



Laparoscopic treatment of hydatid cyst of the liver in children. A report on 34 cases

Kais Maazoun*, Mongi Mekki, Fatma Zohra Chioukh, Lassaad Sahnoun, Amine Ksia, Riadh Jouini, Mohamed Jallouli, Imed Krichene, Mohsen Belghith, Abdellatif Nouri

Department of Pediatric Surgery, Fattouma Bourguiba Hospital, 5000 Monastir, Tunisia

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Abstract

Purpose: This study evaluated the safety and efficiency of laparoscopically treated liver cysts in children.

Methods: From September 2001 to July 2004, 34 patients underwent laparoscopic treatment of hydatid cysts of the liver. All patients had chest x-ray, abdominal sonography, and hydatid serology. The different stages of the procedure were the same as in open surgery: puncture, aspiration, injection of scolicedal agent, reaspiration, removal of proligerous membrane, and resection of the dome.

Results: The patients' mean average age was 7 years and 7 months (range, 3–14 years). The number of cysts ranged from 1 to 10 with a diameter of 40 to 150 mm (mean diameter, 65.5 mm). One case had a mesenteric associated hydatid cyst, another splenic hydatid cyst. The average length of hospital stay was 5 days (range, 4–14 days). No per- or postoperative complications were reported. At 12 to 45 months follow-up, no recurrence has been reported.

Conclusion: Laparoscopy represents an excellent approach for the treatment of hydatid cyst of the liver in children.

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Hydatid cyst is a parasitic disease caused by the tapeworm *Echinococcus granulosus* or *Echinococcus alveolaris*. The disease is endemic in Tunisia and many other areas of the world.

Laparoscopic treatment of hydatid cyst of the liver remains controversial because of the small number of patients and lack of hindsight series published. The aim of this work was to study the specificities of this approach in the treatment of hydatid cyst of the liver in children.

1. Materials and methods

This is a prospective study carried out between September 2001 and July 2004. It includes 34 children who underwent laparoscopic surgery for hydatid disease of the liver at the pediatric surgical center of Monastir, Tunisia. The parents, who were informed of the nature of the investigation, agreed to participate in the study.

All patients had chest x-ray, abdominal sonography, hydatid serology, and preoperative biologic analysis (blood grouping, blood count, hemostatic analysis). Abdominal tomography and hepatic analysis were not done for all patients.

Three patients had albendazole therapy before intervention: 2 cases for disseminated hydatidose with treatment of

* Corresponding author. Tel.: +216 98454645; fax: +216 73460678.
E-mail address: kaismz@yahoo.fr (K. Maazoun).

5 years before and 6 months after surgery for the first case, and 1 year before and 6 months after surgery for the second case. The third patient had a hydatid cyst of the left lung measuring 20 mm, and underwent Albendazole treatment 1 year after surgery in the hope of achieving cyst regression, to avoid the surgery.

2. Operative technique

After the induction of general anesthesia, all patients received prophylactic antibiotics. Laparoscopic access of the abdominal cavity is achieved under direct vision after vertical incision directly through the umbilicus by a 10-mm trocar.

Carbon dioxide pneumoperitoneum pressure is maintained between 10 and 12 mm Hg depending on the patient's weight.

Two other 5-mm trocars are introduced in the right and left hypochondrium. In 4 cases, a third trocar was necessary to retract the liver. A 0° or 30° telescope is then used depending on the cyst localization.

The cyst is protected by sterile clean pads introduced through the umbilical trocar and filled with hypertonic saline solution. After that, we proceed to a puncture aspiration of the cyst, sterilization of its content by infusion of hypertonic saline solution during 10 minutes, then reaspiration. The cyst is opened and the proligerous membrane is removed and put in a sack.

Puncture aspiration is performed with a 1.6-mm-diameter needle through 1 of the trocars or transparietal Veres.

The last step is the resection of the dome and the search for biliary fistula. Residual cavity draining is not systematic.

The pads and resected pericyst are placed in the same sack, then exteriorized by the umbilical orifice to prevent the risk of intraperitoneal soiling and contamination.

3. Results

Seventeen boys and 17 girls were treated by laparoscopic surgery for hydatid disease of the liver. Ages ranged from 3 to 14 years (average, 7 years and 7 months).

The circumstances of diagnosis were abdominal pain in 10 cases, abdominal mass in 3, and checkup of hydatid disease of the lung in 21 cases.

Two cases of disseminated hydatidose were treated with albendazole. The first one had 30 cysts treated medically with involution of 20 cysts and the 10 remaining others by laparoscopic surgery. The second case had 20 cysts, 12 of which were involuted with medical treatment; the rest were treated by laparoscopic surgery.

In the other cases, the number of cysts treated with surgery ranged from 1 to 7 (58 cysts; average, 1.7 cyst/patient). Cyst size was 65.5 mm (range, 40-150 mm). The

right liver was concerned in 35 cysts and the left one in 23 cysts. Based on the classification of Gharbi et al [1], the cysts were catalogued as follows: type I, 46; type II, 7; type III, 3; type IV, 2.

