



Clinic, Epidemiology and Diagnosis of Human Echinococcosis

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Abstract

Cystic echinococcosis or hydatidosis is an infestation caused by the larval form of *E. granulosus* species. It may develop asymptotically or as a severe disease, often fatal, in humans.

Objective: Our study is aimed to realize a radiography of the cases with hydatid cyst (and others form of presentation of the echinococcus infection), which were hospitalized at the regional institute of gastroenterology and hepatology (IRGH) Cluj Napoca, on a considerable period of time (5 years). 192 of cases with the diagnosis of Echinococcus spp. were hospitalized on the period of the 5 years establish to evaluate in our study. Women's number (90) was higher as the men cases (80), Hydatidosis is more common in females, being present in 55 women (55%), than in males (45%), with small differences between different age groups. Patients with the age between 21 and 60 years old have summed almost 75% of the cases, which also represent the period of age when the persons can be most active in the professional jobs. Most of the patients were potentially economically active persons (taking into account workers and unemployed and even the students). From a total of 23 Romanian residence counties, the majority of the patients (53, approximately 30%) are from Cluj county, in which is also located the hospital from where the cases origin. Most frequently the *E. granulosus* species was involved, and in a considerable part the species remained unspecified. Surgery was the primary option of treatment in our casuistry with various type of procedures, most frequently cysto-pericystectomy and drainage. It can be seen that the number of cases in the of each year of the 5 years was relative constant, with little variations, which can indicate the lacking of preventive measures or an insufficiency of it or even the existence of a inherent risk despite of all the measured which were taken. Conclusions: This study offers a pretty faithful image of the current situation about the Echinococcus infection pathology in the Transilvania area, on the period we had evaluated. Hydatidosis can be considered hence endemic on this region and means of prevention and control are still required to be introduced till the elimination of this parasitosis. Encouraging it's the fact that means which have been proven efficient both in the treatment and most important in the primary prevention of this disease are largely available.

Keywords: Hydatid Cyst In Human; Hydatidosis; Human Echinococcosis; Hospitalized Patients; Diagnosis; Clinical Evolution; Serodiagnosis; Therapy

Abbreviations

E: Granulosus; E: Echinococcus; HC: Hydatid Cyst

Introduction

Infectious diseases still represent in our time and in our country a public health burden, although the role of preventive and curative medicine proofed its efficiency, there are limits which make

the infectious diseases and in this particular case Echinococcus disease to still represent a significant part in the morbidity, and fortunately little in mortality

Human echinococcosis is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by parasites,

namely tapeworms of the genus *Echinococcus*. Echinococcosis occurs in 4 forms:

- Cystic echinococcosis, also known as hydatid disease or hydatidosis, caused by infection with *Echinococcus granulosus*;
- Alveolar echinococcosis, caused by infection with *E. multilocularis*.
- Polycystic echinococcosis, caused by infection with *E. vogeli*; and.
- Unicystic echinococcosis, caused by infection with *E. oligarthrus* [3].

The two most important forms, which are of medical and public health relevance in humans, are cystic echinococcosis (CE) and alveolar echinococcosis (AE) [3].

The parasites that cause echinococcosis are found all over the world. Studies have shown that the infection tends to more often affect older people rather than children. Dog owners and people who work with sheep, goats or cows can be more at risk [2].

Like other cestodes, echinococcal species have both intermediate and definitive hosts. The definitive hosts are canines that pass eggs in their feces. After the ingestion of eggs, cysts develop in the intermediate hosts—sheep, cattle, humans, goats, camels, and horses for the *E. granulosus* complex and mice and other rodents for *E. multilocularis*. When a dog (*E. granulosus*) or fox (*E. multilocularis*) ingests infected meat containing cysts, the life cycle is completed [1].

