Surgical treatment of hydatid cysts of the liver: A single center experience

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ABSTRACT

Objectives: The surgical treatment of hydatid cyst varies from simple puncture and aspiration to radical resections and total cystectomy. The aim of this study was to evaluate and compare outcome of different surgical treatments of liver hydatid cysts in our center.

Methods: This retrospective study included 33 patients who were operated for hydatid liver disease between 2010 and 2015. During that period radical surgery (pericystectomy or hepatic resection) was performed in 15 patients, while 18 patients underwent conservative surgery, including endocystectomy and drainage procedures. Data collection included demographic variables, diagnostic methods, surgical procedures, and morbidity and recurrence rates. The diagnosis was in the most cases set by ultrasound evaluation and CT scanning.

Results: The mean age of patients who underwent surgical treatment was 47.09±13.57 years, with 45.5% of men. The majority of respondents had hydatid cysts classified as CE2 (60.6%). More patients had hydatid cyst localized in the right lobe of the liver (48.5%). Multiple cysts (2-4) had 36.4% of patients. Length of hospitalization was significantly shorter in the group treated with radical surgical procedure in comparison with conservative surgery (9.67±3.39 vs. 14.44±6.68 days, p=0.01). The overall rate of recurrence was 3% and observed only in the conservative surgery group (5.6%).

Conclusion: Radical surgery (pericystectomy or hepatic resection) and conservative surgery (endocystectomy and drainage procedures) are safe treatments for hydatid cysts of the liver. Radical surgery of liver hydatid cyst can be performed with lower rate of recurrence.

Keywords: hydatid cyst, surgery treatment

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INTRODUCTION

Hydatid disease or cystic echinococcosis is a parasitic disease caused by infection with metacestodes (larval stage) of the Echinococcus granulosus tapeworm. Those metacestodes typically infect carnivores, such as dogs, foxes, and wolves, after the consumption of offal from infected intermediate hosts, such as sheep or pigs. Humans are accidental intermediate hosts that become infected either by direct contact with a dog contaminated with egg-bearing feces or by ingesting water, food, or soil contaminated with such feces. Hydatid disease is endemic in certain parts of the world, including our country particularly the region of Herzegovina [1].

Hydatid cysts of liver are the most common form of an echinococcosis, occurring in 52-78% of cases [2]. Small asymptomatic cysts are discovered accidentally. Large cysts give a sense of tension abdomen, poor appetite, discomfort, and dyspnea. Cysts are usually unilocular, and can range anywhere from 1 to 15 cm in diameter. In hepatic hydatid disease, cyst growth ranges from 1.2 to 10 mm per year.

Treatment of liver hydatid disease depends on the extent of organ involvement, the number of cysts, presence or absence of cystic-biliary communications, and other factors, such as secondary bacterial infection and hemorrhage. The choice of operative method in patients with cystic echinococcosis of the liver remains controversial [3,4]. The surgical procedures performed for hydatid cysts have varied from simple puncture and aspiration of the cyst to radical resections and total cystectomy, and can be divided into radical (cystopericystectomy or liver resection) and conservative (drainage or obliteration of the cavity) approaches. Conservative surgical procedures are technically easier to perform, but they are associated with high incidence of local recurrence and cavity-related complications [5].

The present study aimed to evaluate and compare outcome of different surgical treatments of liver hydatid cysts in our clinical center during the last five years.
Materials and methods

Patients
This retrospective study included 33 patients with hydatid cyst of the liver who were surgically treated at the Clinic of General and Abdominal Surgery, Clinical Center University of Sarajevo, between 2010-2015. According to the type of surgical procedure, patients were divided into two groups; Group A involved patients who were treated with radical surgery (pericystectomy or hepatic resection), while group B consisted of patients who underwent conservative surgery, including endocystectomy and drainage procedures.

Diagnosis of hydatid cyst of the liver was obtained during preoperative evaluation with ultrasound imaging (100%) in combination with computerized tomography (CT) of abdomen (81.8%), and serological tests (57.6%). World Health Organization - Informal Working Group Classification on Echinococcus (WHO - IWGE) was used for ultrasound classification of hydatid cysts [6]. Preoperative chemotherapy with albendazole in dose of 10 mg/kg/day for at least 4 weeks before surgery and for 12 weeks after surgery were performed in all patients to reduce the risk of postoperative secondary hydatidosis.

