

## Research Article

# Experience with the Surgical Treatment of Hepatic Hydatidosis. Case Series with follow-up

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- Morbidity
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## Abstract

**Aim:** To describe patient characteristics and results of surgical treatment for hepatic hydatidosis (HH) in the Hospital HernanHenriquez Aravena in Temuco, Chile from December 2001 to June 2015.

**Methods:** Subjects older than 15 years with suspected HH were included based on the clinical picture and radiological studies. The series was comprised of 357 patients, with an average age of  $44.6 \pm 16.9$  years. The most frequently used surgical technique was subtotal cystectomy in 89.6% of the patients. In addition, 21% of the series presented complications in the postoperative period and mortality was 1.6%.

## ABBREVIATIONS

HH: Hepatic Hydatidosis

## INTRODUCTION

Hepatic hydatidosis (HH) is a zoonosis produced by *Echinococcus granulosus* in most cases, and presents a high prevalence and incidence in southern Chile, at a rate of 38 per 100,000 [1,2]. There are many options for the treatment of HH, but based on the World Health Organization's guide and our group's experience, surgery is the most effective treatment for HH [3-5].

There is a wide range of surgical techniques for the treatment of HH, from radical surgery (pericystectomy or regulated hepatic resections) to more conservative techniques (subtotal cystectomy with or without epiploplasty; subtotal cystectomy plus capitonnage, cystostomy plus epiploplasty, among others) [4-10]. Some reports show that epiploplasty decreases the incidence of abdominal abscess after surgical treatment.

The surgical technique preferred by our surgical team is subtotal cystectomy, leaving the smallest amount of cyst in the liver parenchyma, accompanied by epiploplasty<sup>11-12</sup>.

Our hypothesis is that morbidity and mortality rates associated with surgical treatment of HH in the Hospital Hernán Henríquez Aravena, Temuco, Chile, are comparable to

national and international figures. Our aim isto describe patient characteristics, the results of the surgical treatment and the morbidity and mortality associated with the surgical treatment of HH in Hospital Hernán Henríquez Aravena from December 2001 to June 2015.

## MATERIALS AND METHODS

**Study design and population:** Patients were subjects older than 15 years, with suspected HH based on the clinical and radiological findings performed in Hospital Hernán Henríquez Aravena (Temuco, Chile) from December 2001 to June 2015.

## Definitions

**Subtotal cystectomy:** Surgical technique in which part of the adventitious membrane of the hydatid cyst is resected. In this technique, we can only leave the adventitia adjacent to vascular structures. When possible, this part is covered by a vascularized omental flap (epiploplasty).

**Pericystectomy:** Total resection of the cyst's adventitious membrane, in which the plane between the adventitious membrane and liver parenchyma is dissected. This technique is used for peripheral cysts.

**Maneuver:** The biliopancreatic surgical team prefers to treat HH via the abdomen no matter where the cyst is located. A subcostal laparotomy is used, either right or bilateral, depending

on the location of the cysts, or a J laparotomy towards the right. The round ligament is sectioned and tied off and the liver is then moved to locate the cyst. On some occasions, intraoperative ecography is used when cysts are difficult to locate. Once a cyst is located, we protect the surgical area with compresses containing diluted povidone. The cyst is subsequently punctured and all the hydatid fluid and daughter vesicles are aspirated. The germinative membrane is removed and the protective field withdrawn. Depending on the location, the subtotal cystectomy is planned, beginning the resection of the cyst wall with electrofulguration, controlling the hemostasia, leaving only that part of the cyst adjacent to vascular structures. The residual cavity is reviewed in search of biliary communications, which are sutured with reabsorbable material. Some surgeons on the team perform a cholecystectomy and inject physiological serum into the cystic duct through a Nelatonprobe to make small biliary communications visible. Depending on the number of communications and the diameter of the bile duct, a choledochostomy is performed. The only absolute indication for a choledochostomy is a clinical picture of cholangiohydatidosis, in which the bile duct is always drained. Another alternative to drain the bile duct is to perform an endoscopic retrograde cholangiography. An epiploplasty is subsequently performed with a greater omentum flap. Drains are not positioned as a matter of course and are at the surgeon's discretion.

