

Laparoscopic versus Open Management of Hydatid Cyst of Liver

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ABSTRACT

Background: To compare laparoscopic versus open management of the hydatid cyst of liver regarding recurrence rate, the surgical approach to liver *echinococcosis* is still a controversial issue. This study shows our results of surgical treatment of liver hydatid cysts during a 5 years period.

Methods: A prospective study of 32 patients operated on in a 5-year period (1999-2003) in Dubrava University Hospital, Zagreb, Croatia, with hepatic hydatid cyst. All patients were preoperatively treated with albendazole. In 32 patients, total pericystectomy without opening the cyst cavity was performed laparoscopically, other procedures were used as surgical approach.

Results: There was no mortality after 5 to 6 months follow-up, but in one patient, in the open partial pericystectomy group, recurrence of the disease occurred after 2 to 3 years. When a laparoscopic procedure was done, there were no complications or recurrence. The median operative duration for open surgery was 100.0 minutes (range 60.0-210.0) and for laparoscopic surgery 67.5 minutes (range 60.0-120.0). The median length of hospitalization for open surgery was 8.0 days (range 7.0-14.0) and for laparoscopic surgery 5.0 days (range 4.0-7.0).

Conclusion: Total pericystectomy without opening the cyst cavity, preceded by preoperative albendazole therapy is the method of choice for hepatic hydatid cyst treatment. Despite the small group of patients, our first results show laparoscopic total pericystectomy, without opening the cyst cavity, in the treatment of hepatic hydatid cyst.

Keywords: Laparoscopical treatment, Liver, Hydatid cyst, Abdominal approach.

INTRODUCTION

Hydatid disease is a rare entity primarily affecting the population of developing countries. Septation and calcification of the cysts with a high antibody titer in the patient's serum confirm the diagnosis, although more sophisticated tests have been applied recently. Surgery constitutes the primary treatment with a variety of techniques based on the principles of eradication and elimination of recurrence by means of spillage avoidance.

1. Hydatid disease is endemic mainly in the Mediterranean countries, the Middle East, South America, India, Northern China and other sheep-raising areas; however, owing to increased travel and tourism all over the world, it can be found anywhere, even in developed countries. Hydatid disease is a zoonotic infection caused by adult or larval stages of the cestode *Echinococcus granulosus*.
2. The prevalence of hydatid disease among human was determined as 9.1% in a World Health Organization study in central Peruvian Andes.
3. In humans, most hydatid cyst occur in the liver and 75% of these are single cyst and other common organs included are lung, spleen and kidney.
4. The hydatid cyst of the liver has two layers: The ectocyst—a dense fibrous host reaction to the parasite, and the parasite—derived endocyst which has an outer laminated and an inner germinal layer. The single-celled

germinal membrane gives rise to broad capsules, which contain the scoleces and daughter cysts, which float freely in the clear cyst fluid.

5. Surgery remains the gold standard in terms of therapy for patients with hepatic hydatid cyst. Despite significant advances in medical treatment and interventional radiology, the conventional operative procedures of the hydatid cyst of the liver, like enucleation, cystectomy, evacuation, marsupialization, etc., which involve a significant morbidity especially in term of wound infection are used. Laparoscopic treatment of hepatic hydatid disease has been increasingly popular parallel to the progress in laparoscopic surgery.
6. Controversies about the role of laparoscopy in the management of liver hydatid cyst have not been resolved; these controversies include selection of patients and surgical technique. This study presents our experience and results in laparoscopic treatment of hepatic hydatid cysts.¹⁻³

PATIENTS AND METHODS

From November 2007 to January 2010, 32 patients with liver hydatid cyst were treated laparoscopically in the Department of General Surgery, Ain Shams University Hospital, Cairo, Egypt and New Al-Jedaani Hospital, Jeddah, Saudi Arabia. The study group consisted of 14 men and 18 women. Ages ranged from 26 to 63 years (mean

