Study on cryptosporidiosis prevalence in children from Timiş County – Recent Updates

Ovidiu Mederle¹, Gheorghe Dărăbuș², Kalman Imre², Ionela Denisa Sorescu², Narcisa Mederle²∗

¹ – University of Medicine and Pharmacy “Victor Babeș” Timișoara, Romania.
² – Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael the Ist of Romania” from Timișoara, Faculty of Veterinary Medicine, Calea Aradului 119, 300645 Timișoara, Romania.

Correspondence: Tel. +40256-277008, Fax +40256-277118, E-mail narcisa.mederle@yahoo.com

Abstract. Cryptosporidiosis as a parasitic disease found all over the world is a major health issue. According to some researchers, Cryptosporidium sp. is among the first three or four enteric pathogenes in humans. The most serious problems occur in paediatrics, mainly in the countries where hygienic conditions are poor. The aim of the study was to collect information related to epidemiology from patients in hospitals, clinics and foster institutions for children and to examine faeces samples using ELISA method. Following the examination of 212 coprological samples taken from children with diarrhea symptoms, tuberculosis, AIDS, dystrophy or infested with Giardia spp. the results show a cryptosporidiosis prevalence of 7.54% (16/2120).

Keywords: Cryptosporidiosis; Children; Prevalence.

Introduction

The importance of cryptosporidiosis has enormously increased in the last decade due to the antropozoonotic and zoopaediatric characters, the negative impact on livestock productions and the interference or perturbation of human health (Caccio and Pozio, 2006).

The human infection with Cryptosporidium was described all over the world, across the six contents, both in developed and developing countries, in adults and children from urban and rural areas alike (Fayer et al., 2000).

The morphological, biological and genetic features which differentiate a species of Cryptosporidium from other species is a major problem in understanding the way of transmission of the infection with cryptosporidiosis for the veterinarians and epidemiologists who are directly involved in the parasitological control of this morbid entity (Cama et al., 2008; Dărăbuș and Imre, 2010).

Materials and methods

The study was conducted in the January – September 2014 period. 212 faecal samples were taken from children in hospitals, clinics and foster institutions. The patients were aged like this:
The children came from the urban and rural areas in Timiş county and presented primary symptoms such as:

- acute diarrhea disease (ADD, 61 patients)
- tuberculosis meningitis (4 patients)
- pulmonary tuberculosis (12 patients)
- AIDS (102 patients)

- Giardiosis (7 patients)
- Dystrophic and anemic children (26 patients).

The samples were studied in the ELISA laboratory of the Parasitology Department of the Faculty of Veterinary Medicine. To identify the presence of Cryptosporidium oocysts, the faeces were examined by:

- Direct fecal smears method
- The immunoenzimatic method – BIO K 155 Kit (Bio-X Diagnostics, Belgium) (Imre et al., 2008).

For each positive case, we made an epidemiological inquiry which comprised (figure 1):

<table>
<thead>
<tr>
<th>Surname</th>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Urban/Rural</th>
<th>Address</th>
<th>Parents (profession, phone number)</th>
<th>Child (Kindergarten, School, Nursery)</th>
<th>Contact with animals</th>
<th>Drinking water source</th>
<th>Primary diagnostic</th>
<th>Illness history</th>
<th>Recreational water use</th>
<th>Eating fruit and vegetables from the market/the garden</th>
<th>Travels abroad</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1.** Epidemiological inquiry

**Results**

The results obtained following the examination of 212 coprological samples taken from the children living in the urban and rural areas of Timiş county show a prevalence of cryptosporidiosis of 7.54% (16/212).

The most affected age category was 1 month – 3 years old, 43.75% (7/16). The prevalence of the disease in other age categories was: 25% (4/16) for 4-7 years and for 12-14 years old, respectively and 6.25% (1/16) for 8-11 years old.
Cryptosporidiosis was diagnosed in a percentage of 68.75 (11/16) in the urban area and 31.25 (5/16) in the rural area.

