

## ECHINOCOCCUS GRANULOSUS MULTISYSTEMIC INFECTION - INFLUENCE OF SOCIO-ECONOMIC FACTORS ON PROGNOSIS

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### ABSTRACT

**Introduction:** Echinococcus granulosus eggs` ingestion leads to the parasitosis known as echinococcosis. **Case report:** At age 11 the teenager was admitted for anaphylactic shock (rupture of a hydatid cyst in his right lung, removed together with the medium lobe). Five years later he was admitted for thoracic pain. CT performed at that point showed multiple cystic lesions (pulmonary parenchyma, pleura, liver, subcutaneous tissue). Patients` parents did not agree with the surgical removal of the lesions. After 6 months he presented with respiratory distress after a thoracic traumatism (car accident). Chest X-ray showed multiple lesions with air-fluid levels in the right lung. CT showed multiple cystic masses, some of them ruptured and partially evacuated, in both lungs, mediastinum and peritoneum, associated with pleural effusion. **Conclusions:** We report the case of a teenager diagnosed with a curable parasitic infection during childhood which unfortunately became untreatable due to non-medical factors.

**Key words:** hydatid cysts, social factors

### INTRODUCTION

Cystic echinococcosis is a life-threatening parasitic infection caused by the Echinococcus species (*E. granulosus* and *E. multilocularis*). The disease arises with the ingestion of *E. granulosus* eggs. Diagnosis, treatment and control of the disease are difficult, this condition generating high morbidity and mortality worldwide, with a particularly high prevalence in some areas, including Eastern European countries [1]. Cystic echinococcosis is considered a chronic disease and has a major socio-economic impact through disability and monetary expenses [2-4]. The most frequent site of the larval cysts are the liver and the lungs [5]. Treatment options include surgery and medical treatment, the most frequently used drug being Albendazole, with controversial

efficacy. The first option is usually surgery, but the main problem is recurrence. Medical treatment alone is considered when the disease is classified as inoperable [3,4].

### CASE REPORT

We report the case of a 15 years old male patient who was admitted for the first time to the Department of Pediatrics of "Grigore Alexandrescu" Emergency Children's Hospital in March 2017 for right side lumbar pain.

The patient originates from illiterate parents and lives in the rural area, in improper conditions, with lack of hygiene, and is in frequent contact with animals.

The child was known with Echinococcus granulosus infection for 4 years (since he was 11 years old). At that time he was admitted to

the Surgical Department of our hospital for anaphylactic shock due to the rupture of a hydatid cyst in his right lung, which was removed together with the medium lobe. Subsequently he was prescribed Albendazole, which was not regularly administered. He was lost from follow-up.

Five years later he presented to the Surgical Department for re-evaluation. The chest x-ray showed multiple cysts of the right hemi thorax. Abdominal ultrasound revealed multiple different size cystic lesions of the liver and subcutaneous tissue, some of them with daughter vesicles inside. Cranial, thoracic and abdominal computed tomography (CT) confirmed the presence of multiple hydatid cysts localized in the pulmonary parenchyma, pleura, liver and subcutaneous tissue. The diagnosis of disseminated hydatidosis was established and the patient was recommended to continue the antiparasitic therapy with Albendazole.

Two months after, at the time of admission to our Department, the patient was well-appearing. He was complaining of right lumbar pain. Physical examination showed a surgical scar on the right hemi thorax (Fig. 1) and on the right posterior axillary line a palpable, mobile, painless mass (Fig. 1). The breath sounds were diminished in the lower right hemi thorax, with no crackles. No other abnormalities were seen.



**Figure 1. Right hemi thorax - surgical**

**scar. Mobile, painless mass on the posterior axillary line.**

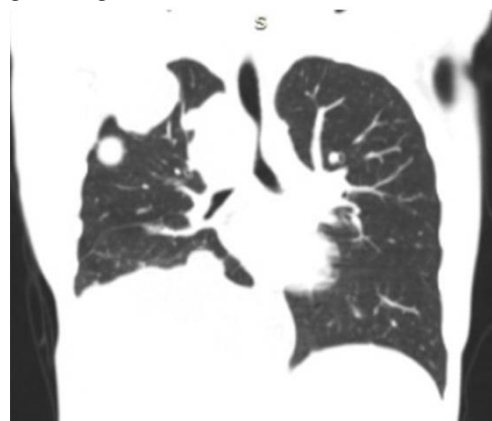
The chest x-ray showed multiple well-defined round homogeneous opacities in the right hemi thorax and ascended right hemidiaphragm due to middle lobectomy (Fig. 2).



**Figure 2. Chest X-ray – multiple well-defined round homogeneous opacities in the right hemi thorax; ascended right hemidiaphragm.**

Abdominal and soft tissue ultrasound showed multiple hydatid cysts, some of them with daughter vesicles inside, located in the right liver lobe, and also of the soft tissue in the right laterothoracic region.