### Variables

Variables examined included clinical and laboratory features, clinical images and evolutionary complications. Variables examined included ultrasound (US) and computed tomography (CT) characteristics of the cyst, the number of cysts, location of the cyst, diameter of the lesion and evolutionary complications of the cysts (hepatic abscess of hydatid origin, hepatothoracic transit, rupture to abdominal cavity and cholangiohydatidosis).

The substance used to protect the surgical area (povidoneand/ or hypertonic solution), as is the surgical technique (categorized as subtotal cystectomy, pericystectomy, segmentectomyor hepatectomy). The use of choledochostomy and / or drain is evaluated.

The duration of hospitalization is assessed, and the presence of postoperative complications. Abscess in the residual cavity is defined as any purulent collection in relation to the liver surgical bed that requires treatment (surgery or CT-guided drainage).

Postoperative follow-up was carried out by clinical assessment. For any abnormal findingUS or CT was undertaken. Liver recurrence was defined as any cyst image (such as hydatid cyst) with postoperative normal images.

Descriptive statics were used, calculating measures of central tendency (mean, median) dispersion (SD) and extreme values. The database was analyzed using the program Stata® v. 11.0.

## RESULTS AND DISCUSSION

The series included 357 patients with a mean age of 44.6 ± 16.9 years; with a median of 43 and a range 15 – 90 years. The distribution by gender showed 202 (56.5%) male and 155 (43.5%) female. One hundred and forty nine patients (50.7%) were admitted through the emergency service and 176 (49.3%)

were elective. The mean number of cysts found by US was 1.49 ± 0.89, and the mean number found in surgery was 1.33 ± 0.66. The mean diameter of the main lesion was 10.81 ± 5.81 cm with a median of 10 cm and range of 5 – 34 cm.

When describing the location of the largest cyst, we found that 253 (70.8%) were located in the right hemi-liver and 104 (29.2%) in the left hemi-liver.

The most frequently used surgical technique was subtotal cystectomy in 320 (89.6%) cases (Table 1). In those patients who underwent a subtotal cystectomy, 297 (92.8%) also received epiploplasty.

The bile duct was explored via choledochostomy in 110 patients (30.8%), with the most common indication being suspected cholangiohydatidosis. This condition was treated by bile duct exploration and antibiotic treatment. A drain was left in the cystectomy site at the end of surgery in 298 patients (83.7%). Ninety patients (25.2%) presented postoperative complications, with the most frequent being atelectasis and pneumonia in 23 patients (25.5%), surgical site infection in 12 patients (13.3%) and hemorrhage in 10 (11.1%). Six patients presented abscess in the residual cavity. Three were solved surgically and three treated by guided drainage.

The clinical, evolutionary and laboratory variables according to the presence of complications are described in Table 2.

The mortality of the series was 5 patients (1.4%). Twelve patients received albendazole as a pharmacological therapy subsequent to surgery. Forty-one patients were operated on for pulmonary hydatidosis at some point in the postoperative evolution.

With an average follow-up of 28 ±10 mo, 29 patients (8.1%) presented recurrence. In 27 patients recurrence was in relation to a surgical site.

When the biopsies of the patients treated for suspected HH were reviewed, we found that HH was confirmed in 355 patients (99.4%). In only 2 patients did the biopsy show different results: in the 2 patients a biopsy revealed a simple hepatic cyst with signs of inflammation. The mean hospital stay was 15.3 ± 7 days, with a median of 12 days and range 3 – 65 days.

All the patients in our series had abdominal pain as the main symptom upon admittance. Our center does not run routine immunological exams for Echinococcusbecause several previous reports from our center have questioned their diagnostic value<sup>13</sup>. Our diagnostic suspicion is based on epidemiological history, the study of images and the clinical presentation of the patient.

