

HYDATID CYST WITH SURPRISING LOCATION IN THE FORENSIC AUTOPSY CASE REPORT AND LITERATURE REVIEW

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Abstract: Hydatidosis or hydatid disease is a chronic parasitic disease caused by the larval form of the tapeworm *Echinococcus granulosus*. The disease is more common in countries where agriculture, especially sheep farming, occupies an important place in the national economy, while areas with lower standards of hygiene and development show increased prevalence. The hydatid cyst develops by ingesting oncospheres, causing primary hydatidosis, mostly located at the level of the hepatic capillary network [60-70%], 20-30% at the level of the pulmonary filter, and 10-15% in the large circuit, with dissemination in muscles, bones, brain, heart, etc.

The case of a 50-year-old man who died by mechanical asphyxiation by hanging will be presented, during the autopsy an extremely rare disease was discovered: cardiac hydatid cyst.

Keywords: forensic autopsy, cardiac hydatid cyst, rare location.

INTRODUCTION

Echinococcosis [hydatidosis, hydatid disease, cystic echinococcosis] presents a chronic parasitic disease with severe medical and socio-economic implications. The invasion is of interest, mainly, through the destructive damage to the organs and tissues, especially the liver and lungs, through the disabling potential, frequent recurrences and relatively high lethality, as well as through the complexity of the treatment and countermeasures. The disease has a cosmopolitan spread, but it is more common in countries where agriculture, especially sheep farming, occupies a basic place in the national economy, the highest prevalence being recorded in areas where hygiene and development standards are relatively low.

The etiological agent of hydatidosis is represented by the larval form of the tapeworm *Echinococcus granulosus* - a worm from the phylum Plathelminthes, class Cestoda, order Cyclophyllidae, family Taeniidae, genus *Echinococcus*. The parasite has the shape of a tapeworm with dimensions varying between 2 and 6.5 cm. It is composed of the head [scolex], which is slightly globular and measures approximately 0.5 cm. with 4 round suckers and a prominent rostrum [proboscis]

surrounded by a double crown of hooks, 36-38 in number, short and thick neck as well as strobila which consists of 3-4 proglottis. The first and second proglottis are asexual, the third is hermaphrodite, and the fourth - distal, the oldest, is also the longest, being more than half the length of the parasite. This last proglottis, with lateral projections, has a uterus in which there are from 400-800 to 2000 eggs. The eggs of *Echinococcus granulosus* [oncospheres], according to the morphological criteria, do not differ from the eggs of other tapeworm species: they are oval, yellow-brown in color, measure 30-35 mcm, have a thick radial shell and a hexacant embryo. The larval stage of the parasite presents a multinuclear protoplasmic mass in the form of a vesicle, called a hydatid cyst, with dimensions ranging from a few millimeters to 30-40 cm, which contains hydatid fluid.

The development of the hydatid cyst in the human body can be achieved in two circumstances: by ingesting the oncospheres that form a primary hydatidosis, located in different organs, depending on the passive migration of the parasite with the circulatory stream. Most of the embryos are retained by the hepatic capillary network, 60-70%, especially the right lobe; 20 - 30% are retained by the pulmonary filter and only 10 - 15% pass into the large circuit, being disseminated in

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muscles, spleen, brain, kidneys, thyroid, orbit, bones and others. Usually, it is located in a single organ, but multiple locations are also found.

The other way of producing hydatidosis is by breaking some primary hydatid cyst in the body of the intermediate host with the release of protoscolechi,

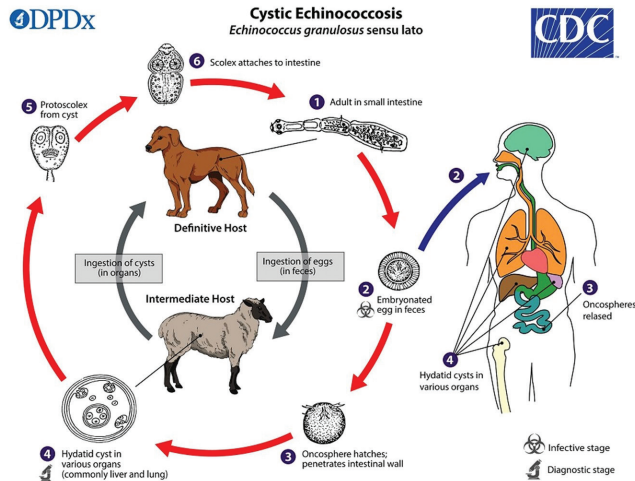


Figure 1. The echinococcosis cycle [3].



