Prevalence of cystic echinococcosis in sheep, cattle and swine from the western Romania

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Abstract. Cystic Echinococcosis (CE) due to the developing of one or more cysts in liver, lungs or other organs of an intermediate host after ingestion of the eggs of the Echinococcus granulosus tapeworm is an important zoonotic disease. Reports from several eastern european countries provide documented evidence for the reemergence of this disease. In the western part of Romania animals sacrificed in slaughterhouses from three counties (Arad, Timiş and Caraş-Severin) were considered. Livestock involved in the transmission pattern includes: sheep, cattle and swine. In all these counties CE maintains at a high level. The highest level was recorded in Arad County (10.49% out of all examined animals) followed by Timiş County (4.65%) and Caraş-Severin County (1.98%), respectively. Out of the three investigated species of animals, cattle were the most intensely infected (12.31% – 22.36%), with a maximum prevalence in Timiş County (22.36%), followed by sheep (5.83% – 11.51%), with a maximum prevalence in Arad County (11.51%) and by swine with a highest prevalence in Arad County (10.12%) and the lowest incidence in Caraş-Severin County (0.96%), respectively. Studies carried out in slaughterhouses showed an active transmission among these hosts.

Keywords: Prevalence; Cystic Echinococcosis; Livestock; Western Romania.

Introduction

Generally speaking, the CE prevalence in Romania is high but different, function of host species and of region. Following the records carried out in slaughterhouses, infections between 1.1% and 86.1% have been reported (Ionescu et al., 2004; Morariu, 2004; Olteanu et
al., 1995). But, if the presence of the cysts in dead animals or in those sacrificed outside the slaughterhouses had been taken into consideration, the numbers would have been much greater.

As far as Europe is concerned, the CE differs from one country to another. In Bulgaria, for example, the infection prevalence was of 22.55% in sheep, of 12.30% in cattle and 2.88% in swine (Zheliaskov et al., 1995), in Yugoslavia of 58.63% in sheep, of 11.70% in cattle and 35.37% in swine (Damnjanovic et al., 1995), and in Italy, as Lorenzini and Ruggieri (1987) have determined, of 0.7% in cattle, of 5.4% in sheep and of 0.4% in swine.

Taking into consideration these data, as well as the fact that studies regarding the epizootic situation of CE in western Romania are missing, we have considered that an epidemiologic inquiry, performed in three counties from the western region of the country, would be convenient.

Materials and methods

The prevalence of infection with cysts in cattle, sheep and swine (both males and females) from the western Romania was established on the basis of the data obtained from Sanitary-Veterinary Divisions of Arad, Timiş and Caraş-Severin counties. The results are shown in the table 1 and 2 and figure 1, for the period 1998 and the 1st semester of 2003.

Results

As far as the county of Arad is concerned, the epidemiologic study carried out for a five years period (table 1, 2 and figure 1) shows a relatively uniform prevalence of CE in the examined sheep, cattle and swine (11.51%, 12.97%, and 10.12%, respectively). Compared with the total number of slaughtered and examined animals (351,358), the prevalence of infection maintains within the same range of values (10.49%, namely 36,868 infected animals).

The epidemiologic inquiry performed in Timiş County shows a contrasting prevalence of CE in studied species (table 1, 2 and figure 1). Thus, in sheep and swine, the values are closed: 5.83%, respectively 4.32%. But in cattle, almost a quarter of the slaughtered animals were infected (22.36%).

In sheep, the greatest prevalence was determined in 1998 (7.28%), and the smallest in 2003 (4.48%). The greatest number of infected cattle was recorded in 1998 (27.09%), and the smallest in 2003 (16.14%).

In 2000, statistics have recorded the greatest number of infected swine (11.43%) and in 2002 the smallest number of infected animals (0.91%).

For Caraş-Severin County, the situation is somehow similar to that in Timiş County (table 1, 2 and figure 1). The sheep were infected in a percentage closed to that in Timiş County (5.90%), but lower than that in Arad County (11.51%). As far as the swine are concerned, the infection prevalence was the smallest (0.96%). Compared with the other species, in Caraş-Severin County cattle were more intensely infected, as well, but the prevalence was smaller than in the other counties (12.97% for Arad and 22.36% for Timiş).

Discussions

If analyzing the distribution of CE cases in Arad County, function of animal species, we can draw the following conclusion: in sheep, the maximum prevalence of CE was noticed in 2001 (15.73%), the minimum in 2003 (0.89%); in cattle, we have the same reference years, respectively, maximum in 2001 (21.10%) and minimum in 2003 (6.25%). As far as the swine are concerned, the most numerous cases were recorded in 1999 (14.47%) and the least ones in 2003 (0.75%).

Taking into consideration the fact that, until 1999, in Timiş County the greatest number of swine could be found in COMTIM Holding, where the sanitary measures were much more attentively applied and observed, a high percentage of infected swine is surprising when compared with Arad County. Alongside with the flow of the young pigs from the private farms, the percentage of the infected
animals has increased, and in 2000 it reached its peak (11.43% infected animals).

At the same time, when compared with Arad County, the great number of infected cattle is, also, contrasting. The peak has been recorded in 1998 (27.09%), after which in 2003 a significant decreasing up to 16.14% followed.

For sheep from Caraş-Severin County, the maximum prevalence was recorded in 1998 (16.45%), after which a gradual decreasing follows, in 2003 the minimum prevalence being registered (1.72%).

In cattle, the most numerous cases were, again, noticed in 1998 (24.56%), and the lowest ones in 2002 (3.86%). For swine, the infection rate was maintained low, with a maximum of 2.23% in 1998, followed by a gradual decreasing. The minimum percentage of infection was recorded in 1999, with 0.26% infected animals. In fact, the swine slaughtered in Caraş-Severin County showed the lowest rate of infection, among the examined animals from the three counties.