age 43.4 years). The most common complaints were dull pain at the right hypochondrium or/and epigastrium and palpable mass. Patients were diagnosed by ultrasonography (US) (Fig. 1), computed tomography (CT), magnetic resonance imaging (MRI) and confirmed by serological examination (immunoelectrophoresis which has a high sensitivity, being positive in 30 patients). We excluded cases with multiple liver hydatid cysts having more than two or cysts located in blind area for laparoscopic procedures, like segments 1, 2 and 7. Our exclusion criteria also included intraparenchymal location of the cyst or cysts with thick and calcified walls. All procedures were performed under general anesthesia and in the supine position. Prophylactic antibiotics were administered for 30 minutes before the operation. The surgeon and the camera assistant standing on the left side of the patient with the assistant and scrub nurse standing on the right side of the patient. Four ports were placed, a supraumbilical 10 mm port through which a 0° telescope inserted, another 10 mm port inserted at the epigastrium as near as possible to the cyst and used as a working channel and two additional 5 mm ports inserted according to the cyst location.⁴ From the epigastric port, gauzes soaked with 20% hypertonic saline as scolicedal agent were introduced into the abdominal cavity and placed around the cyst. The cyst was punctured with long laparoscopic needles connected to vacuum suction through epigastric port; another sucker was introduced through the right 5 mm port to avoid accidental spillage of the cyst content. Cystic fluid was aspirated and then 100 ml of 20% hypertonic saline was injected inside cyst via the same needle then aspirated (Fig. 2), this procedure was repeated three times and then the needle was withdrawn while still connected to suction to prevent back spillage from needle, and then deflated cystic wall was suspended by two graspers, and cystotomy was performed by electrocautry, and the laminated membrane was carefully removed and put into endobag and retrieved through epigastric port, then the

laparoscope was inserted into the cyst to exclude any biliary communication or retained daughter cysts. The cystic cavity was irrigated with 20% hypertonic saline several times, and partial or near total cystectomy was done by using harmonic scalpel, then a drain was placed in the remaining cystic cavity, and gauzes were placed in an endosac and removed. Postoperative follow-up was very smooth, oral fluid intake was allowed next day of operation, drain was removed at 48 hours after operation if no apparent bile in the drain, patients were discharged to home and advised for follow-up at 2 weeks, 3 months and 6 months and then yearly by ultrasound and serological tests (immunoelectrophoresis test).^{5,8,11}

Indications

1. Single superficial cyst that may rupture
2. Large cyst with multiple daughter cysts
3. Cysts in communication with the biliary tree
4. Infected cysts
5. Cysts giving compression to the near vital organs.

Contraindications

1. Dead cysts
2. Multiple cysts
3. Cysts difficult to access
4. Small cysts.

LAPAROSCOPIC PROCEDURE

A lot of clinical studies that had been done to compare laparoscopic vs open hydatid liver particularly the recurrence rate, most of them advocate laparoscopy that is why in last years morbidity and mortality decrease.

Palanivelu planned a recent technique, the so-called Palanivelu Hydatid System (PHS). The PHS consists of a complex system of fenestrated trocar and cannulas through which it reduced at least the peritoneal spillage.

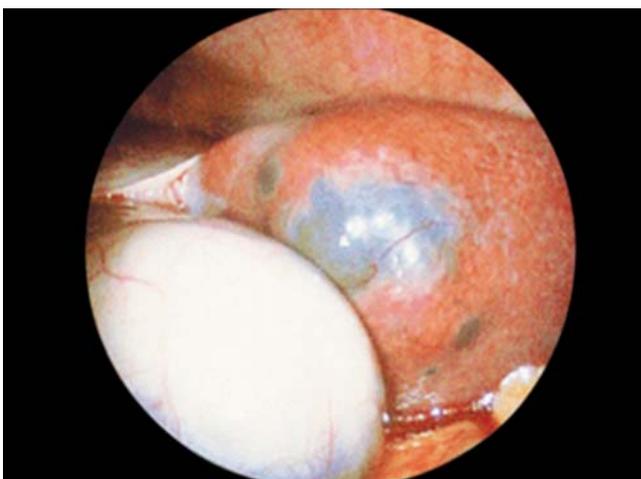


Fig. 1: Exposure of liver hydatid



Fig. 2: Aspiration

Radical Surgery

In the pericystectomy technique (Fig. 3), the cyst was totally removed together with 1 cm of the liver parenchyma, without opening the cavity. In a left lobe lateral segmentectomy, to secure the vasculature of the left lobe lateral segment, the segmentectomy was performed after taking the mesentery. In both situations, drain put in area of operative field.

