

## Clinical presentations and surgical management of liver hydatidosis: our 20 year experience

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### Abstract

**Background.** Hydatidosis/echinococcosis of the liver is a very old problem in Greece and still exists, although it is declining. We have reviewed our 20 years' experience, and here we report the various clinical presentations of the disease and evaluate the clinical outcome of the surgical procedures performed. **Patients and methods.** We conducted a retrospective analysis of the past 20 years' medical records; 35 patients (males 34%, females 66%, mean age 58 years) were treated surgically. **Results.** The presenting symptoms or findings leading to the diagnosis of liver echinococcosis were jaundice (six cases, 17%), abdominal pain (five cases, 14%), gastrointestinal discomfort of the upper abdomen (e.g. nausea, vomiting, distention, anorexia) (two cases, 6%), acute pancreatitis (one case, 3%) and portal hypertension (one case, 3%). The rest of the cases were diagnosed incidentally (20 cases, 57%). External drainage and cystectomy with omentoplasty was performed in 21 cases (60%) and pericystectomy in 14 cases (40%). The mean hospital stay was 16.8 days. Morbidity and mortality were 18% and 3%, respectively, with no statistically significant differences between the two surgical approaches. The recurrence rate averaged 3%. **Discussion.** A high index of suspicion is recommended when variable clinical manifestations of the upper abdomen are present. Meeting all criteria for surgical treatment of hydatid disease, external drainage and cystectomy should be the standard surgical procedure. Pericystectomy could be used for peripherally located liver cysts that are only partially surrounded by parenchyma. Resection procedures are considered too radical for a benign disease. Appropriate randomized controlled studies are needed to establish the definite surgical management of liver hydatidosis, including modern techniques such as laparoscopy and transcutaneous puncture under US guidance (PAIR technique).

**Key Words:** *Cystic echinococcosis, Echinococcus granulosus, surgical procedures*

### Introduction

Hydatidosis of the liver is an old zoonosis caused by larval stages of the cestode *Echinococcus*, a decreasing but still ongoing problem in Greece [1].

Following oral intake of the cestode's ova, oncospheres are released, penetrating the gut barrier and reaching the liver through the portal circulation, spreading thereafter to every possible destination [2]. In principle, all tissues can be affected. However, the liver is infected in about 60% of cases, the lung in about 20% and remaining organs in about 20% (kidney, brain, bone, muscles and others) [3].

The cysts grow 1–30 mm in diameter yearly. Additional cysts (daughter cysts) can develop inside the primary cysts. The host organism isolates itself from the parasite by the formation of the 'pericystic' reaction, which is a capsule of connective tissue [3]. Pericyst is important for surgical management. Leaving the pericyst *in situ* and removing the content of the

cavity is a well documented and accepted technique [4].

Symptoms are created by the compression or displacement of other structures or organs, with subsequent jaundice, adverse effects on hollow organ motility, and exceptionally spontaneous or traumatic rupture [5,6].

The physical characteristics and the location of the hydatid cysts, in conjunction with the general status of the patient, will guide the indications for surgery [7].

We review our 20 years' experience, report the various clinical presentations of the disease and evaluate the clinical outcome of patients who underwent surgical treatment of liver hydatidosis.

### Patients and methods

A retrospective analysis was conducted reviewing the medical records of all patients who underwent surgical treatment of liver hydatidosis, between 1986 and

2005, at the 2nd Department of Surgery of Asclepeion General Hospital, Athens, Greece. Demographic data, clinical presentation, cyst location, operative data, postoperative complications and follow-up results were recorded and statistically analysed. The statistical analysis relied on proportions and utilized simple descriptive techniques. Summary statistics for these factors are presented as frequency and percentage.

Follow-up was performed by telephone or by clinic visits/ultrasonography when appropriate. Telephone follow-up was carried out with a standard questionnaire.

### Operative/perioperative management

The procedures performed depended on the location and characteristics of the cysts and on the general condition of the patient.

For cysts located peripherally, where possible, radical management by simultaneous removal of the pericyst was performed. The cyst was removed en bloc with the pericyst, thus avoiding intraoperative spillage by accidental rupture.

For cysts located deeper in the liver parenchyma, simple external drainage and partial or total cystectomy was performed. Protecting the operating site with gauze packs soaked in H<sub>2</sub>O<sub>2</sub> or povidone iodine, the cyst content was aspirated and the membrane was removed, usually in one piece. The residual cavity was soaked with a scolicidal agent: hypertonic saline solution (initially 3% and lately 10–15%), H<sub>2</sub>O<sub>2</sub> or povidone iodine. We have not encountered any significant complications secondary to the use of these solutions. The pericyst was cleaned and smoothed out and possible daughter cysts developing in the pericyst were removed. Any biliary communications with the cyst were sutured individually. Omentoplasty was performed for packing of the residual cavity after inspection of the cavity for remaining living hydatid tissue or bile leakage. The prepared omental pedicle was fixed into the cystic cavity with absorbable suture material.

