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# Purely Cystic Hydatid Disease of the Liver: Treatment with Percutaneous Aspiration and Injection of Hypertonic Saline[1]

**Percutaneous aspiration of purely cystic liver lesions was performed in 15 patients aged 11–56 years. After aspiration under guidance with computed tomography (CT) in 12 patients, a membrane that is diagnostic for hydatid disease was visible in the lumen of the cyst on CT scans. Hypertonic saline was injected in the cystic cavities of these patients as a scolecidal agent. No major complications occurred during or after the procedures. In the follow-up period of 6–16 months, control CT and ultrasound scans revealed a progressive decrease in the size of the lesions and no evidence of peritoneal seeding. It is concluded that percutaneous aspiration and hypertonic saline injection for purely cystic hydatid disease of the liver seem to be an effective form of treatment and may eventually prove to be an alternative to surgical intervention.**

**Index terms:** Cyst, percutaneous drainage, 761.3121 • Echinococcosis, 761.2083 • Liver, cysts, 761.3121 • Liver, echinococcosis, 761.2083 • Liver, interventional procedure, 761.1229, 761.2083

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THE appearances of hydatid liver disease due to *Echinococcus granulosus* on sonograms, computed tomographic (CT) scans, and magnetic resonance images have been well documented (1–4). However, it may be difficult to distinguish hydatid cysts from other space-occupying lesions of the liver with these techniques when characteristic daughter cysts or septa are not present. Serologic tests are also used to distinguish between a hydatid cyst and other mass lesions. The sensitivity of serologic tests varies between 63% and 87%, depending on the techniques used and the criteria used for positivity (5).

Although percutaneous aspiration of hydatid cysts has been discouraged because of potential complications such as anaphylactic shock or seeding due to spillage, unintended aspiration cannot always be avoided in clinical practice. However, no fatal allergic reactions or seedings of the disease have been reported in the intended or unintended aspirations of hydatid cysts (6–9).

We report our use of percutaneous diagnostic aspiration of purely cystic liver lesions in 15 patients and therapeutic hypertonic saline injection in 12 patients in whom a membrane became visible in the lumen of the cyst after aspiration diagnostic for hydatid disease (10).

## PATIENTS AND METHODS

Fifteen patients (nine male and six female patients aged 11–56 years [mean age, 31 years]), underwent percutaneous aspiration of purely cystic lesions of the liver. Seven patients had pain in the right upper quadrant. In the eight other patients, the lesions were found incidentally during abdominal sonographic examinations. Five patients had a history of surgery for hydatid disease. Results of immunologic tests were available in 12 patients, and results were positive in seven patients.

Because *E granulosus* is endemic to our area, the diagnosis of hydatid disease was suspected before aspiration in all of our patients. All lesions were solitary and purely cystic and were 40–100 mm in diameter (average diameter, 60 mm). In five patients, postoperative changes also existed due to previous operations for hydatid disease. These patients and four patients with positive results of serologic tests were given 50 mg/kg of mebendazole (Vermox; Janssen Biochimica, Beerse, Belgium), a chemotherapeutic agent for hydatid disease, every day for 3 days for prophylaxis against potential spillage before aspiration. Twelve lesions were in the right lobe; two lesions, in the left lobe; and one lesion, in the caudate lobe. All patients had an intravenous catheter, and resuscitation equipment was available in case of anaphylaxis. Under CT guidance, a 20-gauge needle was inserted through the normal hepatic parenchyma into the cystic cavity. The cystic cavity was approached via the transhepatic, rather than the transperitoneal, route to prevent dissemination of the disease by spillage of hydatid material. The approximate volume of the cyst was calculated, at least 50% of the cystic fluid was aspirated, and specimens were submitted for cytologic, microbiologic, and/or serologic assessment. In some patients the needle was obstructed during aspiration, probably because of membrane fragments. The obstruction was relieved by reinsertion of the stylet. To decrease the risk of traumatic spillage and the needle tip slipping out of the cavity in these patients, aspiration of 50% of the cystic fluid was considered adequate.