The thorax CT demonstrated multiple cysts localized in the mediastinum, pulmonary parenchyma and in the pleura (Fig. 3, Fig. 4).



**Figure 3. Thorax CT (coronal view), lung window; round macronodular well defined lesions involving the upper right lobe and inferior lobe showing a mass effect on the trachea and right main bronchi.**

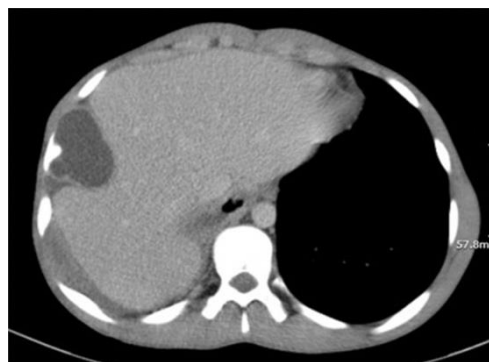


**Figure 4. Thorax CT (axial view), lung window; round macronodular well defined lesions involving the upper right lobe showing a mass effect on the trachea.**

Abdominal CT displayed multiple hydatid cysts in the right liver lobe, peripherally located, para-hepatic cysts and also a cyst located in the right parietal subcutaneous tissue (Fig. 5, Fig. 6).



**Figure 5. Abdominal CT (coronal view) showing hypodense hypoenhancing fluid content lesion with thin enhancing wall, multilobulated, localized inter-hepato-parietal.**



**Figure 6. Abdominal CT (axial view) showing hypodense hypoenhancing fluid content lesion with thin enhancing wall, multilobulated, localized inter-hepato-parietal.**

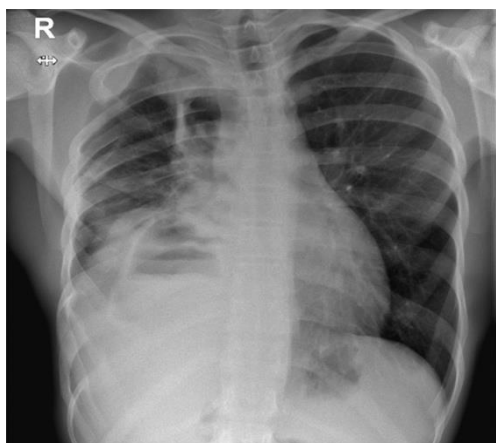
The diagnosis of disseminated hydatidosis was confirmed and the patient was started on Albendazole and pain reliever medication. Cessation of pain was attained.

A parasitological consult was obtained - it was recommended that the patient continued with the antiparasitic treatment (Albendazole 200mg every 8 hours). The evacuation of the pulmonary hydatid cysts was recommended as a first step, with the management of the abdominal ones following as a second step.

Considering this, the patient was referred to the surgical team in order to schedule the intervention for the evacuation of the pulmonary cysts. The patient didn't return for the scheduled intervention and was lost from follow up again.

Six month later the patient was involved in a car accident and subsequently presented with fever, severe persistent spasmodic cough. He was admitted again to the Pediatrics Department. Laboratory tests showed leukocytosis and neutrophilia, high inflammatory markers.

The chest x-ray revealed multiple cavities with air-fluid levels in the right hemi thorax (Fig. 7).

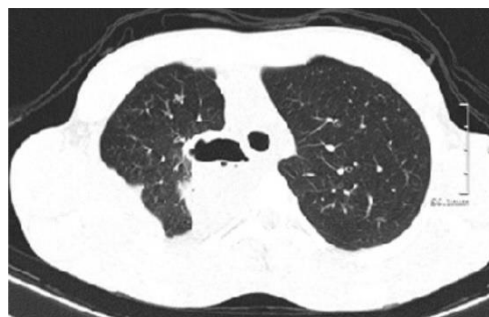


**Figure 7. Chest x-ray - postero-anterior view showing multiple large mixt lesions with air-fluid levels projected in the right hemi thorax.**

The thorax CT showed multiple partially evacuated hydatid cysts at the same level (Fig. 8, Fig. 9, Fig. 10).



**Figure 8. Thorax CT (coronal view) - lung window; multiple cavities located in the right hemi thorax.**



**Figure 9. Thorax CT (axial view) - lung window; cavity with air-fluid level located in the right hemi thorax and posterolateral pleural effusion.**



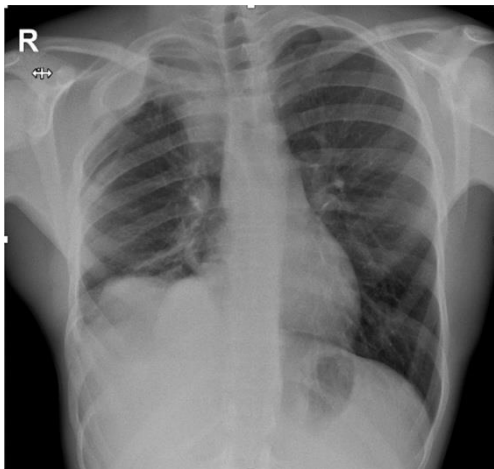
**Figure 10. Thorax CT (axial view) with contrast; cavity with air-fluid level located in the right hemi thorax and posterolateral pleural effusion.**

The diagnosis of multiple complicated pulmonary hydatid cysts was established. The antiparasitic treatment with Albendazole was continued and the patient also received antibiotherapy and symptomatic medication with slow improvement.

