Our Experience in Laparoscopic Treatment of the Liver Hydatid Cysts

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Abstract: In the past open surgery was the only treatment of liver hydatidosis. There are now very good therapeutic alternatives: medical treatment alone, echo-guided puncture, laparoscopic treatment. In the 1990’s, the hydatid cyst of the liver, started to be treated by laparoscopic surgery, given the advantages of this procedure. Objectives: To assess the results of the laparoscopic treatment of the hydatid cyst liver. Material and method: A number of 59 patients with hydatid cyst liver who underwent laparoscopic surgery over a period of 20 years, from 1995 to 2014 were studied. Results: Lagrot partial pericystectomy was performed in 43 patients (72.8% of cases) and total cystectomy in 16 patients (27.2% of cases). Patients with biliary lithiasis (17.4% of cases) associated with the hydatid cyst underwent laparoscopic cholecystectomy. Mortality was nil and morbidity was 8.7%. The average operating time was 85 minutes, the average hospital stay was 6 days and only one patient relapsed. Conclusions: Hydatid cyst laparoscopic approach is an alternative choice whenever meet criteria for selection of cases regarding the location of the cysts and their stage of evolution.

Key words: Taenia echinococcus, hydatid cyst of the liver, laparoscopic treatment.

1. Introduction

Echinococcus granulosus, the parasitic agent that causes cystic echinococcosis, is part of the smallest worms of the Taenia family whose larval stage causes zoonosis in men. [1]

The treatment of the hydatid cyst of the liver includes treatment with albendazol or mebendazol, open surgery or laparoscopy approach and PAIR (puncture, aspiration, injection, reaspiration) technique. [2]

Laparoscopy is recommended in accessible cysts. It provides very good visibility, safe haemostasis and shorter hospital stay, while open surgery is more useful especially in cysts that are difficult to access, in giant cysts and in the presence of adhesions and involves a higher rate of complications and longer hospital stay [3, 4, 5].

Currently, the laparoscopic treatment of the hydatid disease is considered a feasible and safe solution in selected patients. Laparoscopy has low morbidity and mortality rate, complies with the principles of open surgery and has the advantages of minimally invasive surgery: postoperative comfort, minimal pain, short hospital stay, rapid social reintegration [6]. In 1993, Bickel A. et al. and Khoury G. et al. reported the first cases of laparoscopic approach in hydatid disease [7]. In Timisoara, the first laparoscopic surgery of a hydatid cyst took place at Surgical Clinic II, in 1998. The aim of the present paper is to assess the experience gained in the laparoscopic treatment of the hydatid cyst disease in our clinic.

2. Material and method

This study is a retrospective analysis conducted reviewing medical data of the patients with liver hydatidosis admitted in our clinic between 1995 and 2014. Demographic data, clinical presentation, cysts location, operative data, postoperative complications and follow-up results were recorded and statistically analyzed. Follow-up was performed by clinic visits, ultrasound examinations, tomographic examinations and laboratory findings.

A total of 359 medical records were reviewed. There were 148 men (41 % of pts.) and 211 women (59 % of pts.), with a mean age of 35.8 years (range 6 to 67 years).

All the 359 patients had a preoperative ultrasound, and the cysts were classified initially according to Gharbi’s classification (8) and after the introduction of WHO-IWGE classification in 2003 (9) we used this ultrasound classification (Table 1). We encountered 557 cysts, because we had 86 patients with two cysts and 56 patients with three cysts.
Table 1. Classification of Cysts.

<table>
<thead>
<tr>
<th>Gharbi’s Classification</th>
<th>WHO-IWGE Classification</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Type CL</td>
<td>156 (28%)</td>
</tr>
<tr>
<td>Type II</td>
<td>Type CE1</td>
<td>107 (19%)</td>
</tr>
<tr>
<td>Type III</td>
<td>Type CE2</td>
<td>99 (17%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>Type CE3</td>
<td>83 (15%)</td>
</tr>
<tr>
<td>Type V</td>
<td>Type CE4</td>
<td>69 (12%)</td>
</tr>
<tr>
<td></td>
<td>Type CE5</td>
<td>43 (9%)</td>
</tr>
<tr>
<td>Total Number of Cysts</td>
<td></td>
<td>557 (100%)</td>
</tr>
</tbody>
</table>

Four hundred-nine cysts were situated in the right liver lobe, and the mean diameter of the cyst was 6.7 cm (range 3 cm to 19 cm). There were also multiple locations of the cysts: lung (7 cases), splenic (3 cases), pancreatic (2 cases), peritoneal (2 cases), diaphragmatic (1 case).

Preoperative workup also included computer tomography or magnetic nuclear resonance, biochemical and immunochemistry profile. An important part was the routine use of albendazole 10-15 mg/kg starting one to three days before treatment procedure and for one to three months after the procedure.

Of the 359 patients with liver hydatidosis, 208 patients (57.9%) have received puncture guided by ultrasound in 92 patients (25.7%) were performed interventions by open approach and 59 patients (16.4%) were treated by laparoscopic approach. (Graphic 1).