Immediately after aspiration, control CT scans were taken while the needle was still in place. In 12 patients, a totally or partly detached membrane became visible in the remaining cystic fluid. In these patients, hypertonic saline (20% sodium chloride solution) as a scolecidal therapeutic agent was injected into the cavity. The amount injected was a little less than the amount aspirated. Control CT scans were obtained to check for the dilution of hypertonic saline and proper contact of hypertonic saline with all parts of the cavity and to assess the presence of biliary communications. After 5–10 minutes, the maximum possible amount of fluid was reaspirated and the needle was withdrawn. All

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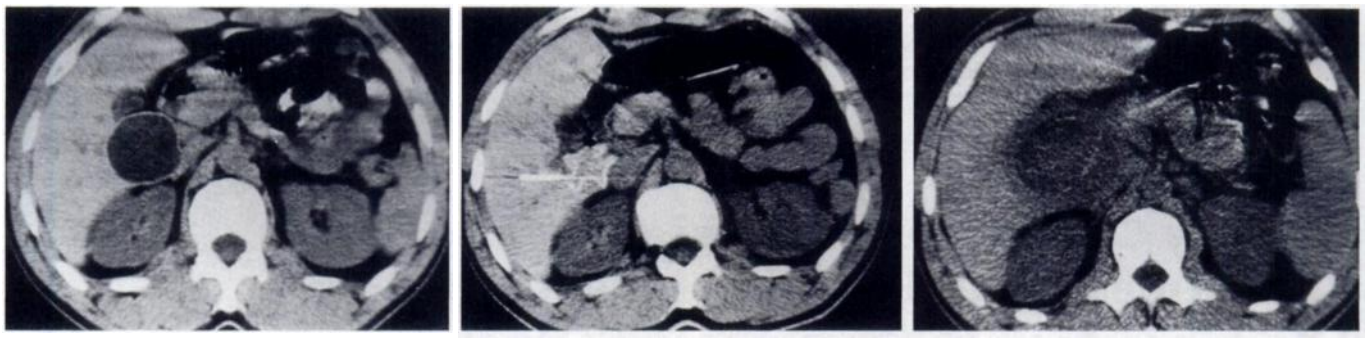
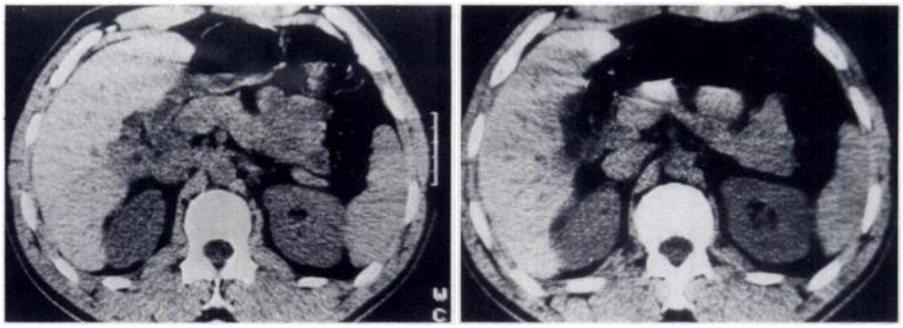


a. b. c.

**Figure 1.** **(a)** Purely cystic hydatid lesion, 50 × 40 mm, in the caudate lobe. **(b)** After aspiration the membrane becomes visible. The needle is still in place. **(c)** Follow-up CT scan obtained 2 weeks after **a** and **b** were obtained. The cyst is larger now. Detached membrane fragments are still visible; edema around the lesion is seen. **(d)** Follow-up CT scan obtained 6 months after **a** and **b** were obtained shows thickening in the cyst wall, with a residual cavity 1 cm in diameter. **(e)** Follow-up CT scan obtained 16 months after **a** and **b** were obtained. The cyst is hardly visible.

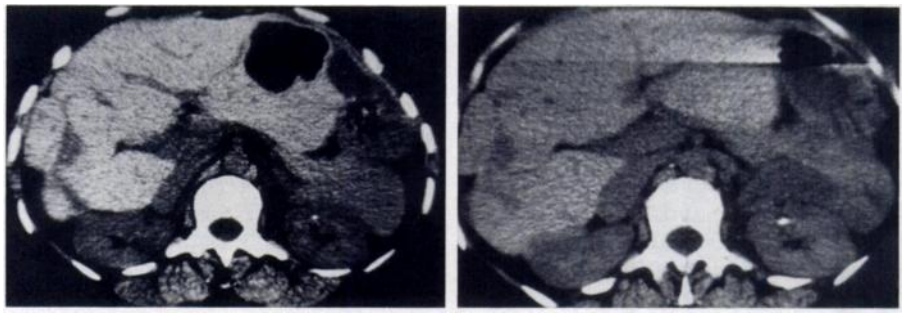


d. e.

patients with hydatid disease were given 50 mg/kg of mebendazole every day for 1 month. They were followed up with sonography and CT. They underwent an examination every 15 days for the first month and then underwent examination at 3-month intervals.