People get echinococcosis by swallowing the eggs of parasites when they eat contaminated food or drink water contaminated with the faeces of animals which have been infected with the tapeworm. The infection is most often spread from dogs, wolves and foxes but can also come from sheep, goats, cattle, camels and horses. Infected humans do not excrete eggs [2].

People who are infected with echinococcosis usually do not have any symptoms. Symptoms are usually caused when the cysts formed by the infection restrict or compress other parts of the body [2].

Patients with hepatic echinococcosis who are symptomatic most often present with abdominal pain or a palpable mass in the

right upper quadrant. Compression of a bile duct or leakage of cyst fluid into the biliary tree may mimic recurrent cholelithiasis, and biliary obstruction can result in jaundice. Rupture of or episodic leakage from a hydatid cyst may produce fever, pruritus, urticaria, eosinophilia, or anaphylaxis. Pulmonary hydatid cysts may rupture into the bronchial tree or pleural cavity and produce cough, salty phlegm, dyspnea, chest pain, or hemoptysis. Rupture of hydatid cysts, which can occur spontaneously or at surgery, may lead to multifocal dissemination of protoscolices, which can form additional cysts. Other presentations are due to the involvement of bone (invasion of the medullary cavity with slow bone erosion producing pathologic fractures), the CNS (space occupying lesions), the heart (conduction defects, pericarditis), and the pelvis (pelvic mass) [1]. Ultrasonography imaging is the technique of choice for the diagnosis of both cystic echinococcosis and alveolar echinococcosis in humans. This technique is usually complemented or validated by computed tomography (CT) and/or magnetic resonance imaging (MRI) scans [3].

Cysts can be incidentally discovered by radiography. Specific antibodies are detected by different serological tests and can support the diagnosis. Biopsies and ultrasound-guided punctures may also be performed for differential diagnosis of cysts from tumors and abscesses [3].

Therapy for cystic echinococcosis is based on considerations of the size, location, and manifestations of cysts and the overall health of the patient [1].

Both cystic echinococcosis and alveolar echinococcosis are often expensive and complicated to treat, sometimes requiring extensive surgery and/or prolonged drug therapy. There are 4 options for the treatment of cystic echinococcosis:

- Percutaneous treatment of the hydatid cysts with the PAIR (Puncture, Aspiration, Injection, Re-aspiration) technique;
- Surgery
- Anti-infective drug treatment
- Watch and wait" [3].

Both cystic echinococcosis and alveolar echinococcosis represent a substantial disease burden. Worldwide, there may be in excess of 1 million people living with these diseases at any one

time. Many of these people will be experiencing severe clinical syndromes which are life-threatening if left untreated. Even with treatment, people often face reduced quality of life [3].

For cystic echinococcosis, there is an average of 2.2% post-operative death rate for surgical patients and about 6.5% of cases relapse after an intervention, thereby requiring prolonged recovery time [3].

The 2015 WHO Food borne Disease Burden Epidemiology Reference Group (FERG) estimated echinococcosis to be the cause of 19 300 deaths and around 871 000 disability-adjusted life-years (DALYs) (1) globally each year [28].

In endemic areas, echinococcosis can be prevented by administering praziquantel to infected dogs, by denying dogs access to infected animals, or by vaccinating sheep. Limitation of the number of stray dogs is helpful in reducing the prevalence of infection among humans. In Europe, *E. multilocularis* infection has been associated with gardening; gloves should be used when working with soil [1].

A programmed combining vaccination of lambs, deworming of dogs and culling of older sheep could lead to elimination of cystic echinococcosis disease in humans in less than 10 years [1,29].

Our study

Is aimed to realize a radiography of the cases with hydatid cyst (and others form of presentation of the echinococcus infection), which were hospitalized at the regional institute of gastroenterology and hepatology (IRGH) Cluj Napoca, on a considerable period of time (5 years). IRGH is a complex hospital, with internal and surgical departments, where are concentrated the most cases with this kind of pathology from the Transilvania region, on and because of the specific pathology treated here: gastroenterological and hepatological, but also because of the prestige and the experience of the medical staff in the treatment of this pathology.

