

## ORIGINAL PAPER

# Percutaneous Treatment of Symptomatic Non-Parasitic Benign Liver Cysts With 20% NaCl Solution

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**G**OAL. The aim of the study is to evaluate efficacy of single-session 20% NaCl solution sclerotherapy in the treatment of symptomatic non-parasitic benign liver cysts. **METHODS.** 20 patients were chosen (7 man and 13 woman, mean age 52,9 with mean duration of disease before treatment 9,4 months) for a prospective trial. Patients were treated with ultrasound-guided percutaneous aspiration and injection of 20% NaCl solution. Patient demographics, clinical characteristics, treatment outcome and complications were analyzed during the trial. The procedure was considered successful if the cyst disappears. The cyst was considered to have disappeared if it could no longer be visualized on ultrasonography. Other important measures to document the efficacy of treatment included the length of the hospital stay and complications related to the procedure. **RESULTS.** The average volume reduction was 96.3 % (range, 74.9-100%). During the 24-month follow up period, 8 cysts (40.0%) disappeared completely. The hospital stay was one day for all patients. **CONCLUSION.** Percutaneous treatment and sclerotherapy with hypertonic NaCl (20%) is safe and effective for hepatic non-parasitic cysts. **KEYWORDS:** INTERVENTIONAL ULTRASOUND, LIVER CYST, CYST SCLEROSATION

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## 1. INTRODUCTION

Non-parasitic liver cysts are very often asymptomatic and rarely associated with clinical symptoms. They occur more frequently in women and are generally found in the right lobe of the liver. In some percentage due to its size and pressure on adjacent tissue they can cause abdominal pain, meteorism, nausea, vomiting, early satiety and jaundice. Simple liver cysts are usually stable in size over long time, but may slowly or rapidly enlarge and become symptomatic or even rupture, show hemorrhage, or get infected (1). The reported prev-

alence amounts at 2.5%–7%. The prevalence is increasing with the age. Even though simple cysts are usually solitary, more cysts may be present even in the absence of polycystic liver disease.

Conservative surgical management was the only way of treatment in the past. The procedure which is in general recommended is total removal of the symptomatic hepatic cyst by either enucleation or hepatic resection (2-4) or if the cyst contains bile than internal drainage into a Roux-en-Y limb of jejunum (5). The morbidity and mortality rates of these procedures, however, may

be significant. Laparoscopic deroofing of simple hepatic cysts was evaluated in several studies and has showed successful results (6-9).

Percutaneous treatment is the less invasive method and can be used as aspiration only treatment or aspiration and injection of a sclerosing agent. The most used sclerosant is alcohol (10-13); not often other sclerosant is used (14-20). Frequent relapses are documented at percutaneous cyst aspiration only, without use of sclerosant (9, 21, 22–24).

In this study experience with 20 patients is reported to evaluate use of 20% NaCl in single-session sclerotherapy in the treatment of symptomatic non-parasitic benign liver cysts.

## 2. GOAL

The aim of the study is to evaluate efficacy of single-session 20% NaCl solution sclerotherapy in the treatment of symptomatic non-parasitic benign liver cysts.

## 3. MATERIALS AND METHODS

In this prospective study, 20 consecutive patients with a symptomatic simple liver cyst underwent single session sclerotherapy with 20% NaCl as a sclerosing agent. Patients were enrolled in the study if they had symptoms and presence of the cyst was confirmed by ultrasound or computed tomography examination. Some patients had more than one cyst, in these patients each cyst was evaluated separately. Symp-

toms and signs which were evaluated were: abdominal pain, abdominal swelling, early satiety, mass over liver and jaundice.

Exclusion criteria were polycystic liver disease, neoplastic cysts, Caroli disease, cystic tumor of the liver, diaphragmatic mesothelial cysts, and coagulopathy. All patients were serologically tested at echinococcus granulosis.

Each patient was ultrasonographically evaluated one day after the aspiration and sclerosation. If the patient was still symptomatic after the procedure, the symptoms were attributed not to be caused by the cyst itself and patients were excluded from the study. Written informed consent was obtained from each patient and the study was approved by the local ethics committee. The study sample included 7 men and 13 women, with mean age  $52,9 \pm 10,1$ . Mean duration of disease before treatment was 9,4 months. Intervention was performed in a way that we first determined exact localization of the cyst and its relation to the liver tissue. Selection of the catheter entry point was completed and puncture site marked. The entry point was chosen in order to minimize damage of the liver tissue (tick liver tissue) and avoid vascular structures of the liver. Prevention of leakage from the cyst and catheter dislocation was of great importance. The percutaneous technique used was trocar method and catheter showed a pigtail end with side holes in it. All patient underwent local anesthesia without conscious sedation. The volume of the aspirated fluid was recorded and a sample fluid underwent bacteriological and cytological analysis. In order to exclude possible communication with biliary system or communication with peritoneal cavity we used contrast medium under fluoroscopic guidance. None of the cysts showed any communication or incomplete contrast aspiration. The pain caused by sclerosing agent was not expected, so none of the medication was injected in the cyst cavity for pain relief. 20% NaCl was injected after complete contrast evacuation. Sclerosing agent remained in the cyst cavity for