Taking into consideration the existent situation from these counties located in the western Romania, with the statistical data from certain European countries located, especially around the Mediterranean Sea, we can say that, in our country, the infection maintains at a medium rate, as compared with these countries.

### Table 1. Cystic echinococcosis prevalence in slaughtered animals from three counties of western Romania (Arad, Timiş and Caraş-Severin) in a 6 years period

<table>
<thead>
<tr>
<th>County</th>
<th>Animals Examined</th>
<th>Year</th>
<th>Sheep Positive (%)</th>
<th>Cattle Positive (%)</th>
<th>Swine Positive (%)</th>
<th>Total Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,424</td>
<td>1999</td>
<td>1,313 (20.31)</td>
<td>1,313 (20.31)</td>
<td>1,313 (20.31)</td>
<td>9,069 (14.64)</td>
</tr>
<tr>
<td></td>
<td>4,386</td>
<td>2000</td>
<td>4,386 (100.00)</td>
<td>4,386 (100.00)</td>
<td>4,386 (100.00)</td>
<td>11,933 (12.84)</td>
</tr>
<tr>
<td></td>
<td>2,949</td>
<td>2001</td>
<td>2,949 (100.00)</td>
<td>2,949 (100.00)</td>
<td>2,949 (100.00)</td>
<td>6,587 (9.44)</td>
</tr>
<tr>
<td></td>
<td>1,011</td>
<td>2002</td>
<td>1,011 (100.00)</td>
<td>1,011 (100.00)</td>
<td>1,011 (100.00)</td>
<td>902 (2.07)</td>
</tr>
<tr>
<td></td>
<td>2,164</td>
<td>2003*</td>
<td>2,164 (100.00)</td>
<td>2,164 (100.00)</td>
<td>2,164 (100.00)</td>
<td>200 (0.96)</td>
</tr>
</tbody>
</table>

### Table 2. Cystic echinococcosis prevalence in all animals slaughtered in a 6 years period (1998-2003) in three counties from western Romania

<table>
<thead>
<tr>
<th>County</th>
<th>Sheep (positive %)</th>
<th>Cattle (positive %)</th>
<th>Swine (positive %)</th>
<th>Total (positive %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arad</td>
<td>5,476 (11.51)</td>
<td>3,676 (12.97)</td>
<td>287,879 (10.12)</td>
<td>351,358 (10.49)</td>
</tr>
<tr>
<td>Timiş</td>
<td>674 (5.83)</td>
<td>8,783 (22.36)</td>
<td>2,157,600 (4.32)</td>
<td>2,208,415 (4.65)</td>
</tr>
<tr>
<td>Caraş-Severin</td>
<td>2,011 (5.90)</td>
<td>2,223 (12.31)</td>
<td>31,466 (0.96)</td>
<td>36,552 (1.98)</td>
</tr>
</tbody>
</table>

* only the 1st semester.
Thus, in Turkey, in 1999, the rate of infection was of 67.6%, in sheep and of 22.6% in cattle (Altintas, 2003). In Greece, it was of 0.23-21% in sheep and of 0.00-53% in cattle, in a ten years period (1989-1998). At the beginning of the control program in Greece, in 1984, the infection prevalence was of 82% in cattle, of 80% in sheep, 24% in goats and of 5%, in swine (Sotiraki et al., 2003). In Italy, again for a ten years period (1990-1999), the infection prevalence was of 86.9% in sheep and of 23.7% in cattle (Seimenis, 2003). In Spain, in 1986, at the beginning of the control program, the infestation prevalence was of 82.3% in sheep, and, in 2000, it reached only 20% (Jimenez et al., 2002).

Now, if the data presented in the tables and in their corresponding figure are attentively examined, we can easily notice that, in all the three counties, the cases of CE in livestock show a slow, but progressive decreasing. But, unfortunately, this decreasing is not based on a real support. It is based, mainly, on a drastic decreasing of livestock, both in state and in private farms. At the same time, some general anthelmintic treatments with benzimidazolic or pro-benzimidazolic substances could have contributed, in a certain measure, to the decrease of the disease prevalence.

The environmental agents (temperature, humidity etc.) seem to have had their part in limiting the disease transmission. Starting with 2002, summers became hotter and hotter and droughty. Under these circumstances, surviving on pastures becomes a real problem for *Echinococcus granulosus* eggs, which leads to a certain limitation of the CE transmission (Gemmell, 1997; Gemmell et al., 1986).

Nevertheless, the maintenance of the infection at a relatively high level can be explained by the fact that, in many regions, all the three mentioned species graze together, and the shepherd dogs, as well as the stray ones contribute to a quasi-permanent pollution of the pastures. For sub-mountainous and mountainous regions from the three counties,
we must, also, take into consideration the interference of wild canidae, as final hosts, in the epidemiological chain of parasite.

Conclusions

In all the three counties under consideration (Arad, Timiş and Caraş-Severin), the CE prevalence maintains at a high level.

The highest level of parasite infection was recorded in Arad County: 10.49%, namely, 36,868 infested animals, out of 351,358 examined animals.

Out of the three investigated species of animals, cattle are the most intensely infected, with a maximum prevalence in Timiş County (22.36%, versus 12.97%, in Arad and 12.31%, in Caraş-Severin).

The different changes inside the property structures, the anthelmintic treatments with benzimidazolic drugs, as well as, the selection pressure performed by environmental agents, all of these have contributed to the decreasing of hydatid disease transmission.

Fluctuations from a year to another can be explained by the situation that, in slaughterhouses come, every year, animals from different farms or locations; that is why, this decreasing of the infection prevalence can be only roughly determined.

References


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