**Table 1:** Surgical technique for HH in this patient series.

Technique	N (%)
Subtotal cystectomy	320 (86.9)
Liver resection	12 (3.3)
Subtotal cystectomy + liver segmentectomy	4 (1.1)
Others	21 (8.7)
Total	357 (100)
HH: Hepatic hydatidosis	

**Table 2:** Clinical, evolutionary and laboratory variables according to postoperative complications (mean  $\pm$  SD).

Variables	Patients with postoperative complications	Patients without postoperative complications
<b>Epidemiologic variables</b>		
Age (yrs)	46.2 $\pm$ 17	45.3 $\pm$ 15
Female (n)	44.3 $\pm$ 13	41.8 $\pm$ 11
Male (n)	48.4 $\pm$ 16	49.8 $\pm$ 19
<b>Number of cysts (n)</b>	1.49 $\pm$ 0.6	1.31 $\pm$ 0.9
<b>Protection of the surgical area with povidone (n)</b>	88	264
<b>Evolutionary complications before surgery</b>		
HAH (n)	11	8
HHT (n)	9	5
Rupture to abdominal cavity (n)	6	2
Cholangiohydatisidosis (n)	19	4
<b>Laboratory</b>		
Leukocyte count (cells/mm <sup>3</sup> )	10121 $\pm$ 4110	9230 $\pm$ 3665
Total bilirubin (mg/dL)	2.2 $\pm$ 2	1.47 $\pm$ 1.2
Alkaline phosphatase (U/L)	585 $\pm$ 420	327 $\pm$ 283
AST (U/L)	87.8 $\pm$ 38	57.8 $\pm$ 89
ALT (U/L)	81.4 $\pm$ 94	75.2 $\pm$ 94

HAH: Hepatic abscess of hydatid origin; HHT: Hepatothoracic transit; AST: Aspartate transaminase; ALT: Alanine transaminase

The mean age of the series (44 years) and predominance of males are remarkable aspects in that these vary from what Greek publications report, with more females and younger patients<sup>14</sup>.

The average diameter of the main lesion (10.81  $\pm$  5.81 cm) was smaller than reported in a previous cohort conducted in our center (14.5  $\pm$  6 cm). The predominant location in the right hemiliver is consistent with national and international series [12-14].

Among the evolutionary complications of HH, the most frequent was cholangiohydatisidosis (30.8%), followed by hepatothoracic transit (21%). This contrasts with a previous cohort studied in our center, where the most frequent evolutionary complication was HAH (51.5%) followed by cholangiohydatisidosis (10.6%) [11].

We have changed the preference of surgical area protection to diluted povidone, due to some cases of hypernatremia which occurred with use of hypertonic saline solution.

With respect to the surgical technique, our team prefers subtotal cystectomy with epiploplasty. We are emphatic about resecting most of the content of the cyst, leaving only the surface in contact with the vascular structures, which we would call an *almost total cystectomy*. To this end, it is necessary to have a complete mobilization of the liver and be familiar with the vascular structures of the hepatic segments.

Our service does not perform routine choledochostomies in HH surgery. This is demonstrated in the 30.8% of patients in the series who underwent this procedure, where the majority had suspected cholangiohydatisidosis.

Unlike other centers [14], postoperative treatment with albendazole is not routine in our service; this is based on previous

studies conducted in our center that showed a low concentration in the interior of the cyst and not existence of an association between the intracystic concentration of albendazole and the viability of the scolices [15].

The recurrence of abdominal hydatisidosis (8.1%) is comparable to a European publication with a similar surgical approach [16].

A greater prevalence of evolutionary complications and a greater alteration in hepatic test results can be seen in those patients who presented postoperative complications. This tendency must be corroborated in a cohort study designed for this purpose.

The median duration of the hospital stay (15.3 days) is comparable to that published by a previous Chilean series (17 days) [17].

## CONCLUSION

In conclusion, in our 15-year-long Chilean series, subtotal cystectomy was the most common procedure undertaken for HH. The rates of morbidity and mortality are comparable to those reported by other national and international series.

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Hector Losada and Andres Troncoso designed the research and analyzed the data.

Andres Troncoso, Maite Lopez, Macarena Diaz, Natalia Rolack and Cristian Riffo collected the data.

Hector Losada and Andres Troncoso wrote the paper.

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