In 8 out of the positive patients (8/16), Cryptosporidium was coprological diagnosed on an organism infested with HIV; in 3 cases (3/6) the primary diagnosis was ADD and pulmonary tuberculosis, respectively, while 2 out of the infested children with Cryptosporidium were diagnosed with anemia (2/16).

**Discussions**

After comparing our results with those described by other authors, same epidemiological aspects should be pointed out. The human infection with criptosporidiosis was described in the developed and developing countries in the rural and also in the urban area, in children and adults.

The characterization of Cryptosporidium using DNA extracted from faecal samples collected from 2414 humans with diarrhoea in England between 1985 and 2000 reveals Cryptosporidium parvum in 56.1% of cases, C. hominis in 41.7%, a mixture of C. parvum and C. hominis in 0.9% and other species (C. meleagridis, C. felis C. andersoni, C. canis, C. suis) (Leoni et al., 2006).

The prevalence of the disease is estimated from 1-2% in Europe to 20% in Africa and America (Fayer et al., 2000; Caccio and Pozio, 2006; Xiao and Feng, 2008). In our country, the study conducted by Mederle et al. (2009) shows a prevalence of cryptosporidiosis of 4.03% in children.

The prevalence of the disease has increased up to 7.54% until the present study.

The persons who run a major risk for infection are children, malnourished individuals and those with low immunity (Campos et al., 2000; Alves et al., 2001; Cama et al., 2003; Mederle et al., 2009).

Unlike the infection in animals, cryptosporidiosis could occur at any age in humans, although the incidence might be higher at an earlier age, due to careless exposure, while the probability of an acquired immunity after previous infection is lower. Most of the authors diagnosed cryptosporidiosis in all age categories, with a higher frequency until 2 years old (Fayer et al., 2000; Caccio and Pozio, 2006; Cama et al., 2008; Xiao and Feng, 2008).

Our study shows similar results with other studies from abroad with the highest prevalence of the disease in the age category from 1 month to 3 years old (43.75%, 7/16).

People could get infected by their food especially, when they come in contact with animals and show disregard for hygiene. The authors opinions differ regarding the main infection source in humans – some state that the incidence is higher in the rural areas, because of the closer contact between humans and animals, whereas other argue that the protozoa has a higher prevalence in the urban area, being transmitted from man to man (Caccio and Pozio, 2006; Mederle et al., 2009; Dărăbuş and Imre, 2010).

The present study found a higher prevalence of cryptosporidiosis in the children who were living in an urban area (68.75%).

The infection with Cryptosporidium is self-limited to the immunocompetent individuals. The infection could persist in the immunodeficient individuals by self-infecting, even if no reinfection was recorded (Campos et al., 2000; Alves et al., 2001; Xiao and Feng, 2008).

In the present study, the infection with Cryptosporidium was identified on immunospressed organisms: AIDS, ADD, tuberculosis, anemia.

The correlation of the epidemiological results of the research conducted on infected children show the following:

- We diagnosed cryptosporidiosis in children from urban and rural areas
- In both areas, children had contact with animals (cats, dogs, lambs, calves)
The children were living collectively (Kindergarten, school)

They were eating fruit and vegetables from the market or directly from the garden without washing them

The source of drinking water was wells in the rural areas, and springs/tap water in the urban areas

The children did not travel abroad and did not use swimming pools and other recreational waters.

Conclusions

The results obtained following the examination of 212 fecal samples taken from children living in Timiș County, using the direct fecal smears method and the immunoenzymatic technique, show a prevalence of cryptosporidiosis of 7.54% (16/212).

The prevalence of cryptosporidiosis was higher in children aged between 1 month and 3 years: 43.75% (7/16), in children from the urban areas (68.75%, 11/16) and those primarily diagnosed with AIDS, ADD, tuberculosis and anemia.

The results of the epidemiological research point out the possible ways and sources of infestation for children: contact with animals (calves, lambs, cats, dogs), collectivity (Kindergarten, school), eating unwashed fruits and vegetables, drinking water from unsafe sources, possibly infested with Cryptosporidium oocysts.

References