Figure 3. Hanging with left submandibular knot.



Figure 2. Hanging with anterior cervical knot, right paramedian.

which give birth to new hydatids, thus producing local secondary echinococcosis or if it spreads far from the primary focus - systemic secondary echinococcosis.

Cardiac hydatidosis can cause ventricular ruptures, pericarditis, cardiac tamponade with the spread of the parasite in other organs and tissues [1, 2].

CASE PRESENTATION

A 50-year-old man from the countryside, Mureș county, who was found dead at home, by hanging, on 2020. The relatives report that he did not use to go to the family doctor, so he was not on record with chronic diseases, nor did he present symptoms characteristic of any pathology; he had various domestic animals in his household: chickens, pigs, cows and sheep.

The autopsy was performed at the Târgu Mureș Institute of Legal Medicine.

The external examination of the corpse reveals the hanging mark (with the rope attached) at the level of the cervical region, upper third, with an oblique-ascending trajectory, with a double knot, one towards the left submandibular region (laterocervical), and the other anterior cervical, right paramedian.

During the internal examination of the corpse, at the level of the heart, postero-apexian, including both ventricles, especially the left one, invading the left ventricular cavity, a whitish-yellowish cystic pseudotumoral formation, of firm consistency, with smooth walls from which clear liqued flowed at the time of sectioning.

The liver has a steatotic appearance without identifying cystic formations at this level (Figs. 8, 9).

A fragment of the heart was collected for histopathological examination and the following were noted:

Heart: on the examined fragment, extensive foci of myocardiosclerosis, hypertrophic myocardial fibers, moderately subepicardic adipose tissue can be observed, the focal wall being replaced by a cystic formation with the wall consisting of a fibrohyaline connective tissue with areas of calcification and reduced inflammatory infiltrate predominantly chronic lympho-plasmacytic [adventitial layer of the pseudocyst], inside the cyst with numerous acellular membranous structures of different sizes, focally with a wavy appearance [acellular/ anchyst layer of the pseudocyst], without visualizing the presence of daughter cells [most likely being a cyst cardiac hydatid].

DISCUSSIONS AND LITERATURE REVIEW

Cardiac hydatid cyst is more commonly located in the left ventricle as shown in a case report from Iran (Ata Firouzi *et al.*), in 2019, of a 57-year-old man who

presented to the hospital with atypical chest pain, which had been going on for about 3 years and had worsened in the last month. Transthoracic echocardiography revealed a well-defined multicystic mass at the level of the postero-lateral wall, i.e. left ventricular



Figure 4. The posterior side of the heart where a bulging, hard pseudotumoral formation is evident.



Figure 5. Sectioning of the heart, starting from the apex, highlighting the cystic.

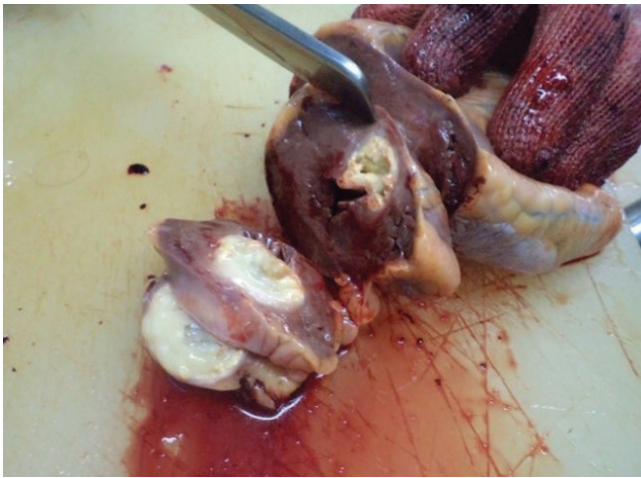


Figure 6. Sectioning of the heart and cystic formation.