In the radical surgery group (group A), a block pericystectomy or hepatectomy segmentalis was used (“closed-cyst” method). Parenchymal transection was performed using clamp-crush technique or an ultrasound aspirator dissector. In the course of surgical procedure, afferent blood vessels and biliary ducts were ligated between the pericyst and the normal liver. In patients who underwent hepatectomy, liver hanging maneuver was performed in order to reduce venous back flow, bleeding, facilitating bloodless transection, and to maintain safe deeper dissection on the retrohepatic area [7].

In the conservative surgery group (group B), standard drainage procedure was performed with 20% hypertonic saline or Lugol Solution (solution of elemental iodine and potassium iodide in water) was used as scolicidal solution and left inside the cyst about 10 minutes to kill the scolices. The puncture site was covered with hypertonic saline solution - soaked gauzes, in order to prevent accidental spillage of the cystic content. All the cavities were drained to prevent bilioma and consequent biliary peritonitis.

Statistical analysis
All data were expressed as mean ± standard deviation (SD). The distribution of variables was tested by the Shapiro-Wilk test. The difference between two groups was analyzed by Unpaired t-test or the Mann-Whitney U test. Chi-square analysis was applied for the comparison of categorical variables. P value less than 0.05 was regarded as statistically significant. SPSS (Chicago, IL, USA) for Windows (Version 15.0) was used for statistical analysis.

Results
Demographic and clinical characteristics of the patients who underwent surgical treatment due to hydatid cyst are summarized in Table 1.

Mean age of patients in group B was higher compared to patients in group A (52.61±13.17 vs. 40.47±11.13 years, p=0.022). There was no difference in gender distribution between observed groups (X²=2.347; p=0.125).

All patients were treated with chemotherapy by benzimidazole carbamates preoperatively (albendazole in doses of 10-15 mg/kg/day or mebendazole in doses of 40-50 mg/kg/day four hours prior to the procedure), with continuing the treatment for one month postoperatively with albendazole, and for three months with mebendazole, in order to reduce the risk of secondary hydatid after surgery intervention.

Although the majority of patients had hydatid cysts classified as CE2 (60.6%), there was no difference between patients treated surgically in relation to the ultrasound classification of a cysts (X²=2.347; p=0.125).

Table 1. Demographic and clinical characteristics of the study patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (15 pts)</th>
<th>Group B (18 pts)</th>
<th>Total (33 pts)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40.47±11.13</td>
<td>52.61±13.17</td>
<td>47.09±13.57</td>
<td>0.022</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 (60.0%)</td>
<td>6 (40.0%)</td>
<td>15 (45.5%)</td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td>6 (33.3%)</td>
<td>12 (66.7%)</td>
<td>18 (54.5%)</td>
<td></td>
</tr>
<tr>
<td>Serological examination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>9 (60.0%)</td>
<td>10 (55.6)</td>
<td>19 (57.6%)</td>
<td>NS</td>
</tr>
<tr>
<td>-</td>
<td>6 (40.0%)</td>
<td>8 (44.4%)</td>
<td>14 (42.4%)</td>
<td></td>
</tr>
<tr>
<td>Preoperative radiological</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrasound</td>
<td>15 (100%)</td>
<td>18 (100%)</td>
<td>33 (100%)</td>
<td>NS</td>
</tr>
<tr>
<td>CT</td>
<td>12 (80%)</td>
<td>15 (83.3%)</td>
<td>27 (81.8%)</td>
<td></td>
</tr>
<tr>
<td>Preoperative and postoperative chemotherapy of hepatic hydatidosis</td>
<td>15 (100%)</td>
<td>18 (100%)</td>
<td>33 (100%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Data are presented as mean ± SD and as absolute numbers and percentages; CT, computerized tomography; NS, not significant
Hydatid cyst was more frequently located in the right lobe of the liver compared to the left one ($X_2^2=9.375; p=0.002$). Multiple cysts (2-4) were presented in 36.4% of all patients, with 55.6% in group B.

As shown in Table 3, length of hospital stay was shorter in group treated with radical surgical procedure than in the group treated with conservative surgery.

Total postoperative morbidity rate was 27.8% in group B and 13.3% in group A, (with no significant difference ($p>0.05$). The most frequent postoperative complications in both groups were wound infections (total number 5). There was no evidence of recurrence of hydatid cyst in radical surgery group, while in conservative surgery group recurrence rate was 5.6%.

