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## Hepatic cystic echinococcosis: Percutaneous treatment as an outpatient procedure

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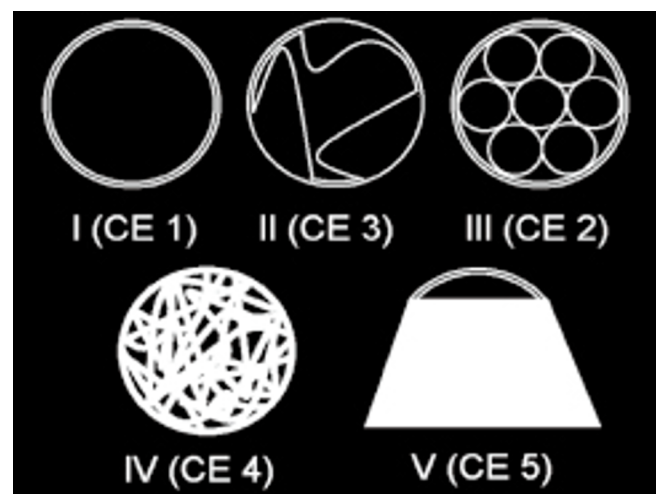
Percutaneous treatment

### ABSTRACT

**Objective:** To demonstrate utility and safety of the puncture aspiration injection and reaspiration (PAIR) technique for outpatients. **Methods:** Percutaneous treatment with US guidance was applied to 33 patients for 44 cysts. Patients treated with the PAIR technique, were outpatients. PAIR and catheterization technique were evaluated for efficacy and safety of procedure and complication rates. **Results:** Thirty-five of 44 cysts were treated with the PAIR and 9 of 44 were treated with the catheterization technique. The success rate of the cysts Gharbi type 1 (CE1) and type 2 (CE3a) treated with the PAIR technique was 100%. In the follow up of 9 cysts treated with the catheterization technique, 2 of them (22%) developed cyst infection and 1 (11%) developed a biliary fistula. **Conclusions:** The PAIR technique was found to be an effective and safe approach in order to treat Gharbi type 1 and type 2 cysts percutaneously for outpatients. It has a very low complication rate in comparison with the catheterization technique. So every effort should be made to finish the treatment with PAIR technique.

## 1. Introduction

Hepatic hydatid disease is a parasitic infection caused by *Echinococcus granulosus* (Figure 1). It is a public health problem in developing countries. The most common location of infection in human is the liver [1,2]. The manifestation of the disease can range from totally asymptomatic to anaphylaxis due to cyst rupture. The percutaneous approach in the treatment became a promising method to avoid complications caused by surgery and longer hospitalisation times [3,4]. Our purpose is to demonstrate the utility and the safety of the PAIR technique in hydatid disease patients at an outpatient basis.



**Figure 1.** Classification of hydatid cysts according to Gharbi and The World Health Organization. 59 mm×47 mm (300×300 DPI).

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## 2. Material and methods

### 2.1. Patient information

Within a 5 year period, between 2005 and 2010, 33 consecutive patients (26 female and 7 male) were included in our study. The mean age was 41.8 (13–77) years old. In 6 patients there were multiple cysts in the pre-interventional ultrasonography examination. Forty-four cysts were planned for the intervention in 33 patients.

