

Sudden Death Caused by Hydatid Embolism

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Summary. An 18-year-old man died on the spot during a foot race. Previously, he had been in a healthy condition. Since the cause of his sudden death was unknown, a forensic autopsy was carried out. The autopsy revealed hydatid cysts in the right ventricle of the heart some of which had embolized the pulmonary arteries. In case of sudden death in endemic areas the possibility of a hydatid disease should be taken into consideration.

Key words: Echinococcosis, hydatid embolism – Sudden death, hydatid embolism

Zusammenfassung. Ein gesunder junger Mann (18 Jahre alt) starb auf einer Sportveranstaltung. Bei der gerichtsmedizinischen Obduktion wurde eine Herzechinococcosis festgestellt. Abgerissene Cysten hatten eine Lungenembolie verursacht. In Endemie-Gebieten können ähnliche Fälle vorkommen.

Schlüsselwörter: Echinococcosis, Hydatiden-Embolie – Plötzlicher Tod, Hydatiden-Embolie

Introduction

Cardiac echinococcosis has been known since the first presentation by Williams in 1836 [10]. The frequency of cardiac echinococcosis ranges between 0.2% and 2.0% of all echinococcal cases [6]. It is more frequent in the left than the right ventricle of the heart but may be present in the interventricular septum as well [3]. The cardiac form is generally accompanied by primary infection of the liver or the lungs [9]. Symptoms may take a long time to develop for the disease progresses rather slowly. The clinical signs depend on the location. Compression of coronary arteries or conduction defect may occur as complications of cardiac echinococcosis [3]. The rupture of hydatid cysts to pericardial cavity or

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to the circulation may result in embolism or anaphylactic shock [2, 4, 7]. Of the patients 20% died suddenly of anaphylactic shock. The most frequent cause of rupture is a trauma. Madariaga et al. [7] reported the case of a 13-year-old boy suffering cardiac echinococcosis, who died of anaphylactic shock after a small accident because of rupture of hydatid cysts. The diagnosis of this disease in vivo may be difficult. In case the cysts are in the lungs or alter the shape of the heart chest radiogram or echocardiogram can have diagnostic value. As in the ischemic coronary disease owing to the embolism of coronary arteries by cysts, a special electrocardiogram is obtained [5]. Echinococcosis can be proven by Casoni type intradermal skin test. Surgical therapy of cardiac echinococcosis based on the exact diagnosis is possible [1, 8].

Case Report

An 18-year-old man died suddenly during a 3000-m foot race at a sports event. Previously, he had been in a healthy condition and under sanitary inspection of a sports physician. Manifestation of any disease was precluded. After his sudden death a forensic autopsy was requested. Later on, the family history revealed that the patient's family lived in an endemic area, and that his father was a sheep breeder.

Results

Necropsy Findings

At necropsy the heart was found to be dilated, and the right ventricle was rounded. There floated a solitary cyst 15 mm in diameter in the right ventricle (Fig. 1). The cyst showed a semi-transparent, grayish-white laminated layer, and there was unstained fluid in it. Another multilocular collapsed cyst 35 mm

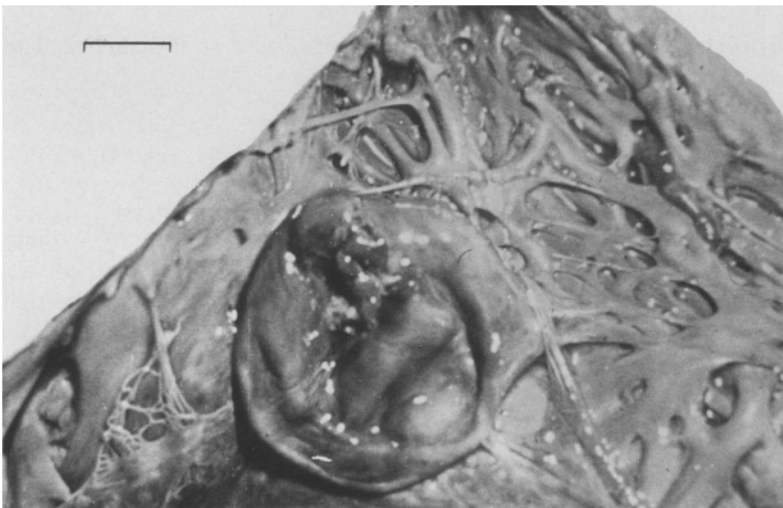


Fig. 1. A ruptured hydatid cyst connected with the endocardium of the right ventricle