**DISCUSSION**

Liver is the most frequent site of hydatid cysts (until 78%), often diagnosed accidentally, without any symptoms [1]. Cysts in the liver can compress bile ducts, causing obstruction that can manifest as obstructive jaundice, abdominal pain, anorexia, and pruritus [8,9]. Cyst rupture or leakage can cause immunological symptoms from the initiation of an immunoglobulin (Ig) E response, leading to allergic reactions most frequently characterized by hives, flushing, and mucous membrane swelling [10]. A major rupture can cause a life-threatening anaphylactic reaction [8]. Ruptured cysts can release viable cystic contents and protoscolices into the peritoneum, resulting in secondary hydatidosis [9].

The liver hydatid disease diagnostic procedures involves serum serological testing for antibodies against hydatid antigens, and preferably imaging by ultrasound or computed tomography (CT) or magnetic resonance (MRI). Treatment methods include chemotherapy with benzimidazole carbamates and/or surgical approaches, including radical surgery (pericystectomy or hepatic segmental resection) and conservative surgery (endocystectomy and drainage procedures). However, there is still no consensus on the optimal treatment. Specific drug therapy has scolicidal activity but it is clinically effective in less than 30% of patients with hepatic hydatidosis. The recent analysis of published studies on the treatment of hydatid cysts indicates that antihelminthic treatment alone is not the ideal treatment for liver hydatid cysts [11]. Surgical treatment is still the treatment of choice, with a recurrence rate of approximately 10-15% [5]. However, the choice of surgical approach in the operative treatment of hydatid cyst is still controversial. More studies in the literature support the effectiveness of radical treatment compared with conservative treatment. Conservative surgery with

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (15 pts)</th>
<th>Group B (18 pts)</th>
<th>Total (33 pts)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of hospitalization (days)</td>
<td>9.67±3.39</td>
<td>14.44±6.68</td>
<td>12.27±5.88</td>
<td>0.01</td>
</tr>
<tr>
<td>Postoperative morbidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wound infection</td>
<td>2 (13.3%)</td>
<td>3 (27.8%)</td>
<td>5 (21.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>bleeding</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>bilioma</td>
<td>-</td>
<td>1 (5.6%)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>abscess</td>
<td>-</td>
<td>1 (5.6%)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Recurrence</td>
<td>0 (0%)</td>
<td>1 (5.6%)</td>
<td>1 (3.0%)</td>
<td>NS</td>
</tr>
</tbody>
</table>
omentalplasty is effective in preventing postoperative complications [11] as well as percutaneous drainage with albendazole therapy as a safe and effective alternative treatment for the liver hydatid cysts. Radical surgery with pre- and post-operative administration of albendazole is the best treatment option for liver hydatid cysts due to low recurrence and complication rates [12]. Conservative procedures are safer and easier to perform although postoperative complication rates have been reported to be 6-47% [13,14].

Single hydatid cysts were presented in 63.6%, while multiple cysts (2-4) in 36.4% of our patients. The majority of our patients had hydatid cysts classified as CE2, multicompartment cyst types (60.6%), and hydatid cysts were more frequently located in the right lobe of the liver compared to the left. Other published results also indicate that hydatid cysts often affect the right lobe more frequently than the left lobe due to the nature of portal blood flow [15]. Types CE2 hydatid cysts require surgery in combination with drug therapy or a different type of percutaneous intervention due to the high risk for relapse after intervention [16].

In our study, patients with hydatid cyst who underwent radical surgical procedure had significantly shorter time of hospitalization than the patients in the group treated with conservative surgery. Shorter hospitalization has an important impact on the health care economy in countries in transition. In addition, total postoperative morbidity rate was not significantly lower in radical surgery group compared to group treated with conservative surgery (13.3% vs 27.8%). In keeping with our results, Tasev et al. in their prospective comparative study, found lower postoperative morbidity and mortality rates and shorter postoperative hospital stay in radical surgical procedures [17].

In the observed period, recurrence hydatid cyst was only documented in conservative surgical group (5.6%). In a large Turkish study [12], morbidity and recurrence rate were higher in conservative compared with radical surgery group (11.6% vs. 3.2%; 24% vs. 3.2%, respectively). Also, early local recurrences were observed only after conservative surgical procedures in a study of Yuksel et al., in which recurrent cysts were consequence of satellite cysts or pericystic disease [18].

**Conclusion**

Radical surgery (pericystectomy or hepatic resection) and conservative surgery (endocystectomy and drainage procedures) are a safe treatment for hydatid cysts of the liver. Radical surgery can be performed with lower rate of recurrence.

**Declaration of interest**

The authors declare no conflict of interest for this study.

**REFERENCES**