Figure 7. Sectioned heart and highlighting of the cyst cavity, with thickened, fibrous walls.



Figure 8. Liver - diaphragmatic surface.

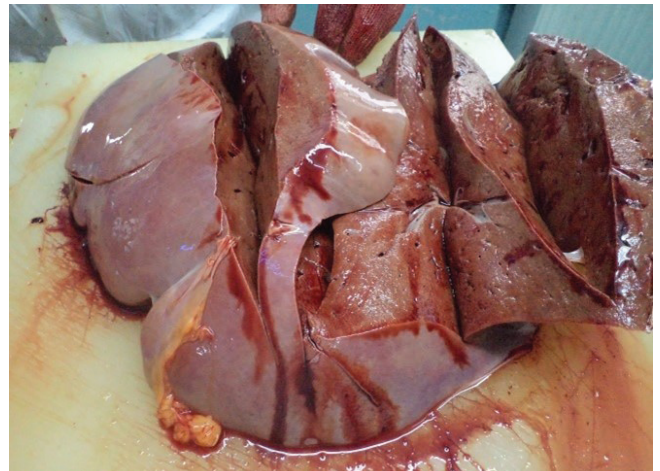


Figure 9. Liver sectioned.

inferoseptal, an aspect suggestive of a cardiac hydatid cyst. The medicinal treatment administered was with Albendazole, later surgical intervention was performed [4].

In a study from Tunisia (S. Fennira *et al.*), in 2019, a literature review was performed, and cases of cardiac hydatid cyst located at the level of the interventricular septum were selected. 45 cases were identified between 1964 and 2019. Most of the patients had atypical chest pain, which could not be classified as angina pectoris. Other symptoms include: palpitations, dyspnea or even syncope, the severity of the symptoms being directly proportional to the size of the hydatid cysts [5].

Cardiac hydatid cyst can also be present in young patients as demonstrated by a case report from Kyiv (V.M. Beshlyagaa *et al.*), from 2001, of a 10-year-old boy who presented to the doctor with fever and chest pain. Transthoracic echocardiography

revealed echinococcosis in the epicardial left ventricle, and the patient underwent a surgical intervention where the cyst was enucleated [6]. Another case of a 12-year-old girl was discovered in Turkey in 2006, when she presented to the doctor with acute dyspnea and palpitations. The echocardiographic examination revealed cardiac tamponade, and pericardial drainage was urgently performed. Cardiac magnetic resonance revealed a primary cardiac hydatid cyst in the left ventricle, without localization in other organs [7].

A rare localization of the cardiac hydatid cyst can be at the level of the right atrium, as was missed in a case report from India [S. Tandon, A. Darbariv], from the year 2006, being about a 24-year-old woman with a medical history of chest pain, hemoptysis, and a right atrial mass. She underwent surgery in which right atrial cardiac hydatid cyst as well as bilateral hepatic and pulmonary hydatid cysts were discovered [8].

In a 2020 case report [Badre El Boussaadani]

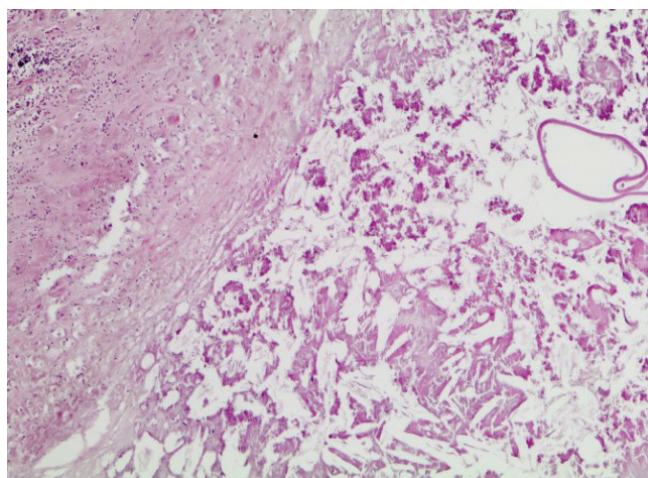


Figure 10. Cyst wall [single anchyost membrane in adventitial layer].