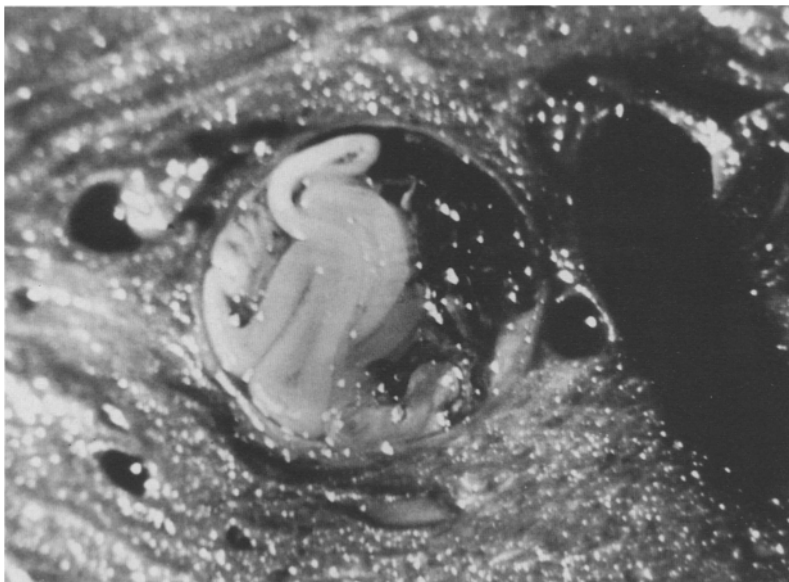


Fig. 2. Embolism of a pulmonary artery by collapsed hydatid cyst and membranes

in diameter with a thicker wall was on the tricuspid valves in the right atrio-ventricular orifice. A locally thickened part of the outer layer of the cyst was adherent to the valvular endocardium. The right ventricle was dilated, its myocardium was fragile and 6 mm in thickness. The secondary and tertiary branches of pulmonary artery were embolized with small collapsed cysts and hydatid membranes. The liver was free from hydatid cysts. The coronary arteries were passable.

Histological Findings

The microscopic examinations showed hydatid cysts connected with the endocardium. The cysts had an eosinophilic and PAS-positive inner layer and a collagenized fibrotic outer layer. There was no recognizable germinal layer. Around a perforation of cyst there were numerous lymphocytes. The ruptured cyst did not contain scoleces or hooklets. No culture was made. The macroscopic and microscopic shapes of the cysts and membranes were the same in the pulmonary arteries (Fig. 2).

Discussion

Echinococcosis is caused by the adult tapeworm *Echinococcus granulosus*. This disease is endemic where sheep are bred. Children are infected more frequently. The disease progresses rather slowly and it can go through life without any symptoms. The parasite is about 5 mm in length and consists of a head and

three proglottids. The intermediary hosts are generally sheep or dogs. The definitive host becomes infected by eating the entrails of the intermediary host. The embryos penetrate the intestinal wall and reach the liver or the lungs. Here the embryos develop into hydatids containing scoleces with hooklets. The cysts present an outer laminated elastic layer and an inner germinal layer. Some of the cysts may collapse and undergo fibrosis and calcification. Liberated into the circulation, the hydatid fluid causes allergic manifestation and anaphylactic shock. The rupture of the cysts is more frequent in the right than in the left ventricle of the heart. After rupture visceral metastases or embolism may occur. We described the sudden death of an 18-year-old man caused by hydatid embolism. His death happened during a sports event. The undiscovered basic disease and the cause of death were cleared up by a forensic autopsy. According to the family history, the family of the deceased man lived in an endemic area, and his father was a sheep breeder. Under similar circumstances, when sudden death occurs, hydatid disease must be considered.

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