### 2.2. Treatment procedures

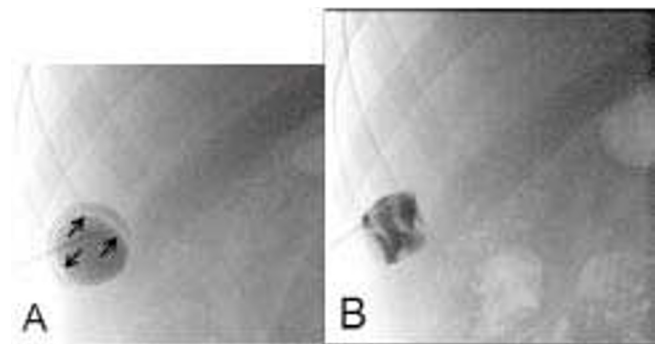
Puncture, aspiration injection re-aspiration (PAIR) technique and the catheterization techniques were performed percutaneously. In the PAIR technique, the cyst was punctured with 18 G Seldinger needle under US guidance. Using the color Doppler US the vessels in the entry side for the intervention were carefully detected in order to avoid them. In the first entry, 90% of the cyst content was aspirated with the needle. Then radiopaque material (ionic, meglumine and sodium–ioxytalamate, 350 mg/mL; Telebrix–35®, Guerbet, Cedex, France) as much as 10%–20% of the cyst volume was given. Then 30% hypertonic saline infusion with an amount of the 60%–70% of the former cyst volume was given. After 15 min the cyst liquid was re-aspirated (Figure 2). Then again with fluoroscopy guidance the radiopaque material as much as 10%–20% of the cyst volume was given to make sure that there was no leakage outside from the cyst to the peritoneum and to the biliary tract. This is followed by injection of 96% ethanol with a volume of 60%–70% of the cyst volume for sclerosing and scolicedal purposes. Ethanol was aspirated after 15 min. All hypertonic saline and ethanol injections were done under fluoroscopic control. The most important disadvantage of the PAIR technique is that the injected hypertonic saline and alcohol cannot be aspirated due to the separating membranes in some patients. In these patients, when necessary, with real-time US guidance the rest fluid was completely aspirated. One important point was that the separating membranes of the cyst could plug the 18 G Seldinger needle in a check valve manner and to overcome this problem the 20 G needle was advanced into cyst through 18 G needle coaxially and the liquid was aspirated under US guidance. Sometimes the first needle was connected to a line for free drainage, this also can help to overcome check valve manner blockage of the needle. If needed second or third needle (mostly 21 G) was inserted into the cyst cavity with another puncture. While performing these manures the first needle was always kept in place to avoid leakage. Therefore almost all cysts were aspirated fully or almost fully with success.

If a cysto–biliary fistula is detected or if the cyst fluid could not be evacuated despite all these measures,

catheterization technique is used. In the catheterization technique, 30% hypertonic saline injection was made in to the cyst cavity under US and fluoroscopic guidance. After waiting for 15 min and aspiration, a 8 French pigtail catheter (Flexima, Boston Scientific, USA) was inserted into the cyst cavity and this stayed there for 24 h for the drainage (Figure 3). Then cystography was performed in order to detect a possible fistula between the cyst cavity and biliary tract. In the patients with no fistula 95% ethanol with an amount of the half of the former cyst volume was given into the cyst cavity. To maximize the sclerosing and scolicedal effect of the ethanol, it was applied for 15 min. In patients with fistula between the biliary tract and the cyst cavity, the ethanol was not used in order to avoid the risk of sclerosing the bile ducts.

Samples from the cyst content were used for the cytological and microbiological tests. In all patients the diagnosis of the hydatid disease was confirmed by the direct microscopic analysis, high pressure content coming during the intervention, double layer in the ultrasonography, presence of separating membranes or daughter cysts.

The prophylactic albendazol therapy (Andazol 200 mg tb 2 ×2) minimum 10 d before and 30 d after the in intervention was given to all patients.



**Figure 2.** 29 year old man with percutaneously treated Gharbi type 1 hepatic hydatid cyst.

Cystogram obtained 4–5 min after injection of hypertonic saline solution reveals endocyst separated (arrows) from pericyst (A). After 15 minutes the cyst liquid was re-aspirated (B). 40 mm×36 mm (300×300 DPI).

After 15 min the cyst liquid was re-aspirated (B). 43 mm×43 mm (300×300 DPI).

## 3. Results

Forty-four cysts in 33 patients were treated. Thirty-five of 44 cysts were treated with the PAIR technique while remaining 9 of them were treated with the catheterization technique. The PAIR and the catheterization technique were applied in all the patients with a technical success rate of 100%. According to the Gharbi classification 22

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