Of the 59 patients who underwent laparoscopic surgery, 41 were women (69.5%) and 18 men (30.5%). The patients were between 16 and 67 years of age and the highest incidence occurred in the 31-40 age groups.

The patients showed one or several of the following symptoms or signs: pain in the right hypochondrium, biliary dyspeptic syndrome, hepatomegaly. In 12 cases, a renitent tumour was felt by palpation in the right hypochondrium.

Patient selection is essential for the proper performance of the procedure. A number of 46 patients were selected for laparoscopic treatment according to the following criteria:

- cysts in the anterior and lateral segments - II, III, IV, V, VI [10, 11]
- cysts with thin walls and daughter vesicles, not recommended for the PAIR procedure
- cysts at least 7 cm in diameter
- totally or partially calcified cysts; at present, these are accepted, as most of the time they are inactive ad the risk of secondary dissemination is almost nonexistent [12, 13, 14] (Figure 1).

Laparoscopy was not recommended in the following situations:

- infected cysts or liver abscesses
- cyst located in the superior and posterior segments – I, VII or VIII [15]
- more than three cysts
- intrabiliary rupture of cysts or open cysts detected before surgery
- patients with cirrhosis
- patients who had undergone previous superior abdominal surgery
- cysts located near the vascular elements of the liver
- heart and lung affections that do not allow pneumoperitoneum

The therapeutic tactics has the following objectives:

- ultrasonography and CT scan of cyst topography and cyst classification
- complete biological and functional preoperative assessment; diagnosis of associated affections
- an anthelmintic will be administered 24 hours
before surgery and after surgery, for three monthly cycles, with a two-week break between them. This additional measure prevents secondary echinococcosis in the event of peritoneal contamination during cyst puncture.

- for laparoscopic approach we used the same manner as in open approach in case of partial pericystectomy. We put gauze dressing with hypertonic saline solution around the cyst. We insert the aspiration needle into the cavity and instilled also hypertonic saline solution. After 10 minutes we aspirated the cysts, and performed a small hole in the cyst for better aspiration of the hydatid liquid. We extract germinative membrane or daughter vesicles and put them into an endobag. We controlled the cavity of the cysts and if we see a biliary leakage we perform a suture of the biliary fistula. After procedure these patients were sent for an endoscopic sphincterectomy. In the end we put a drainage tube into the cavity for several days. [16]

After we get sufficient expertise in laparoscopic field we performed laparoscopic approach even for cysts from type CE3, CE4 and even for CE5 cysts and in terms of location we can now resolve laparoscopically any segments of the liver, except those cysts located in the central segments of the liver.

Figure 1. Hydatid Cyst in segment VII right liver lobe

3. Results

In the 59 patients who underwent hydatid cyst laparoscopic surgery, the lesions were located in the left liver lobe in 19 cases (32.2%), in the right liver lobe in 38 cases (64.4%) and in both liver lobes in 2 cases (3.4%). The patients included in the study consented to this approach (Table 2).

<table>
<thead>
<tr>
<th>No. of cysts/patient</th>
<th>No. of cases</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cyst</td>
<td>54</td>
<td>91.6</td>
</tr>
<tr>
<td>2 cysts</td>
<td>5</td>
<td>8.4</td>
</tr>
<tr>
<td>Cyst location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right liver lobe</td>
<td>38</td>
<td>64.4</td>
</tr>
<tr>
<td>Left liver lobe</td>
<td>19</td>
<td>32.2</td>
</tr>
<tr>
<td>Both liver lobes</td>
<td>2</td>
<td>3.4</td>
</tr>
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</table>

Table 2. Number of cysts and their location

Cyst dimensions varied from small (7 cm) to huge cysts (15 cm). The average diameter was 9.2 cm. Most cases were acephalocysts (85.3%), but 7 cysts had daughter vesicles and 2 were calcified.

In 43 cases (93.47%), Lagrot partial pericystectomy was followed by extraction of the proliferous membrane, the pericyst and the possible daughter vesicles in a small plastic bag. Next the residual cavity was drained. In 16 cases, total cystectomy was performed. Two were calcified hydatid cysts and one had daughter vesicles. Total cystectomy was carried out after the inactivation and evacuation of the parasite. In 17.4% of cases, biliary lithiasis associated with hydatid disease also required laparoscopic cholecystectomy.

The mortality was nil and the morbidity rate was 6.7 % (4 patients), 2 residual cavity abscesses drained by laparoscopy and 2 biliary fistulas managed by endoscopic sphincterotomy. Two patients (3.4%) had preoperative allergic reactions and received hydrocortisone hemisuccinate and antiallergic drugs. One patient (1.7%) relapsed after surgery.

The average operating time was 85 minutes, with limits between 60 and 170. The average hospital stay was 6 days, with limits between 3 to 18 days.

Complicated cases required longer hospital stay. None of the patients developed postoperative wound infections or incisional hernia. Bowel transit restarted in 48 hours and oral diet started in the first day after surgery. Patient follow-up was possible in all cases, with an average duration of 18 months (10-36 months).