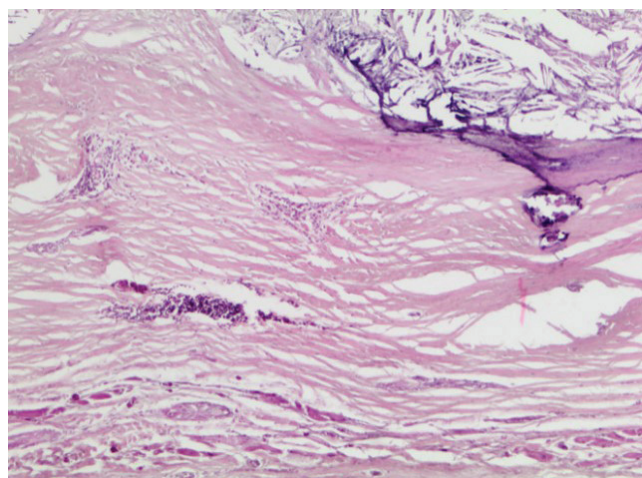


Figure 11. The wall of the cyst with areas of calcification and lympho-plasmacytic inflammatory infiltrate in its thickness; a few myocardial fibers at its periphery.

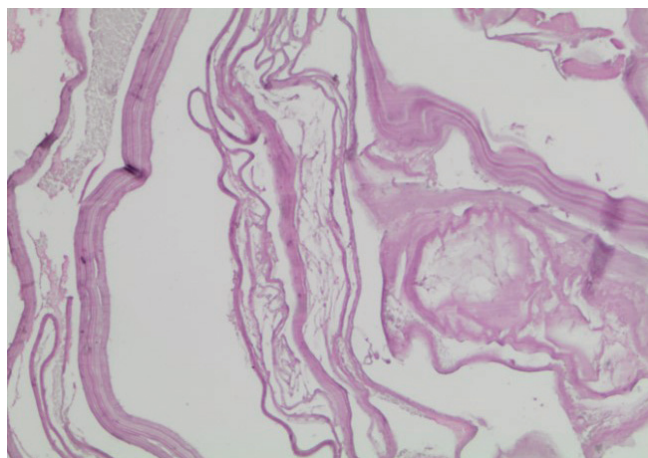


Figure 12. Anchyostic membranes.

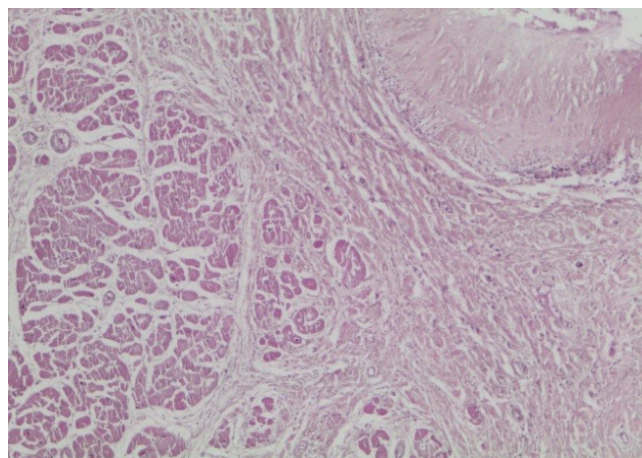


Figure 13. Myocardium and hydatid cyst wall [adventitial layer].

from Morocco, a 70-year-old woman presented to the doctor with right-sided heart failure secondary to the rupture of a primary pericardial hydatid cyst associated with pre-tamponade [9].

CONCLUSIONS

Cardiac hydatidosis is a rare manifestation of *Echinococcus granulosus* parasitic infection. It can be located in different structures of the heart, but the most common location is in the left ventricle. The peculiarity of the presented case is the fact that no other locations of the hydatid cyst were highlighted, so it is a primary cardiac hydatid cyst.

Despite the fact that the death of the 50-year-old man occurred as a result of mechanical asphyxiation by hanging, being a violent death, the accidental discovery of this extremely rare pathology should not be neglected, even if it did not intervene in thanatogenesis.

Conflict of interest

The authors declare that they have no conflict of interest.

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