Case Report

Hydatid Cyst of the Liver: Identification of Detached Cyst Lining on CT Scans Obtained After Cyst Puncture

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We describe a patient with proved hydatid cyst of the liver in whom a membrane in the lumen of the cyst became visible on CT scans obtained after cyst puncture. This apparently represents the lining of the cyst and may be a unique CT finding for hydatid cysts. The patient was treated with percutaneous injection of hypertonic saline into the cavity.

Case Report

A 40-year-old woman with a 3-month history of vague pain in the right upper quadrant was seen. Her medical history was unremarkable and routine laboratory values were normal. CT examination revealed a round, purely cystic mass in the liver that measured 55 mm in diameter and had well-defined borders (Fig. 1A). Results of the complement fixation test for hydatid disease were negative.

Considering hydatid disease or a simple serous cyst in the differential diagnosis, percutaneus aspiration was performed for diagnosis and therapy. A 20-gauge needle was inserted into the cyst cavity under CT guidance. The cyst cavity was approached via the transhepatic route rather than transperitoneally in order to prevent spillage of hydatid material. The cyst had a high intraluminal pressure; clear fluid spurted out as soon as the stylet of the needle was withdrawn.

A CT scan obtained immediately after aspiration while the needle was still in place revealed a membrane detached and floating in the remaining cystic fluid (Fig. 1B). It was postulated that this membrane represented the detached endocyst of a hydatid cyst. Microscopic examination revealed fragments of membranes and scoleces and clarified the diagnosis. Hypertonic saline (20% sodium chloride solution) was injected into the cavity as a scolecidal agent. The amount injected was a little less than the amount aspirated. After 5 min, the fluid was reaspirated and the needle was withdrawn. The hypertonic saline acted as a contrast agent owing to its high density (about 180 H), enabling assessment of the cavity (Fig. 1C). No biliary tract communications were detected. No complications occurred during or after the procedure.

A CT scan 1 month later showed enlargement of the cyst, probably because of the osmotic effect of the remaining hypertonic saline, and fragments of detached membranes were still detectable. A hypodense halo was seen around the lesion, probably owing to edema. In the follow-up period of 6 months, the patient was asymptomatic and a significant reduction in the size of the cyst, with a persistent small cavity, was observed.

Discussion

Hydatid disease is endemic to many parts of the world, including the Mediterranean and Baltic areas, South America, Australia, the Middle East, and Northern Canada. Increasing immigration is said to have led to a rise in the prevalence of this disease in North America, primarily in adults who have harbored the parasite since childhood [1]. The appearance of hydatid disease on sonographic or CT examinations is characteristic only when daughter cysts or a floating membrane is detected [2]. In the absence of these features, the diagnosis cannot be established with certainty. It was postulated that MR imaging, with its ability to differentiate subtle differences in tissue characteristics, might provide a definite diagnosis in

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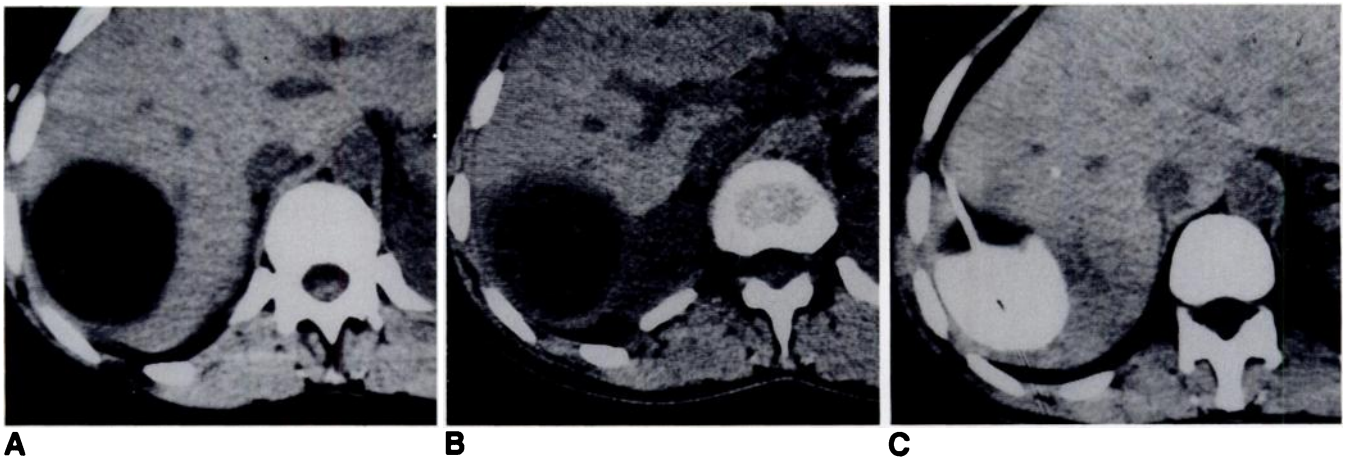