Whenever there was strong suspicion of intrabiliary rupture the common bile duct was explored with a choledochoscope or cholangiography intraoperatively. If intrabiliary rupture was confirmed, lavage of the biliary tract was performed followed by T-tube insertion or biliodigestive anastomosis.

Cholecystectomy was considered a standard procedure.

Daily standard albendazole treatment at 15 mg/kg for a period of 6 months to 1 year was administered selectively to patients who had residual elements of the cyst left in the liver and to patients with suspicion of peritoneal spillage during the surgical manoeuvres. Albendazole administration was correlated with hepatic function tests, leading us to intermittent administration to a number of patients with elevated

tests (4 weeks, followed by 2 weeks without any medication, with the scheme being repeated for 1 year).

Antibiotics were routinely administered intraoperatively and up to the second postoperative day. All patients received thromboembolic prophylaxis, which was discontinued when they were independently ambulating.

### Results

A total of 35 medical records, 12 (34%) men and 23 (66%) women with a mean age 58 years (range 24–84), were reviewed.

The presenting signs or symptoms leading to the diagnosis of liver hydatidosis were: jaundice (six cases, 17%), abdominal pain (five cases, 14%), gastrointestinal discomfort of the upper abdomen (e.g. nausea, vomiting, distention, anorexia) (two cases, 6%), acute pancreatitis (one case, 3%) and portal hypertension (one case, 3%). The rest of the cases were diagnosed incidentally (20 cases, 57%) (Table I).

Cysts were located on the left lobe in 12 patients (34%) and on the right lobe in 23 patients (66%).

Drainage and total or partial cystectomy was performed in 21 cases (60%), while a total or partial peri-cystectomy was performed in 14 cases (40%).

The early postoperative course was totally uneventful in 29 (82%) patients. Overall morbidity was 18%. Bile leakage occurred in one patient (3%) and gradually subsided. Suppuration and abscess formation in the residual cavity occurred in one patient, who was reoperated for drainage of the abscess. One patient (3%) developed acute renal failure of unknown origin on the 11th postoperative day and was admitted to the intensive care unit for haemodialysis. The patient recovered and was discharged from hospital 30 days later. Another patient developed pleural effusion and atelectasis (3%) and was managed conservatively. Two primary wound infections (6%) were treated with drainage and antibiotics (Table II). The mean hospital stay was 16.8 days.

One death (3%) 65 days postoperatively, due to acute hepatic failure, was attributed to albendazole.

The mean follow-up recorded was 63 months (range 6–174). In the meantime eight patients died due to unrelated reasons and three patients were lost

Table I. Clinical presentation of liver hydatidosis.

Presenting symptom	No. (%)
Incidental	20 (57%)
Jaundice	6 (17%)
Abdominal pain	5 (14%)
Abdominal discomfort	2 (6%)
Acute pancreatitis	1 (3%)
Portal hypertension	1 (3%)

Table II. Complications following surgical treatment of liver hydatidosis.

Postoperative complications	No. (%)
External biliary fistula/bile leakage	1 (3%)
Suppuration/residual cavity	1 (3%)
Acute renal failure	1 (3%)
Atelectasis/pleural effusion	1 (3%)
Wound infection	2 (6%)

to follow-up. One recurrence (3%) was recorded 2 years later and it was reoperated.

Comparing the two different surgical approaches (drainage/cystectomy and pericystectomy) in terms of morbidity and recurrence, no statistically significant differences were found.

## Discussion

Hydatid liver disease may be asymptomatic or incidentally diagnosed. When hydatid cysts become symptomatic, their clinical presentation varies, ranging from simple discomfort to acute abdomen. A high index of suspicion is recommended when variable clinical manifestations of the upper abdomen are present (e.g. abdominal discomfort, jaundice, pancreatitis). Liver hydatidosis should be included in the differential diagnosis, especially when the patient comes from Mediterranean or African countries where the incidence of echinococcosis is still high [8,9].

Surgery is the most common approach to treatment of echinococcosis, although removal of the parasite mass is not usually 100% effective [7,10]. The administration of supplementary medical therapy, not always free of complications, may be necessary to keep the disease from recurring (high risk patients) [11]. In our series we report one death attributed to albendazole treatment.

The targets of surgical treatment are: (a) inactivation of infectious material, (b) prevention of contamination (spillage), (c) elimination of all viable elements (endocyst), and (d) management of the residual cavity [10].

