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Case Report

Imaging features of the lungs hydatid cyst disseminated into the brain and spleen

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ABSTRACT

Hydatid cyst commonly affects liver followed by lung, but rarely affects may be found in almost any organ simultaneously. We present an unusual case of disseminated pulmonary hydatidosis and its imaging features before medical therapy. Diagnosis was confirmed by pathologic findings and positive response to antihelminthic drugs.

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Introduction

Hydatid disease (Echinococcosis) is a parasitic infection primarily caused by the larvae of the cestode *Echinococcus granulosus* (*E. granulosus*). This tapeworm is responsible for cystic echinococcosis (CE), which is the most common form [1]. Humans are aberrant intermediate hosts who become infected by ingestion of egg-contaminated food or water or via physical contact with domestic or wild animals that carry the parasite in their small intestine. Cystic hydatid disease is an endemic

trouble in parts of Eastern Europe, Middle East, South America, Australia, New Zealand, Alaska, and Canada. Echinococcosis caused by infection with larval form of parasitic tapeworm *E. granulosus* [1,2]. Disseminated hydatidosis is a rare disease and may involve any organ of the human body [3]. Hydatid cyst commonly affects liver and lung, but rarely affects both organs simultaneously [4].

We reported a rare case of brain, liver, and spleen hydatidosis as a result of disseminated hydatid cysts from the lung hydatid cyst.

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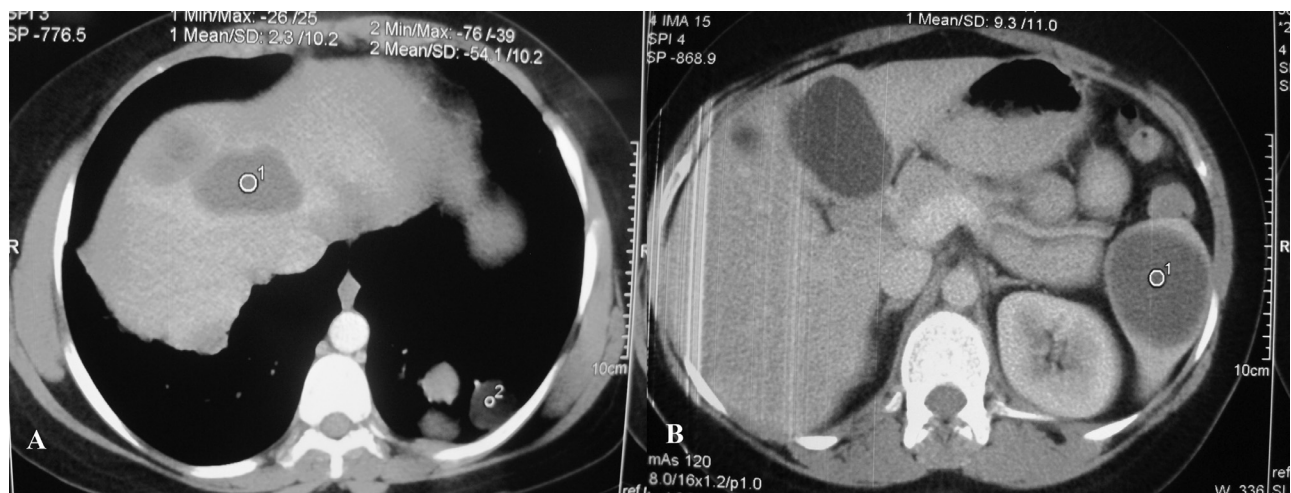


Fig. 1 – Computed tomography images shows soft-tissue sites where ROIs (circles) were placed for measuring Hounsfield unit values. (A) Image shows ROIs in right lobe of the liver and spleen. (B) Image shows ROI in the renal cortex.

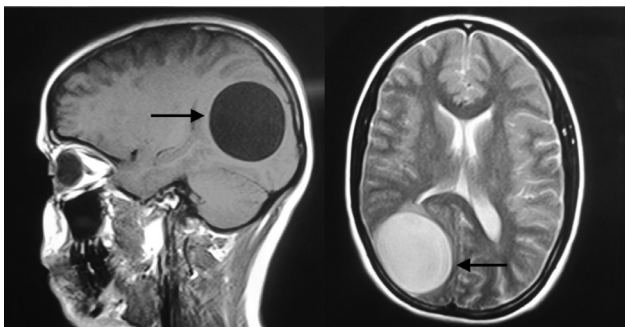


Fig. 2 – A $55 \times 52 \times 52 \text{ mm}^3$ cystic mass in the right parieto-occipital region with minimal edema in T2 (arrows).

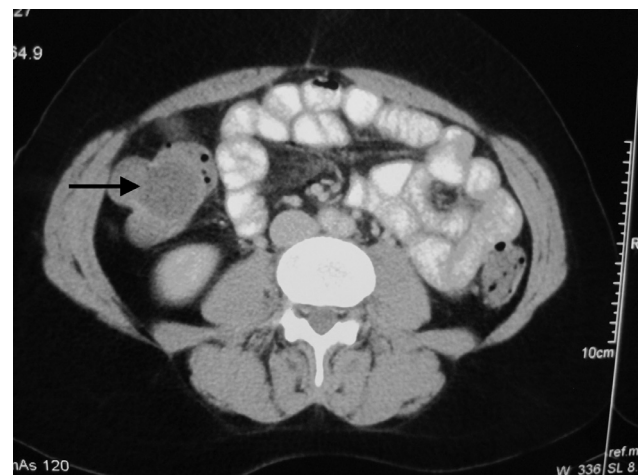


Fig. 3 – Computed tomography of the abdomen showing multicystic lesions.