Materials and Methods

In this descriptive study which we designed in an retrospective manner, we study an patients population with Echinococcus spp. hospitalized at IRGH (Gastroenterology and Hepatology Regional Institute) from Cluj Napoca and at the Cluj-Napoca Municipal Hospital, in the following period: 1 January 2011 – 31 December 2015, meaning a full of 5 years. The casuistry consisted in a total of 177 patients, some of them with more than one hospitalization for the

same pathology - echinococcus infections (recurrence of disease) – in this way with a total of 192 of hospitalizations.

In this work which we designed in a retrospective manner, we study patients with hydatidurias, hospitalized at IRGH (Gastroenterology and Hepatology Regional Institute) and at the Cluj-Napoca Municipal Hospital, during 5 years: 1st of January 2011 – 31st of December 2015. The primary criteria for inclusion in the study was the infection with Echinococcus spp. and from the patients stated in the IRGH Cluj Napoca registry and hospitalized in the period already mentioned, no patient was exclude from the study, except that in the evaluation by diverse criteria we consider only the elements of the 1st hospitalization in the case of patients with multiple hospitalizations (for the same pathology), this aspect is explain also in the chapter of the results.

In this work we have intended to fulfill the following purposes:

- To identify the real incidence of the hydatid cyst in Cluj county, by carrying out a retrospective study on surgical cases.
- To establish the risk groups of the hydatid infestation.
- To characterize the evolution of the hydatid disease in Cluj county and its distribution in different population categories, in a 4 - year period (2011-2015).
- To draw hydatid disease incidence, in the studied areas, depending on the sub-areas and the population groups.
- To correlate the serological results (anti-echinococcus antibodies presence) with those obtained from other investigation methods.
- To analyze the hydatidurias gender and age distribution.

The classification and criteria which we evaluated was:

- Patients gender.
- Age of the patients and thereby the classification by age groups.
- The county of residence.
- Provenience: rural or urban.
- Occupations.
- Hospitalization criteria.
- The organ localization of infection.
- The Echinococcus species involved in the disease.
- Therapeutic management.

- Hospitalization period.
- Hospital discharge status: cured, ameliorated or stationary.
- Distribution by years of cases.

In the presentation of results we used tables and graphics to facilitated the lecture and understanding of the information obtained in our endeavor to offer a pertinent evaluation of diverse characteristics of the cases which we used in our study.

Mentionable, the data source we had access to, meaning the electronic database/registry of IRGH Cluj Napoca, lack or have few information which can be very useful in establish some links between the disease and some factors like: jobs specifics, clinical presentation on hospitalization, complications and some others elements which are left unspecified.

These facts give our study less relevance, but, looking at the bright side, we used the information which were available to make this descriptive study pretty relevant in it's own merit.

Results

192 of cases with the diagnosis of Echinococcus spp. were hospitalized on the period of the 5 years establish to evaluate in our study (2011-2015), but from this total of 192 of cases, 15 of them is about readmissions for the same pathology. Hereby, 13 patients had 2 hospitalizations and 1 patient had 3 hospitalizations. Altogether, are 177 patients who have been hospitalized with the Echinococcus infections on the course of the 5 years.

In Romania, as in other countries, frequent readmissions after hydatid cyst surgery took first place in the reintervention liver, which perfectly illustrates the importance of the hydatid disease in the human pathology [39].

Below, we will present the classifications made by diverse criteria over the 177 patients. In the case of the patients which 2 and 3 hospitalizations we had taken into account in our evaluation only the elements of the 1st of them. Practically, in our evaluation we have 177 of cases in total.

Gender classification

Women's number (90) was higher as the men cases (80), as the table and graphic shows.