Traditionally, various surgical alternatives have been described, such as: marsupialization, external tube drainage, resection of the prominent part, cystectomy (partial or total), cysto-pericystectomy (open and closed, partial or total), endocystectomy with marsupialization or omentoplasty, capitonage, Whipple procedure and cystojejunostomy [7,10–13]. Practically, these operations are not always applicable, and a few of them have been abandoned nowadays.

In contrast, the laparoscopic approach, although not yet entirely accepted due to the lack of prospective randomized clinical trials, is rapidly developing following the progress of modern laparoscopic equipment (e.g. perforator grinder and aspirator apparatus,

locking umbrella trocar) [7,14–20]. For selected patients, total excision, evacuation and obliteration of the cyst cavity have been performed by various authors. The reported advantages are minimal invasiveness, more detailed cyst inspection, shorter hospital stay, reduced wound complications and cost-effectiveness. Disadvantages include the limited manipulation area, spillage potential during puncture and the high risk of bleeding in centrally located cysts [21].

Finally, a modern alternative approach, for trained physicians only, is transcuteaneous puncture under US guidance (PAIR technique), aspiration, proctoscolicide injection and repetitive lavage/aspiration. The approach is contraindicated for superficial or inaccessible cysts, and for cysts that are calcified, solid or have communication with bile ducts [21–23]. Experience is limited as yet, thus no further comparison with traditional techniques is valuable.

The surgical treatment, open or laparoscopic, remains controversial. Some authors suggest conservative techniques, while others advocate radical approaches [7,24–27]. An algorithm for the management of liver hydatidosis that is safe and efficient is summarized in Table III.

The number of cysts, size, relation to bile ducts and blood vessels, extrahepatic disease, age and general condition of the patient will guide the choice of surgical procedure [7].

It is widely accepted that the radicality of the intervention increases the operative risk, but lowers the likelihood of a relapse and vice versa [28]. In our practice, careful selection of patients guarantees safety and effectiveness.

The host capsule is part of the liver and is not itself infectious, thus atypical hepatic resections are excessive for a benign pathology and are not always easy to perform except when the cyst is located on the left lobe. Pericystectomy may be hazardous or even impossible to perform in some cases, especially for localizations such as the dome or the paramedian sector when the cyst is located deep in the liver or near a large biliary tract or vasculature. This surgical treatment requires experience in the field of hepatic surgery and certainly blood reserves. Pericystectomies are procedures of choice for accessible, exteriorized, small, peripheral cysts of the anterior liver or the left lobe. Cystectomy and omentoplasty is safe, simple and effective, meeting all criteria for hydatid surgery. By leaving the properly treated host capsule, surgery of the liver hydatids becomes bloodless and post-operative morbidity is minimized.

## Conclusions

Our study comprises a retrospective observational analysis, thus limiting the scientific weight of the conclusions. The retrospective nature of this study obviously creates certain weaknesses when we attempt

Table III. Algorithm for the surgical management of liver hydatidosis.

## Indications for surgery [28]:

- Large liver cysts (>4 cm) with multiple daughter cysts
- Single superficially situated liver cysts that may rupture spontaneously
- Infected cysts
- Cysts communicating with the biliary tree
- Cysts causing pressure on adjacent vital organs

## Surgical approach:

- Cysts in the left or lower right liver lobe: abdominal (open or laparoscopic)
- Cysts in the higher right liver lobe: thoracic or thoraco-abdominal
- Superficially/peripherally located cysts: <4 cm – pericystectomy  
>4 cm – drainage and cystectomy
- Deeper located cysts: <4 cm – medical treatment and/or PAIR  
>4 cm – drainage and cystectomy

## Cavity management:

- Omentoplasty or
- Closed suction tube drainage (for cysts located in the dome of the liver or if the omentum is not available for obliteration)

## Biliary fistula/intra-biliary rupture:

- In selected jaundiced patients, ERCP prior to surgery
- Identification and suturing of the bile communication
- Common bile duct exploration/lavage
- T-tube or bilio-digestive anastomosis

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PAIR technique, transcutaneous puncture under US guidance; ERCP, endoscopic retrograde cholangiopancreatography.

to interpret the data. However, useful results for a scientifically valuable discussion have arisen.

Although usually occult and incidentally diagnosed, when liver hydatidosis becomes symptomatic, various specific or non-specific signs and symptoms arise. When surgical treatment is decided upon, cystectomy followed by omentoplasty guarantees safety and effectiveness. Pericystectomy should be reserved for peripherally located lesions. Resection procedures are considered too radical for a benign disease.

However, appropriate randomized controlled studies are needed to establish the definite surgical management of liver hydatidosis.

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