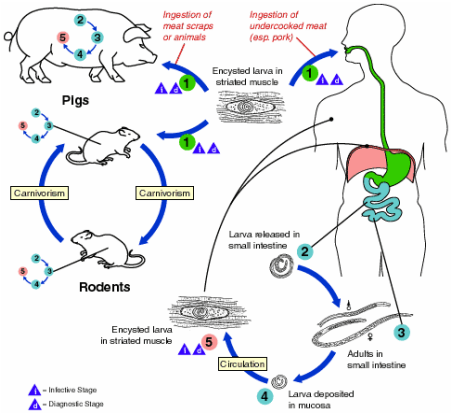

Fig 1-Life cycle of *Trichinella spirallis* (CDC).

Epidemiology: *Trichinella* are distributed throughout the world and are widely spread in nature among a large number of carnivorous animals, humans being an incidental host. The reservoir hosts reflect primarily the fauna present in that region. Humans are an incidental host, most infections being due to *T. spiralis* (Chiotan M., 2002). In United States from 1997-2001, 72 cases of trichinosis were reported to the Centers for Disease Control and Prevention (CDC). In Europe the fox is the primary reservoir of the sylvatic cycle of *Trichinella.,* and human infections usually occur in rural areas where traditional swine-rearing practices are used or raw horse meat is eaten. A *reemergence* of the domestic cycle of trichinosis based in swine in Europe has resulted from the breakdown of veterinary services and state-owned farms in some countries. Pork-related trichinellosis is frequently reported in the European Union states of Serbia, Croatia, Romania and Bulgaria where the disease has *re-emerged* in recent years (Cuperlovic K. et al. 2005). A survey performed by the International Commission on Trichinellosis, identified more than 1100 trichinellosis cases in Europe for the year 2004, with 984 cases being reported from these four countries. According to the International Commission on Trichinellosis survey in 2004, *Romania has the most cases of trichinellosis in the world.* (Romania 780, Argentina 710, Croatia-120, Czech Republic 3, Dennmark 7, France 3, Germany 5, Lithuania 22, Poland 172, Russia 514). Two studies reported cases of human trichinellosis in the European Union that originated in Romania. Nockler et al. described the case of three family members from Bavaria who had been infected by consuming homemade sausages and other pork products during a visit to their Romanian relatives in Arad County in December 2006. Additionally, Angheben et al. reported an outbreak of

trichinellosis diagnosed in Verona, Italy, in early 2008. A Romanian family living in Italy and a family friend became infected during a visit to Romania in December 2007 after consuming meat from a pig slaughtered without veterinary inspection. In Romania, the annual incidence increased during the early postcommunist period (1990–2007) to 6.2 cases per 100,000 inhabitants compared to the incidence during the late communist period (1979–1989), 1.8 cases per 100,000 inhabitants (Blaga R. et al., 2007). Even though trichinellosis has been considered a communicable disease since 1961, cases were most likely underreported before 1990 because of the social stigma associated with *Trichinella* infections (Olteanu G., 2001).

Clinical Manifestations: The clinical spectrum of infection ranges from inapparent to fulminant and fatal illness, but most infections are inapparent. The severity of the disease is proportional to the infective dose. During the first week after ingesting infected meat, a person may be asymptomatic or experience abdominal discomfort, nausea, vomiting, and/or diarrhea. Two to 8 weeks later, as larvae migrate into tissues, fever, myalgia, periorbital edema, urticarial rash, and conjunctival and subungual hemorrhages may develop. Larvae may remain viable in tissues for years; calcification of some larvae in skeletal muscle usually occurs within 6 to 24 months and may be detected on radiographs. In severe infections, myocarditis, neurologic involvement, and pneumonitis can follow in 1 or 2 months. (Grove D., 2005).

Diagnosis of trichinosis is confirmed by a combination of exposure history (the epidemiological investigation), clinical diagnosis (circumorbital edema, splinter hemorrhage, non-specific gastroenteritis, and muscle pain), and laboratory testing (Rebedea I., 2000, Voiculescu M., 1990). Serological tests (eosinophilia, increased levels of creatine phosphokinase, ELISA Ig M and Ig G antibodies) and microscopy can be used to confirm a diagnosis of trichinosis.

The case definition for trichinosis at the European Center for Disease Control states "*at least three of the following six: fever, muscle soreness and pain, gastrointestinal symptoms, facial edema, eosinophilia, and subconjuctival, subungual, and retinal hemorrhages*."

Treatment: Early administration of anthelmintics such as Albendazole (400 mg twice a day for 8–14-21days) decrease the likelihood of larval encystation, particularly if given within three days of infection. These drugs prevent newly hatched larvae from developing and should not be given to pregnant women or children under two years of age. Secondary treatment: After infection, steroids such as prednisone as well as pyrantel may be used to relieve muscle pain associated with larval migration (Cupsa, 2007).