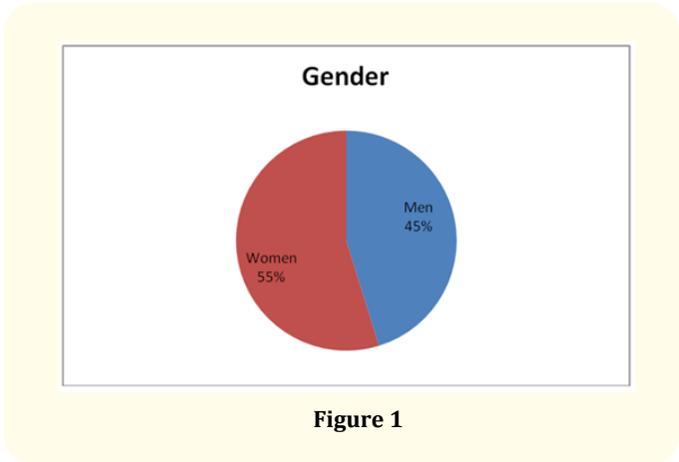


Figure 1

Age groups

Patients with the age between 21 and 60 years old have summed almost 75% of the cases, which also represent the period of age when the persons can be most active in the professional jobs.

| | |
|-------|----|
| < 21 | 10 |
| 21-40 | 69 |
| 41-60 | 68 |
| > 60 | 30 |

Table 1

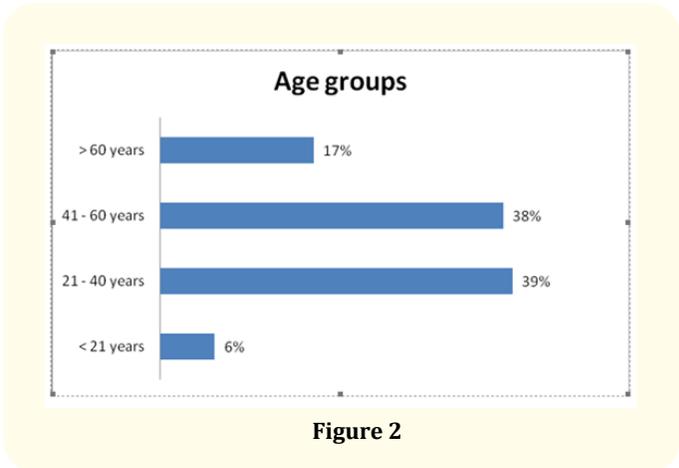


Figure 2

County of residence

From a total of 23 counties of the Romania the patients came, the biggest weight is from the Cluj county (53 of the cases, approxi-

mately 30%), in which is also located the hospital from where we selected the cases.