After another 3 months the patient was admitted again in the Pediatrics Department for fever, cough and thoracic pain. Physical examination showed the same mass on the posterior axillary line, the patient presented productive cough with mucopurulent sputum, right chest pain - aggravated by breathing and movement, percussion dullness in the lower right hemi thorax, abolished breath sounds and crackles at the same level.

Chest x-ray displayed right apical retractile opacity and several other right basal

opacities, nonhomogeneous, some with internal hyper transparencies, some with air-fluid levels (Fig. 11).



**Figure 11. Chest X-Ray - postero-anterior view; right apical retractile opacity and several other right basal opacities, nonhomogeneous, some with internal hyper transparencies, some with air-fluid levels.**

The diagnosis of bacterial pneumonia was established - probably infected evacuated hydatid cyst. He received antibiotic therapy (Ceftriaxone, Metronidazole, Amikacin) and the antiparasitic treatment was continued with slowly improvement.

## DISCUSSION

We presented the case of an adolescent who was diagnosed with a severe disease, which at the moment of diagnosis was approached surgically. Known the risk of recurrence, subsequent antiparasitic treatment compliance and follow-up might have been essential factors in influencing the outcome of the disease [3,4].

Poverty is known to influence the incidence of different diseases such as digestive viral infections, parasitic infections, etc. Among digestive infections with great impact in Romania lays the rotaviral

infection, but this specific virus is more important to a different age group – infants. Poverty is linked to hydatidosis through environmental pollution by animal faeces and poor standards of hygiene [6,7]. Hence, echinococcosis is known to affect individuals with a low socio-economic status (as in our case - the patient came from a rural area), who may have a limited access to medical care. In these cases, most of the possible preventive strategies (e.g. early detection through screening and prompt management) are ineffective [8]. On the other hand, the “hygiene hypothesis” states that strategies used in order to decrease the incidence of infectious diseases, including parasitic infections, may enhance the risk of allergic and autoimmune diseases, diseases of unknown aetiology – some of them difficult to diagnose in children [9,10].

Moreover, poverty may influence the diet of the patient which may have an important impact on the immune system. For instance, omega-3 fatty acids have been demonstrated to have multiple beneficial effects, both cardiovascular and non-cardiovascular [11]. Dietary fatty acids may also be involved in modulating the immune system. It is discussed that they may influence the quality of the cellular membrane by being integrated in the phospholipids, a phenomenon which depends on the dietary intake of fatty acids. This may be attributed to either modulation of the function of membrane associated proteins that may constitute as receptors or forming ion channels or influencing the enzymatic function [12].

Our patient originated from illiterate parents and had six other siblings. They were animal breeders (horses) - the child did not attend school and was frequently in the proximity of animals. The evolution of the patient was severely influenced by the socio-

economic level of the family which resulted in lack of compliance to the treatment and nonattendance to follow-up clinics. As the parents were illiterate, they had limited understanding of the severity of the disease and the consequences of their neglect. Moreover, the refusal of a further surgical intervention restrained the medical team from delivering the appropriate care. Therefore, until the patient will be legally able to consent for medical procedures, the course of treatment and the outcome of the disease remain questionable. In the absence of treatment, severe complications might arise, potentially life threatening.

The social services were called to intervene and review the situation, but the parents couldn't be convinced of the necessity of the intervention. The family refused to acknowledge the child's pain and did not consent for the surgical intervention.

Minors in Romania are not currently considered legally capable of making independent medical decisions and they are represented by parents or a legal guardian. This regulation is based on the general assumption that the responsible adult will act in the best interest of the child [13]. Due to the ongoing legislation in Romania, even though the teenage patient understood his situation and would have chosen to have the

surgery, he was unable to decide for himself.

Some publications focusing on ethics have analysed the position of minors showing maturity and competence, considering that they might deserve an opportunity in determining the course of treatment [13-14]. There are still some concerns regarding the level of maturity of under-aged adolescents and their ability to make an informed decision, especially when the decision is health-related [14]. In some countries the minor may exert his/her patients' rights without consent from a guardian if he/she is considered able to reasonably appreciate his/her interests [15]. Some authors suggest that respect for human dignity and autonomy is of rising importance in the current society and, because of this, laws in some jurisdictions need to be reviewed, taking into consideration the current international trend [14].

## CONCLUSIONS

The authors presented the case of an adolescent with a potentially curable parasitic infection diagnosed in childhood which became untreatable due to non-medical factors.

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