The objective of this study was to provide epidemiological data on trichinellosis from Bihor County during the period 2005-2010.

MATERIAL AND METHODS

The study group included 203 patients, all inhabitants of Bihor County who were hospitalized at the Infectious Diseases Hospital in Oradea from 01.01.2005-30.09.2010. This hospitalization records were investigated to provide the necessary information for this retrospective study.

RESULTS AND DISCUSSION

Table 1

A distribution over 6 years was performed giving the following results:

Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**
Total	**55**	**29**	**11**	**56**	**60**	**14**	**33**	**203**

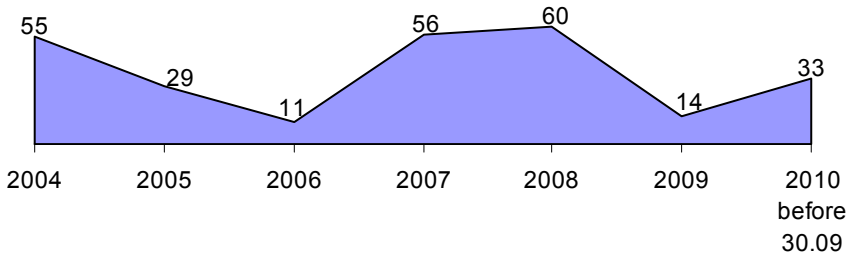

Fig. 2-Annual distribution of trichinosis in Bihor County from 2004.

The fewer cases of illness were in 2006 and 2009 (3 years). In the first nine months of 2010 there were over 50% more cases than in 2009. Comparing the data in a study conducted in 2003 (Lenard I. et al, 2003), there is still a downward trend of the incidence of trichinosis in Bihor county, because in range from 1999 to 2000 there were 208 cases (Table 1, Fig. 2).

Table 2

The patients were distributed into the following age groups:

	2005	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**
1-4	0	0	0	1	1	1	3
5-14	0	0	9	2	3	6	20
15-24	3	2	7	4	1	2	19
25-34	**5**	**3**	**12**	**5**	**2**	**13**	**40**
35-44	**8**	**1**	**15**	**23**	**1**	**3**	**51**
45-54	**0**	**2**	**7**	**14**	**2**	**7**	**32**
55-64	9	2	3	7	2	0	23
>65	4	1	3	4	2	1	15
Total	**29**	**11**	**56**	**60**	**14**	**33**	**203**

The trichinosis was predominant at the active age group 25-55 years (60,59%) (Table 2).

Table 3

Gender distribution:

	2005	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**	**%**
Men	12	7	36	31	9	19	114	56,15
Women	17	4	20	29	5	14	89	43,84
Total	**29**	**11**	**56**	**60**	**14**	**33**	**203**	**100%**

56,15% (114) patients were men and 43,84% (89) were women (Table 3, Fig.3).

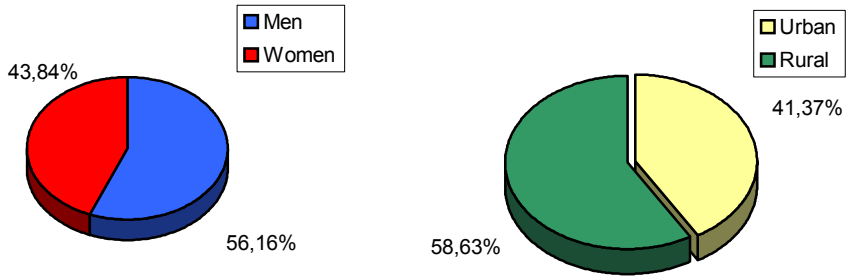

Fig. 3,4-Gender and area distribution

Table 4

Area distribution:

	2005	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**	**%**
Urban	11	4	36	27	0	6	84	41,37
Rural	18	7	20	33	14	27	119	58,62
Total	**29**	**11**	**56**	**60**	**14**	**33**	**203**	**100%**

41,37% (84) patients were from urban areas and 58,62% (119) resided in rural areas (Table 4, Fig. 4).

Table 5

Distribution according to the clinical forms of trichinosis:

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**	**%**
Easy forms	12	4	21	18	7	7	61	30,04
Medium forms	14	6	28	32	7	20	115	56,65
Severe forms	3	1	7	10	0	6	27	13,30
Forms complicated with myocardites	0	0	2	1	0	1	4	1,97
Forms complicated with hepatitis	6	3	12	16	3	12	52	25,61
Other complications	1	0	1	3	1	1	7	3,44

The most of hospitalized forms were medium forms (56,65%), followed by the easy forms (30,04%), existing a small number (13,30%) of severe forms without deaths (Table 5). The last Bihor county death was

registered in May 2009, when a woman, F.M., aged 48, from Oradea, died with fulminant trichinosis form with the myocardial and neurological complications, following consumption of meat pork infected with *Trichinella* in Batar outbreak.