## RESULTS

No severe complications occurred during or after the procedure. In two patients, pruritus developed and disappeared a few hours after antihistaminic treatment. Results of microbiologic and/or serologic examinations of the aspirated fluid were positive for hydatid disease in all patients in whom a membrane became visible in the cystic cavity and negative in the three other patients, whose lesions were compatible with simple cyst. In the early follow-up period (15–30 days) in patients with hydatid cysts, we observed an increase in the size of the cyst, probably caused by the osmotic effect of the remaining hypertonic saline in the cavity, and fragments of detached membranes were still detectable. A hypoattenuating halo on CT scans, a hypoechoic halo on sonograms, or both were seen around the lesion, probably because of edema. In the follow-up period of 6–16 months, a significant decrease in the size of the cysts was observed in all patients with hydatid disease (Figs 1–3). Follow-up CT and US examinations covering all of the abdomen and pelvis revealed no evidence of peritoneal seeding. None of the patients had symptoms. Patient data are summarized in the Table.



a. b.

**Figure 2.** **(a)** Purely cystic lesion, 66 × 51 mm, in the lateral segment of the left lobe. Postoperative changes are seen in the right lobe. Note the calculus in the left kidney. **(b)** Control CT scan obtained 11 months after **a** was obtained. The cyst is not detectable.

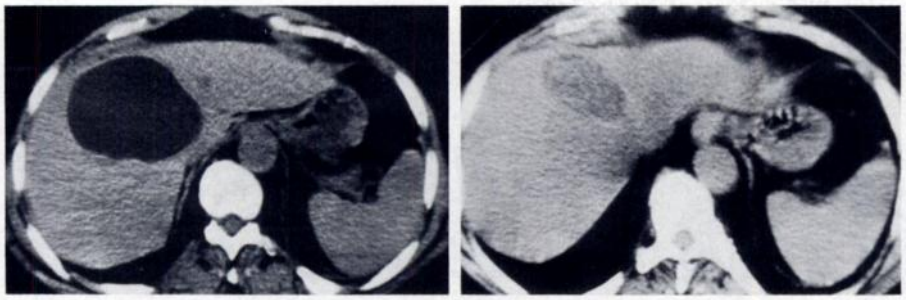
## DISCUSSION

The conventional treatment of hydatid cysts in all organs is surgical. Depending on the organs affected, the state of the development of the cyst, or complications, a number of surgical techniques are available (11). The objective is to aspirate the contents of the cyst, inject a scolecidal agent to destroy the parasite, and remove the cyst by either extirpation of the parasite with obliteration of the residual cavity or resection.

The overall hospital mortality rates among patients who undergo surgery for hydatid cysts of the liver is 3.9% (12). Depending on the surgical techniques used, the postoperative complication rates in uninfected cysts vary from 8.2% to 16.0%, and in infected cysts, the rate is 89% among patients with sepsis, the most frequent complication (12).

Benzimidazole carbamates (mebendazole and albendazole) can destroy the larval stage of *E granulosus*, but the preparations available are poorly absorbed from the intestine, and the ability to diffuse across the cyst wall into the hydatid fluid is limited. For the time being, therefore, these chemotherapeutic agents seem to be palliative rather than curative, and they may be used when surgery is not feasible and for prophylaxis against spillage before or after surgery (12). Percutaneous injection of active forms of benzimidazole carbamates into cavities of hydatid cysts may be used in the treatment of hydatid disease in the future; however, scientific data on this issue are not yet available.

Percutaneous drainage of a hydatid



a. b.

**Figure 3.** **(a)** Purely cystic lesion in the anterior segment of the right lobe of the liver. **(b)** Follow-up CT scan obtained 8 months after **a** was obtained shows a reduction in the size of the cyst and an increase in the attenuation of the lumen.