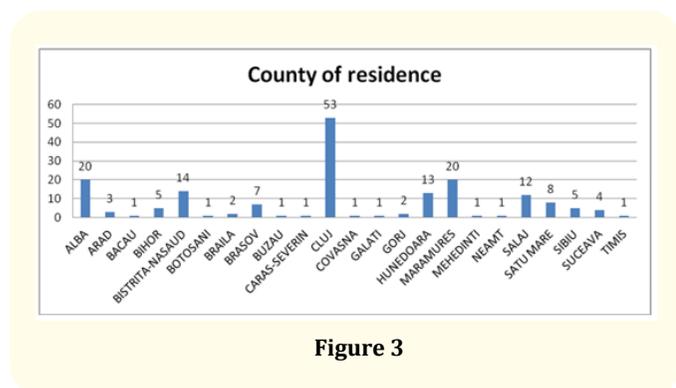


Figure 3

Medium of provenience

| | |
|-------|----|
| Urban | 78 |
| Rural | 99 |

Table 2

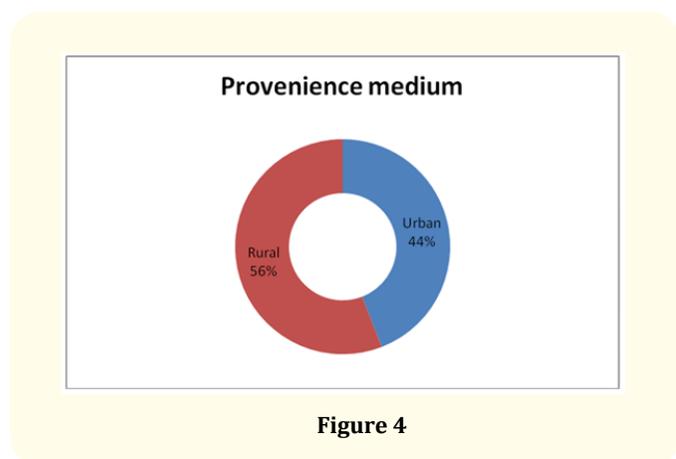


Figure 4

Occupations

Most of the patients were potentially economically active persons (taking into account workers and unemployed and even the students).

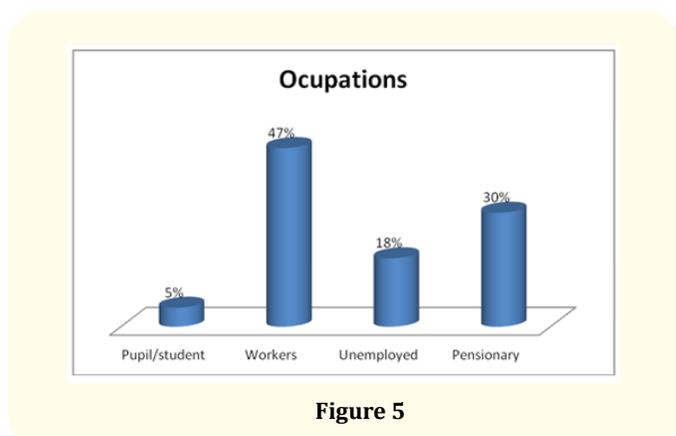


Figure 5

Hospitalization criteria or condition

The emergency class means the type of recording given in the registry we had as a source, and among this patients we find that some of them had as presumptive diagnosis: jaundice, liver abscess, benign or malignant hepatic tumor, anticharities, and celiac disease.

Physician referral class means the patients who were send to the IRGH Cluj Napoca by the family physicians.

| | |
|--------------------|-----|
| Emergency | 33 |
| Physician referral | 144 |

Table 3

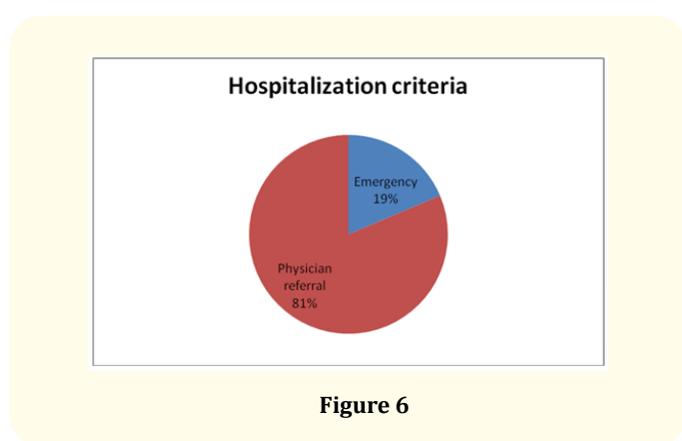


Figure 6

Localization of infection

Predominantly was the hepatic localizations, others for example was the peritoneal echinococcosis.

| | |
|---------------------|-----|
| Hepatic | 172 |
| Other localizations | 5 |