One case had an associated mesenteric hydatid cyst and another a splenic hydatid cyst. These associated hydatid cysts were treated at the same time.

No peroperative complications were observed and no conversion to an open operation was done. No patient needed a blood transfusion before or after intervention.

Residual cavity draining was done in 27 patients with no declivous cyst cavity. Three patients had postoperative albendazole treatment: 2 for fissurated cysts of the liver and 1 for a small, deep-seated cyst of the seventh segment that was not found in peroperative. Its evolution was favorable with medical treatment, because we had a calcified cyst 1 year later.

The patient, who had a 20-mm hydatid cyst of the left lung and was under albendazole treatment before and after surgery, had the same 20-mm-sized cyst after 1 year of medical treatment.

Operative time ranged from 30 to 210 minutes (average, 90 minutes). Alimentation was introduced at the first postoperative day. Average hospital stay was 5 days (range, 4-14 days).

No postoperative complications were observed after a follow-up that ranged from 12 to 45 months (mean, 23 months).

4. Discussion

Many reports on laparoscopic surgery for liver hydatidosis (for adults) are found in the literature [2,3]. We report 1 of the few pediatric series of hydatid disease of the liver treated by laparoscopic surgery [4]. This technique is controversial in studies among adults.

For many authors, in cysts with biliary communication, deeply located cysts and disseminated liver hydatidosis should be excluded [5-7]. We think that the number and size of the cysts are not contraindications to this operation. Also, the location of the cyst also is not a contraindication as reported by some authors [6]. In fact, this technique is safe in exploring the dome and cysts located posteriorly with a 30° telescope.

Complex cysts were not found to be a contraindication to this operation. The laparoscopic approach can be advantageous because the endoscope can be introduced into the cyst cavity for inspection and to make sure that no daughter cysts or laminated membranes were overlooked [5,8]. In addition, this approach helps us to detect small bile openings [5,9], with the help of the magnification by telescope; this offers an advantage compared to classic surgery.

Advantages of the laparoscopic approach compared to open surgery are good cosmetic results, shorter duration, and

rapid recovery. It allows for the treatment of other abdominal cysts at the same time. This was the case for 2 of our patients who had a mesenteric and a splenic hydatid cyst associated to the cyst of the liver.

A major disadvantage of laparoscopy is the lack of precautionary measures concerning spillage, especially under high abdominal pressures induced by pneumoperitoneum [3,10]. However, Bicket et al [11] demonstrated that the increase in intracystic pressure was no greater than the increase in intra-abdominal pressure and that pneumoperitoneum was protective against spillage.

As in the open surgery, the indication of cyst cavity drainage is the lack of declivous residual cavities.

Scolicidal agents are used pre- and postoperatively by some authors in these situations: disseminated liver hydatidose, spillage of the cyst content in the abdominal cavity, deeply located cysts of small size, small pulmonary associated cysts [6,10].

The conversion rate in our series with 34 patients was 0%, whereas the average rate in other laparoscopic series has been 12% (range, 0%-27%) [8,10,12-14]. Factors increasing the risk of conversion include posterior location and advanced stage of the cysts [12].

Postoperative follow-up should be the same as that in classic surgery. Postoperative morbidity in laparoscopic studies ranges from 8% to 25%, and includes biliary fistula, infection, and perihepatic fluid collection [8,12-15].

Another concern for the laparoscopic approach is the risk of anaphylaxis [8,16,17]. In our laparoscopic series, we have not seen any anaphylactic shock.

The recurrence rate after open surgery for hydatid cysts ranges from 0% to 30% [18], in contrast to 0% to 9% in laparoscopic studies [5,8,10]. In our laparoscopic series with a mean follow-up of 23 months, we have not seen any recurrence.

Percutaneous aspiration under radiologic guidance has been advocated as an alternative to surgical intervention. The procedure of needle aspiration, injection of scolicidal agent, and catheter drainage has advantages, including relatively short hospitalization, good cosmetic results, and possibility of performing the procedure using local anesthesia [19-21]; it may also be indicated in the case of deep-seated cysts. However, it is not without drawbacks. Cyst puncture carries the risk of spillage, which because of the procedure's percutaneous nature can be uncontrolled, thus leading to dissemination of the disease or anaphylactic shock [22] (anaphylactic shock ranges from 0.1% to 0.2% [23]); lack of accessibility to extrahepatic cysts; limitations in treating cysts in proximity to major blood vessels [24,25]; difficulty in eradicating complicated cysts (Gharbi types III and IV) [23,26]. Some authors consider that this procedure is unsuccessful in 20% of patients. Failures most often occurred with type III and IV cysts [26].

Laparoscopy represents an excellent approach for treating hydatid cyst of the liver in children. Provided the exclusion criteria are observed and the surgeon has a perfect command

of the operative technique, results are similar to those obtained in open surgery, with better cosmetic results and a shorter hospital stay.

The essential treatment, however, remains the prophylaxy.

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