Hepatic Cystic Echinococcosis with Specific CT Findings

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Abstract

A hepatic central bisegmentectomy was performed on a 36-year-old Iranian man with suspected cystic echinococcosis. Hepatic computed tomography (CT) scan findings showed a large cystic lesion, which included many small round shaped cystic lesions. The diagnosis of hepatic cystic echinococcosis was confirmed during surgery. The aforementioned CT scan findings may be specific findings for cystic echinococcosis, in spite of a low appearance rate.

Key words: Echinococcus granulosus, hydatid disease, liver


Introduction

Cystic echinococcosis, alveolar echinococcosis and polycystic echinococcosis due to the larval stage of Echinococcus granulosus, E. multilocularis and E. vogeli or E. oligarthrus, respectively, are known as human echinococcosis. E. vogeli and E. oligarthrus are endemic only in Central and South America, E. granulosus in both hemispheres and E. multilocularis in the northern hemisphere. Therefore, worldwide cystic echinococcosis and alveolar echinococcosis are important hydatid diseases for humans. In general, physicians are made aware of the presence of cystic echinococcosis via computed tomography (CT) or ultrasonography findings, however, Japanese physicians are unfamiliar with this parasitic disease because cystic echinococcosis is not endemic in Japan. Recently, we treated a patient with cystic echinococcosis whose hepatic CT showed findings specific to cystic echinococcosis.

Case Report

A 36-year-old Iranian man visited the emergency room of our hospital in July 2005 due to 2 months of right hypochondralgia, and was admitted to the department of surgery of our hospital in August 2005. He had no history of echinococcosis, and had been living in Japan from 1992. On admission, physical examination revealed no abnormal findings except for serious tenderness in the right hypochondrium. Laboratory data in July 2005, showed a normal blood cell count and normal biochemical data except for an ALP of 323 U/l and CRP of 1.57 mg/dl. An abdominal CT scan in July 2005 revealed a large cystic lesion, which included many small round shaped cystic lesions that had a lower density inner substance than the density of the inner substance of the large cystic lesion in the right lobe of the liver, and the wall of large cystic lesion was moderately enhanced (Fig. 1). No calcified lesions were found in or around the lesion. The large cystic lesion and these small cystic lesions are thought to be a mother cyst and daughter cysts, respectively, of cystic echinococcosis. Cystic echinococcosis was suspected as being his disease via the aforementioned CT findings and by the fact that he came from Iran, where cystic echinococcosis is endemic. Moreover, the positive presence of serum antibodies against E. granulosus was also indicative. A hepatic central bisegmentectomy was performed and the diagnosis of hepatic cystic echinococcosis was confirmed during surgery. Daughter cysts, jelly like substances, and watery fluid were found in the cavity of the mother cystic lesion macroscopically (Fig. 2); the daughter cysts also had watery fluid in their cavities. Microscopic observation of a daughter cyst revealed the presence of a laminated layer, germinal layer, brood capsules and protoscolices (Fig. 3).

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Figure 1. Abdominal contrast-enhanced CT: A large hepatic cystic lesion which includes many small round shaped cystic lesions that have a lower density of inner substance (white arrows) than the density of the inner substance of the mother cystic lesion identified in the right lobe of the liver. The wall of the large cystic lesion is moderately enhanced (black arrow).

Figure 2. Macrofindings of the hepatic cyst (a. non fixation, b. after fixation with formaldehyde): Many daughter cysts (DC) and jelly like substances (J) are seen.

Figure 3. Microscopical findings of a daughter cyst: Laminate layer (LL), germinal layer (GL), brood capsule (BC), and protoscolex (PS) are seen.

Discussion

Haddad et al reported that a thick cyst wall was surrounded by a hypodense rim in 4 of 14 patients with hepatic cystic echinococcosis who underwent CT (1), however, this finding was not identified in the CT of the present patient. Taourel et al reported that CT showed daughter cysts in the mother cyst with a lower density of fluid than the density of fluid in the mother cyst in 8 of 27 (30%) hepatic cystic echinococcosis cases (2). The CT findings of our patient were the same as their findings. The presence of daughter cysts is a pathognomonic sign of the cystic hydatid nature, and these CT findings are thought to be specific for cystic echinococcosis in spite of the low appearance rate of 30%. To the best of our knowledge, the reason for the difference in density of inner substance found in the CT between the mother cyst and daughter cysts is not known. In the present patient, the mother cyst had jelly-like substances and fluid in its cavity, with the jelly-like substances possibly owing to the higher density.

Brood capsules originate from germinal layer cells budding out into the cavity of daughter cysts, and protoscolices develop from the inner wall of brood capsules. A final host becomes infected by ingesting protoscolices, and each matured protoscolex is capable of developing into an adult E. granulosus in the small intestine of a final host. Daughter cysts are seen as small cysts in the mother cyst as mentioned above, however, brood capsules, formed in the daughter cysts, were not seen in the CT of our patient. Brood capsules are constructed of a thin cell layer, and it is thought that the size of brood capsules and protoscolices is so small and the wall of brood capsules is so thin that neither are identified through CT. The walls of the mother cyst are constructed of a germinal layer, laminated layer and fibrous tissue. It is known that the fibrous cyst wall is formed by the host, while the germinal layer is parasite tissue and the laminated layer is thought to be the parasitic origin. In the CT of our patient, the moderately enhanced wall surrounding the mother cyst was thought to be fibrous tissue.

Suitable intermediate hosts of E. granulosus are sheep, cattle, goats, camels, pigs and caribou; a high prevalence being found in many areas where these animals are raised, especially in Europe, Africa, the Middle East, India, Nepal, China, the Russian Federation, Tasmania, Australia, North America and South America (3). Physicians should consider cystic echinococcosis on seeing patients who come from or have returned from any of the areas mentioned above, and their CT findings show a large cystic lesion containing smaller round shaped cystic lesions with a lower density inner substance than that seen in the large cystic lesion.

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References