2 hours and then was evacuated completely. The amount of 20% NaCl was calculated to be app 30% of the aspirated volume of the cyst but not more than 100ml regardless of the cyst size. The patients changed their position every 10 min (prone, supine, bilateral decubitus) during sclerosation in order to insure proper contact of sclerosing agent to inner surface of the cyst. After evacuation of NaCl, patients rested in bed for 2 hours. The next day after the procedure if the symptoms were not present, patients were dismissed from the hospital. The follow up was after 1, 3, 6, 9 and 12 months during the first year after the procedure and after 6 and 12 months in second year.

Following laboratory tests were performed: C-reactive protein (CRP), haptoglobin, bilirubin, alkaline phosphatase, alanineamino-transferase (ALT), aspartate-amino-transferase (AST) and international normalized ratio (INR).

The goal of the treatment was the disappearance of the cyst. The treatment was considered to be successful if the scar tissue or only normal liver tissue replaced the cyst area as visualized by ultrasonographically.

In order to evaluate the efficacy of the procedure, following parameters were documented: the size of the cyst over time, the length of hospital stay and procedure complication.

**4. RESULTS**

The sclerotherapy was technically successful in all patients and no patient complained worsening of the symptoms after the procedure and no complication related to the procedure were observed.

Liver function test results were in physiological range in all patients be-

Characteristics	N=20
Age, years (mean 4 SD)	52,9 4 10,1
Range	(39-71)
Male/female	7/13
Mean duration of a disease before treatment (months)	9,3 4 2,4
N of symptomatic/asymptomatic patients	20/0
Abdominal pain	20/0
Abdominal swelling	11/9
Mass over liver	6/14
Jaundice	4/16

**TABLE 1.** Baseline characteristics of the patients

Parameter	N=20
N of cysts	20
N of cysts: right lobe/left lobe	11/9
Volume of cyst before treatment (ml)	717,5 4 254,7
Volume of cyst after treatment (ml)	20 (0 - 100)
Average volume reduction (%)	96,3
N of cysts with/without additional treatment	7/13
N of disappeared/persisting cysts	8/12

**TABLE 2.** Cyst characteristics and results

fore and after treatment and during the 24 month follow-up period. The average volume reduction was 96.3 % (range, 74.9-100%).

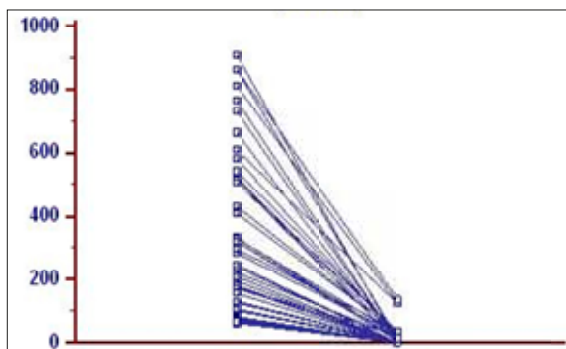
Volumes of the cysts before and after treatment are shown in Fig. 1.

During the follow up period, 8 cysts (40.0%) disappeared completely. The hospital stay was one day for all patients. All symptoms and signs disappeared during the first 24 h after the procedure.

**5. DISCUSSION**

As a minimally invasive procedure, percutaneous treatment of symptomatic liver cyst is becoming more frequently used in the recent years. It is proven as a safe and effective procedure. There are wide variety of percutaneous treatments and sclerosing agents but most frequently used is ethanol.

Several studies have (16, 25, 26) used a multiple instillations with different time intervals between each instillation. According to their results, multiple sclerotherapy yield better results than single instillation of sclerosant and recurrence rate is documented to be reduced. Regardless of the organ



**FIGURE 1.** Volumes of cysts before and after treatment

which is punctured, the disadvantages of multiple session technique include the following: it takes much more time to perform repeated aspiration and injection procedures, multiple sessions cause patient discomfort and inconvenience, and an increased risk of sclerosing agent leakage (27). On the other hand several studies documented that single session alcohol sclerotherapy showed good results (10, 12, 19, 22, 28, 29). They recommend single-session alcohol sclerotherapy as a sufficient and less risk method. The time of exposure to the sclerosant varies widely (from 10 min to 4 h) in various reports (10, 23).

In our study, 20% NaCl as a sclerosing agent was used and time exposure was 2 hours. Percutaneous treatment of symptomatic non-parasitic benign liver cysts with 20% NaCl solution was found to be effective in reducing the volume of liver cysts. It was technically 100% successful with average volume reduction of 96,3%. The cysts totally disappeared in 40% patients and all patients showed symptom relief.

## 6. CONCLUSION

Percutaneous treatment of the symptomatic non-parasitic benign liver cysts with 20% NaCl solution is safe, effective, well-tolerated alternative technique for management of simple liver cysts.

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