4. Discussion

There are still a lot of controversies regarding the management of liver hydatidosis. Initially open surgery was the only accepted treatment for this disease. In the last decades dramatic changes appeared.

In laparoscopic treatment, location, dimension and cyst number, the possible biliary cystic fistula
and the cyst wall thickness are factors must be taken into consideration in the patient selection process [6].

Lagrot pericystectomy is the preferred surgical procedure. Although it does not involve the risk of cyst dissemination in the peritoneal cavity [15], it is performed in 75-90% of cases [17]. In our group, it was used in most cases (93.47%).

In superficial or marginal cyst locations, extensive pericyst resection can be performed in the cavity. In deep intrahepatic forms, minimal pericystectomy is preferred, which is enough only for the extraction of the proligerous membrane.

During puncture, fluid leakage in the peritoneal cavity can cause anaphylaxis, besides secondary dissemination [18]. For prevention purposes, pads filled with hypertonic solution were introduced through trocars, as recommended by several authors [6,7,15,16,19]. However, the lavage of the peritoneal cavity with this solution must be avoided to reduce the risk of hyperosmolar syndrome. One can also use formalin 2%, which can cause sclerosing cholangitis in case of biliary fistula [19], or oxygenated water, which can increase pressure in the cyst and cause its rupture in the peritoneal cavity; in case of biliary fistula, it may also cause gas embolism [19]. Some surgeons use a combination of Cetrimide 0.5% and Chlorhexidine 0.05% as scolicidal agents; however, Cetrimide may cause methemoglobinemia with cyanosis and metabolic acidosis [20].

Various surgical instruments have been created to avoid intraperitoneal contamination and to prevent secondary echinococcosis. D. Sabau, for instance, has created a coaxial double-lumen device for aspiration that adheres to the pericyst owing to the vacuum in the exterior channel. Cyst puncture and aspiration are performed through the interior channel. Some models have clips to avoid accidental detachment of the aspirating device [21]. Bickel and Eitan introduce a 12-mm transparent trocar with negative inside pressure; the trocar is attached to the pericyst like a suction cup and prevents dissemination during puncture [22]. Yucel uses a 5 or 10-mm trocar with an umbrella-type blocking mechanism in the cavity; the mechanism opens after the trocar is introduced in the cyst [23].

The cyst is emptied and the proligerous membrane is removed and put in a sack. This is an easy procedure when the hydatid cysts are recent. Generally, the proligerous membrane is detached from the pericyst and pressed within the cystic cavity because of the pneumoperitoneum pressure.

In older hydatid cysts with thicker, calcified membranes and biliary fistula, the treatment requires laparoscopic biliary drainage. Residual cavity inspection is required to detect possible complications, especially biliary fistulas that are mentioned in the literature of the field in 12-17% of cases [24,25]. These can be sutured with a traumatic thread, as clips cannot be used. If bile keeps leaking through the drain tube, endoscopic sphincterotomy and prolonged drainage are recommended. In our cases, most drain tubes were removed after 48-72 hours.

The literature of the field specifies that the average operating time in laparoscopic approach is 40-180 minutes and postoperative complications occur in 8-25% of cases [13,25,26,29,30]. In our study, the conversion rate was 0%, as it was in the study presented by Manterola et al [27]. The average hospital stay is 2-5,6 days, mortality is nil and relapses occur in 0-3,6% of cases [25,26,27,30]. Our results are comparable to these findings.

There is no RCT comparing open versus laparoscopic treatment for liver hydatidosis. There is a paired study by Zaharia et al (24), showed that laparoscopic approach is safe for the treatment of liver hydatidosis in almost all segments of the liver. Also in our study after the first period when we selected only cysts located in left lobe, now, we consider that almost cysts in all segments are suitable for laparoscopic approach, even if the cysts are types CE4 or CE5.

In terms of safety there many methods described for avoiding leakage of the hydatid liquid in the moment of first insertion of a needle into the cysts (23-26). In our opinion isolating the area around the cyst and using precaution when you insert the needle and administration of albendazole after the procedure for at least one month is sufficient and we didn’t have any peritoneal recurrences after laparoscopic or percutaneous approach.

5. Conclusion

Minimally invasive treatment is the first option for simple, uncomplicated hydatid cysts. Open surgery remains for complicated cysts, with biliary communication, with multiple daughter vesicles or with calcified walls.

Experience in the field of laparoscopic surgery is not very rich. The studies published so far deal with small groups of patients and the number of prospective, randomized studies on the laparoscopic approach is small as well.

Consequently, we believe that conventional surgery can be performed also laparoscopically and the surgical treatment demands can be respected. This works well in selected patients with superficial and smaller hydatid cysts located in anterior segments. In their case, percutaneous puncture is also effective.

Laparoscopy has several significant advantages: it is a minimally invasive procedure involving minimal pain, low infection rate, short
hospital stay, therefore, low costs and quick social and professional reintegration.

6. References