Table 4

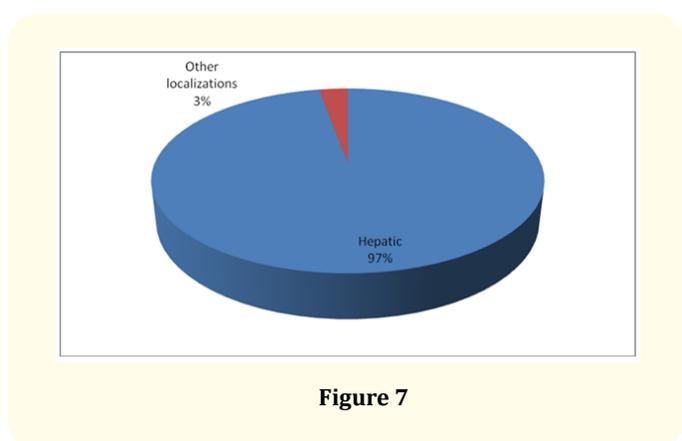


Figure 7

Species of echinococcus

Most frequently the Granuloses species was involved, and in a considerable part the species remained unspecified.

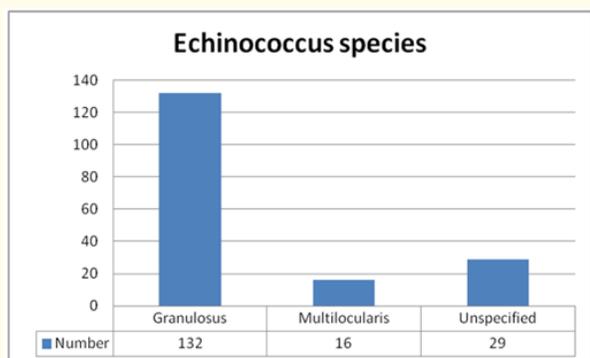


Figure 8

Therapeutic management

Surgery was the primary option of treatment in our casuistry with various type of procedures, most frequently cysto-peri cystectomy and drainage.

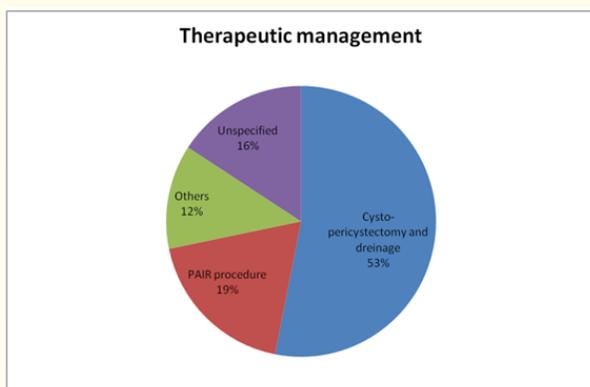


Figure 9

Period of hospitalization

| Days | Nr | % |
|------------|----|-----|
| 1-5 days | 37 | 21% |
| 6-10 days | 96 | 64% |
| 11-15 days | 26 | 15% |
| >15 days | 18 | 10% |

Table 5

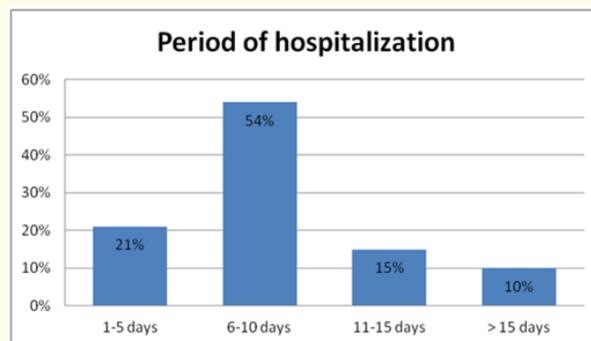


Figure 10

Hospital discharge status

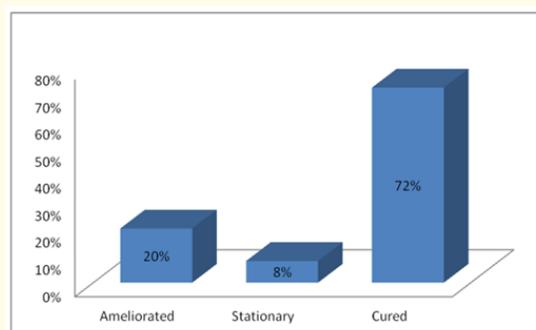


Figure 11

Distribution by years of the cases

There was a little difference of cases by each year, with an average of 35 cases/year.