Fig. 1.—*A*, CT scan shows purely cystic mass 55 mm in diameter in posterior segment of right lobe of liver.
***B*, After aspiration, detached lining of cyst is visible on CT scan.**
***C*, CT scan shows hypertonic saline in cavity.**

unclear cases by unequivocally demonstrating daughter cysts and other debris [3]. Unfortunately no imaging technique, including MR imaging [4], has yet been able to differentiate purely cystic hydatid lesions, which comprise the majority of hydatid manifestations [5], from simple cysts. Until recently, the Casoni skin test was the only way of testing for exposure to hydatid disease, but it has high false-positive and false-negative rates and has been abandoned in many centers. Many new, more sensitive and specific serologic tests are now available.

Even after percutaneous aspiration of the cystic fluid, the results of microscopic analysis of the specimens might be negative [2]. Because of the limitations in imaging techniques and serologic tests, aspiration of a hydatid cyst cannot always be avoided. In some cases, the differentiation of a serous liver cyst from a purely cystic hydatid lesion is possible only with percutaneous aspiration of the cyst. Although percutaneous aspiration of hydatid cysts of the liver is still considered contraindicated by some physicians, several cases of aspiration have been reported with minor complications [2]. With the use of fine needles and the transhepatic route, the chance of spillage is extremely low and may be less than might occur with surgical manipulation.

Echinococcal cysts are composed of both host and parasite tissue. The pericyst is a layer derived from compressed host tissues and chronic inflammatory cells. The true cyst wall is derived from the parasite and is composed of two layers: the acellular outer layer (the ectocyst) and the one-cell-thick germinal membrane (the endocyst). These two layers are usually referred to as the endocyst. The intracystic fluid pressure rises as high as 80 cm H_2O, and this pressure keeps the endocyst tightly adhered to the pericyst. Layers of the cyst wall cannot be differentiated by imaging techniques.

In the present study, percutaneous cyst aspiration was performed in a patient with a purely cystic liver lesion. The fall of the intracystic pressure caused by the aspiration detached the membrane (endocyst) from the wall (pericyst). This phenomenon is called the membrane detachment sign and it is analogous to the water lily sign, which is a well-established radiologic sign of hydatid cyst rupture into an airway in the lung, in which the membrane is seen in profile floating at an air-fluid level and is reminiscent of a floating water lily. A sonographic water lily sign has also been described for the appearance of the detached and collapsed germinal membrane after leak of fluid from a hydatid cyst [6]. The membrane detachment sign is unique for hydatid disease, as no other cystic mass has been described with an inner lining that would detach when the pressure inside the cavity falls.

In addition to the case reported here, we have subsequently performed percutaneus aspiration in four more patients with presumed purely cystic hydatid disease of the liver without serious complications. One of these patients had a history of hydatid disease and two patients had positive complement fixation tests. The membrane detachment sign was positive after aspiration in each case. Microscopic examination verified the diagnosis in three patients. In the remaining patient the fluid was acellular but antigenic. Serologic examination of the aspirated fluid verified the diagnosis.

Scolecidal agents commonly used during surgery include 80% alcohol, a 0.5% silver nitrate solution, and hypertonic saline solutions. We used hypertonic saline as a scolecidal agent. One advantage of hypertonic saline is that, because of its high density, it acts as a contrast agent; this enables one to assess the cavity better and to detect biliary tract communications if any are present, without using iodinated contrast media.

We believe that percutaneous hydatid cyst aspiration without injection of a scolecidal agent will not be effective therapy and recurrences must be expected.

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