Case report

A 33-year-old female who had presented with fever, cough, weakness, and fatigue for 1 month before referring to our hospitals. Given the symptoms of the patient, diagnosed with atypical pneumonia, improved relatively after antibiotic treatment. After 1 month, she presented with headache, nausea, and vomiting. Neurologic examinations were normal except for visual field defects on the left side. Brain MRI (Magnetic resonance imaging) and chest CT (computed tomography) scan revealed some masses (Fig. 1). Despite the negative serologic results, the patient's MRI showed a $55 \times 52 \times 52 \text{ mm}^3$ T1 low, T2 high signal cystic mass in right parieto-occipital region with minimal surrounding edema without increasing contrast and calcification (a radiological finding for the diagnosis for hydatidosis) (Fig. 2). In addition, the imaging of the lungs, spleen, and liver indicated that there were numerous cysts in all of these organs (Fig. 3).

In the pathologic examination of the specimen, irregular laminated layers or protoscoleces were noticed. The laminated layer is one of the specific characteristic of the CE, which is not seen in the alveolar hydatid disease (Fig. 4).

The treatment of choice for intracranial hydatid cyst is often a combination of cyst removal and administration of benzimidazole carbonate (albendazole and mebendazole). The World Health Organization recommends a dose of 10–14 mg/kg/day for 4–6 weeks for treatment, while other studies recommend that therapeutic strategies be tailored to the patient according to infection severity, cyst location, and drug resistance [4]. The patient was treated with albendazole 10 mg/kg/day in 2 divided doses for 3 weeks in order to ensure protective protoscolicidal doses during the surgical procedure.

Discussion

E. granulosus can be found across the globe but is endemic in sub-Saharan Africa. One of the most important endemic

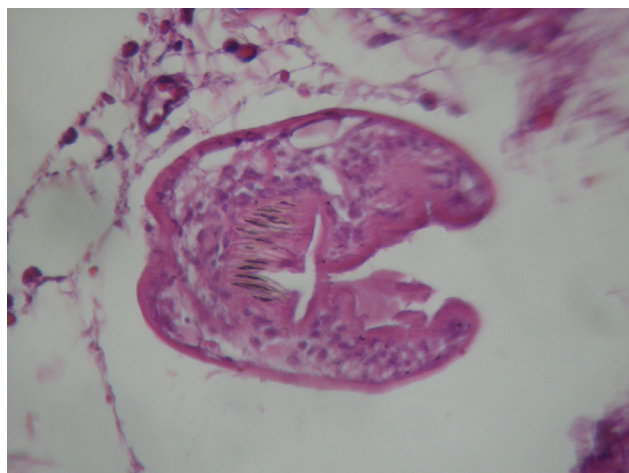


Fig. 4 – Hematoxylin-eosin stainings showing details of the protoscolex with hooks (Magnification x400).

areas of human hydatid disease in Asia is Iran [1]. Hydatidosis is a unique parasitic disease which can occur almost anywhere in the body and demonstrates a spectrum of imaging features that vary according to growth stage, associated complications, and affected tissue. The lungs are the most commonly involved organ in children. Even though hydatidosis mainly affects the liver and the lungs, other organs such as the brain, skeletal muscle, spleen, kidney, and bone may also be involved. Among the comparatively less commonly involved areas, the rarest site is the parenchyma of the brain [2].

Hydatid cysts of the lung can occur in both lobes of the lungs, with the right lower lobe being the most commonly involved area. Although the infection may also occur in childhood, due to the slow growth and progression of the disease, most adults with the liver and lungs hydatid cysts are symptomatic, and only about 10%-20% of cases are detected up to the age of 16 years.

Different imaging modalities such as CT scan, MRI, and ultrasound (*ultrasound* scanning or sonography) can detect lesions in deep organs such as the liver and lungs, and help determine the extent and position of cysts that are fluid-filled and lack blood supply. Due to nonspecific clinical signs, the definitive diagnosis is based on imaging, serologic, and histologic findings [5]. The result of the serologic test was negative for the patient.

Radiologic feature of cerebral hydatid cysts consists of unilocular cyst which is isointense or *isoattenuating* relative to cerebrospinal fluid and in the fibrous capsule fine peripheral enhancement can be seen. Differential marker of cerebral CE from tumor and abscess is absence of surrounding edema and the marked mass effect. Also, characteristic feature of CE of the brain, especially on T2-weighted MRI, is the presence of a *hypointense rim* [6].

Hydatid cysts in the liver have 2 subtypes included solitary (single) and multiple which can appear unilocular or multilocular. Calcification is occasionally occurs in the wall of the cysts and is seen at radiography in 20%-30% CE of the liver. Calcification is regularly curvilinear or ring like and involves

the pericyst. The cyst wall of liver CE is ordinarily thin and well defined but may be thick and can enhance on CT scan. In the pericyst, "split wall" can create by split-up of the laminated membrane [7,8]. Hydatid cysts in the spleen are usually single, and their radiologic features are same to those of hepatic CE. Calcification may also be seen in the splenic cysts [9].

In our case, cerebral hydatid cyst had the typical radiologic features that mentioned. In the case of liver and spleen hydatid cyst in this case, stage 1 without calcification and multiple involvement was observed. As seen in the mediastinum view, lung hydatid cyst in this case is a hypo-attenuate soft tissue mass which has not accordance to mentioned sign and in some cases [10].

Eventually, although cystic hydatidosis is endemic in Iran, only a few patients were reported to have had hydatid cyst as disseminated.

The patient underwent brain surgery and intact resection of a hydatid cyst from her brain parenchyma was performed. She was treated with albendazole at the same time and she reacquires her consciousness. Also, her headache, nausea, and vomiting were completely resolved and she transferred to another hospital for further treatment.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2019.05.005.

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