**Data in 12 Patients with Hydatid Disease**

| Patient No. | Age (y)/Gender | Location | Size (mm) | |
|---|---|---|---|---|
| | | | Before Treatment | At Follow-up |
| 1 | 30/M | Caudate | 50 × 40 | 5 × 5 (16) |
| 2 | 32/F | LLMS | 40 × 40 | 15 × 12 (13) |
| 3 | 39/F | RLPS | 60 × 50 | 23 × 16 (11) |
| 4 | 28/F | LLLS | 66 × 51 | ND (11) |
| 5 | 27/F | RLPS | 60 × 50 | 27 × 14 (10) |
| 6 | 30/M | LLMS | 80 × 60 | 30 × 16 (10) |
| 7 | 30/M | RLAS | 50 × 50 | 15 × 12 (8) |
| 8 | 19/F | RLAS | 80 × 50 | 28 × 21 (8) |
| 9 | 56/M | RLAS | 100 × 60 | 35 × 28 (7) |
| 10 | 11/M | RLPS | 50 × 50 | 20 × 15 (7) |
| 11 | 24/M | RLPS | 65 × 55 | 25 × 20 (6) |
| 12 | 27/M | RLAS | 55 × 40 | 22 × 13 (6) |

Note.—Numbers in parentheses are number of months. LLLS = left lobe, lateral segment, LLMS = left lobe, medial segment, ND = not detectable, RLAS = right lobe, anterior segment, RLPS = right lobe, posterior segment.

cyst of the liver was first reported by Mueller et al (13). Livraghi et al (7) reported diagnostic hydatid cyst aspirations to assess the value of electrolyte determinations in 11 hydatid cysts without complications. Bret et al (8) performed percutaneous aspirations of hydatid liver cysts in 13 patients, and subsequent percutaneous drainage was performed in three of 13 patients. Sterilization of the cyst was achieved by injection of different scolecidal agents. No complications occurred during drainage, and no recurrences developed during 6–12 months after drainage. Filice et al (9) reported aspiration and alcohol injection under sonographic guidance in five patients with hydatid cysts of the liver with complex morphologic appearances (ie, cysts that did not have a purely cystic appearance). No complications or relapses occurred during a follow-up period of 10–26 months.

In our study, pruritus was seen in two patients after the procedure, likely because of spillage of minute amounts of hydatid fluid to hepatic parenchyma during withdrawal of the needle. Peritoneal spillage was not expected because the transhepatic approach was used. A risk of immunologic reactions exists during or after the procedure. However, this risk is also valid for surgical intervention.

Scolecidal agents commonly used during surgery include 80% alcohol, 0.5% silver nitrate solution, and hypertonic saline. We used hypertonic saline as a scolecidal agent. Its scolecidal effect results from a strong osmotic gradient across the outer cuticular membrane of the scolex, which causes its lysis. This can be achieved if the concentration of the salt solution is high enough and the exposure long enough. The recommended concentrations are 15%–20% (14). One advantage that is unique to hypertonic saline is its high density (20% sodium chloride solution has an in vitro CT attenuation of 240–260 HU). This attenuation enables one to assess the dilution of the solution in the cavity, evaluate the presence of proper contact of the solution with all parts of the lesion, and check for the presence of biliary communications (10).

To achieve sterilization with a scolecidal agent, the greater part of the hydatid fluid should be aspirated to prevent dilution, and proper contact between the injected scolecidal agent and all of the scolices should take place. In case of complex hydatid cysts, the scolecidal agent may not penetrate septations and the wall of daughter cysts, and they may remain potentially infective.

Although limited data are available, rupture into the biliary tree should presumably be a contraindication to percutaneous treatment because of the risk of chemical cholangitis. We chose purely cystic masses only for percutaneous administration of a scolecidal agent. A purely cystic lesion signifies an unruptured endocyst, which makes a biliary communication highly unlikely (15).

We conclude that percutaneous aspiration and hypertonic saline injection for treatment of purely cystic hydatid disease of the liver seems to be an alternative to surgical treatment. However, further data are needed before the effectiveness of this method is ascertained. We postulate that in patients with hydatid cysts with complex morphologic appearances, the treatment should be surgical. But whenever surgery is not feasible because of the patient's general condition or multiple previous operations, this treatment may be of value. ■

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