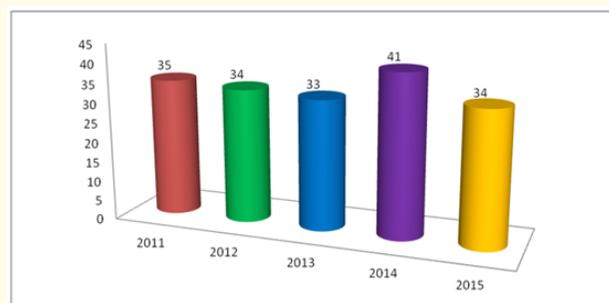


Figure 12

Discussion

The information's which this descriptive study provides can be useful in the assertion of the fact state about the hydatidurias in the Transylvania region [28-49].

It can be seen that the number of cases in the of each year of the 5 years was relative constant, with little variations, which can indicate the lacking of preventive measures or an insufficiency of it or even the existence of a inherent risk despite of all the measured which were taken. These aspects can be correlated with the worldwide state, meaning that hydatidurias is an endemic disease in many of the world states, and even that has been a race for the prevention and control of it and successes have been carried, is that the world still doesn't reach yet the perfect scenario – eradication of echinococcosis infectious in humans.

The differences of the sexes aren't substantially big so we can assume the existence of a higher risk in women's than in men's.

The higher frequency of cases from the patients which have the provenience in the rural medium can be attributed to to life-style conditions, occupations and alimentary habits among others things, which are known to represent a risk for getting the echinococcosis.

Anatomopathological, the site predominantly hepatic is accordant with the global status of the infection and specialty literature descriptions, like also the predominance of the Echinococcus Granulosus species involved in the human hydatidurias.

Surgery (classical or laparoscopic) represented the means used the most frequent in the management of the most of the cases, PAIR procedures or others less invasive ways of treatments are recommended any time when the state of the disease gives this opportunities.

The fact given that the majority of the cases was discharged in cured state and some with ameliorated state, this shows the efficiency of the therapeutically options available, and the fact that that no death was recorded within the casuistry we studied can indicated other positive aspects made in the prevention and control of the disease, specifically the means of prevention and early diagnosis and with the same value the therapeutically options mentioned in our study.

An mentionable aspect is it that we had the chance to get information about the cases of Echinococcus infection from another hospital from Cluj Napoca, hospitalized in the same period like we studied, 2011-2015, and in comparison with the number of the patients registered at IRGH Cluj Napoca, we saw that a percentage less than 10% cases was hospitalized there (Municipal Clinic of Cluj Napoca). This example shows the predominance of managements of the cases in the hospital we had selected the cases for our study.

Conclusions

This study offers a pretty faithful image of the current situation about the Echinococcus infection pathology in the Transylvania area, on the period we had evaluated.

Hydatidurias can be considered hence endemic on this region and means of prevention and control are still required to be introduced till the elimination of this parasitosis.

Encouraging it's the fact that means which have been proven efficient both in the treatment and most important in the primary prevention of this disease are largely available.

Primary option of treatment of the hydatid cyst is still the surgery, with the tendency for less radical procedures when the disease state affords that.

Relative long period of hospitalization, recurrence of the disease, complications means that the Echinococcus infections represent an burden in the aspect of the social and economical costs.

Thereby, despite the progress from the surveillance, prevention and control Echinococcus infections still represent an important public-health issue in the Transylvania region, likewise in Romania and many parts of the world.

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