Table 6

Distribution of cases according to eosinophil value:

	2005	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**	**%**
-between 0-4.9%	8	5	11	9	2	11	46	22,66
-5-9,9%	12	1	8	15	3	7	46	22,66
-10-19,9%	2	3	16	19	7	8	55	27,09
-20-29.9%	3	1	13	7	1	3	28	13,79
-30-39,9%	1	0	4	6	1	3	15	7,38
-40-49,9%	2	0	1	1	0	0	4	1,97
-over 50%	1	1	3	3	0	1	9	4,43
Total	**29**	**11**	**56**	**60**	**14**	**33**	203	100%

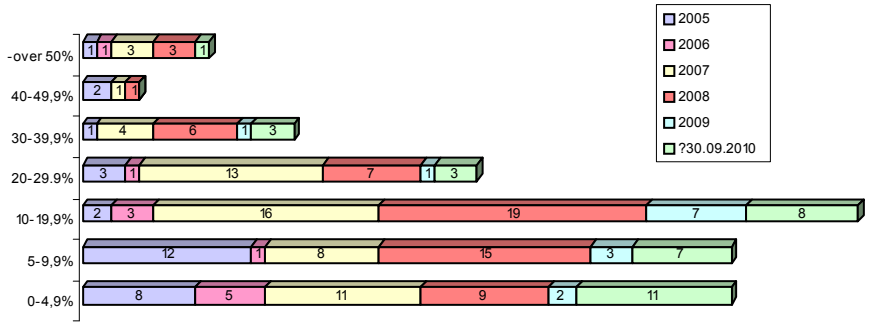

Fig.5- Distribution of cases according to eosinophil value:

More than a third of patients had an eosinophilia up to 20%, correlating with the number of easy and mild forms of disease (86%) (Table 6, Fig.5).

Table 7

Distribution of cases according to leucocyte value:

	2005	**2006**	**2007**	**2008**	**2009**	**→30.09.2010**	**Total**	**%**
<10 000	26	8	45	50	11	30	170	83,74
10 000-20 000	2	3	10	9	3	2	29	14,28
>20 000	1	0	1	1	0	1	4	1,97
Total	**29**	**11**	**56**	**60**	**14**	**33**	203	100%

More than a third of patients had WBC to 10 000/mmc, correlated with the eosinophil percentage and the number of the easy and mild forms of disease (Table 7).

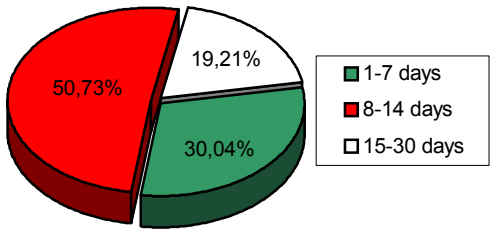

Fig. 6- Distribution of cases according to period of hospitalization.

For over half of patients, the hospitalization period ranged between 8 to 14 days and required considerable health care resources (Fig.5).

In the last two years in the following localities were recorded outbreaks of trichinosis: 2010 -3 outbreaks :Husasau de Tinca (24 patients), Bucuroaia (7 patients), Oradea (2 patients); 2009 -3 outbreaks – Girisu de Cris (3 patients), Curtuiseni-10 patients (Timis outbreak), Tinca-1 patient.

CONCLUSION

- In the first nine months of 2010 there were over 50% more cases than in 2009.
- The trichinosis was predominant at the men (56,15%) and active age group 25-55 years (60,59%).
- 41,37% (84) patients were from urban areas and 58,62% (119) resided in rural areas.
- The most of hospitalized forms were medium forms (56,65%), followed by the easy forms (30,04%), existing a small number (13,30%) of severe forms without deaths, made as a result of the efficient epidemiological inquest.
- For 11 years trichinellosis has not made any victim in Bihor county.
- More than a third of patients had an eosinophilia up to 20%, correlating with the number of easy and mild forms of disease (86%).
- More than a third of patients had WBC to 10 000/mmc, correlated with the eosinophil percentage and the number of the easy and mild forms of disease (Table 7).
- For over half of patients, the hospitalization period ranged between 8 to 14 days and required considerable health care resources.

- In the last two years in the following localities were recorded outbreaks of trichinosis: Husasau de Tinca, Bucuroaia, Oradea(from outbreak Satu Mare), Girisu de Cris, Curtuiseni (from outbreak Timis), Tinca.
- Trichinosis is unfortunately still a health problem in post-communist Romania and in the Bihor county.

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