Conservative Surgery

The anterior wall of the cystic lesion was removed as widely as possible. All the components of the cyst were removed from the interior. After washing the operated area with saline or Betadine solution, one or two drains were placed. Omentopexy was not performed when cysts were located proximally but was performed when cysts were located inferior to the liver.^{5-7,9}

Contraindications

1. Deep intraparenchymal cysts
2. Posterior cyst
3. More than three cysts
4. Cysts with tick and calcified walls
5. Cysts characterized by heterogeneous complex mass (Gharbi type 4)
6. Cyst less than 3 cm in diameter
7. Serious coagulation abnormalities.

TECHNIQUE

After creating pneumoperitoneum through the umbilicus and after identifying the hydatid cyst, the PDS trocar is introduced into the peritoneal cavity directly over the hydatid cyst. Once the trocar is removed only the cannula is advanced until its tip is in contact with the hydatid cyst surface. After suction with cannula, a 5 mm trocar joined



Fig. 3: Pericystectomy

to another suction machine is introduced into the cannula and is pushed into the cyst. The suction is immediate and happens either into the body of the hollow trocar and into the suction cannula, or into cannula and then into the suction side-channel. The trocar is removed, the peritoneal cavity is irrigated by the main channel while the suction is maintained all the time. After removing fluid, the telescope is introduced to visualize the interior of the cavity for control any cyst-biliary communication; a scolicedal agent is instilled into the cyst cavity and after 10 minutes it is suctioned and the cyst is marsupialized. In case of bile leakage, use of scolicedal agent is avoided.^{10,11}

Although the rate of recurrence is lower with radical surgery, application is limited as the associated morbidity and mortality rates are high.⁶ In the radical surgery cases in our study, four were in the left lobe lateral segment with straightforward localization and the other 14 were exophytic locations, therefore, there was no mortality or morbidity related to surgery. The laparoscopic approach is a treatment method developed in recent years using an umbrella trocar to perform partial or total cystectomy.^{6,7}

ALBENDAZOLE TREATMENT

All patients with hydatid disease the size was seen to have increased, firstly albendazole treatment was administered. When the size continued to increase despite this, then surgery was planned at our clinic were administered 10 mg/kg albendazole for 14 to 21 days preoperatively. During this period, liver function tests were closely observed. For all patients undergoing surgery, the same treatment protocol was recommended on postoperative day 1 and continued for 14 to 21 days. If patients experienced recurrence during follow-up, again 14 to 21 days treatment was administered preoperatively, and the postoperative treatment period was 2 months (Figs 4 to 6).

RESULTS

Around 32 patients (18 women and 14 men) with liver hydatid cyst underwent laparoscopic cystotomy and partial cystectomy during the study period from November 2007 to January 2010. The presenting symptoms of patients is shown in Table 1. Abdominal ultrasound, abdominal computed tomography and serological examination (immunoelectrophoresis) confirmed the diagnosis of hepatic hydatid cyst in all patients. A total of 28 patients had solitary liver cyst and four patients had two cysts; 16 cysts located in segment 6, 12 cysts located in segments, four cysts located in segment 3 and four cysts located in segments 4. Mean operative time was 54 minutes (range 45-130 minutes). No conversion to open procedure was required. We had one case that developed an anaphylaxis during procedure but recovered well, the anaphylaxis developed secondary to direct

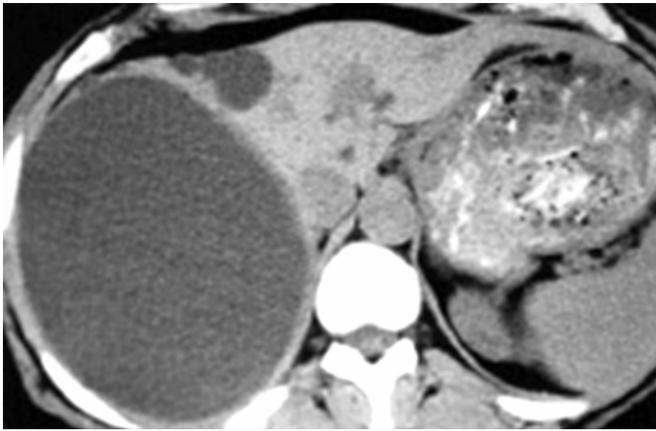


Fig. 4: Computed tomography (CT) scan appearance of a large hepatic cyst

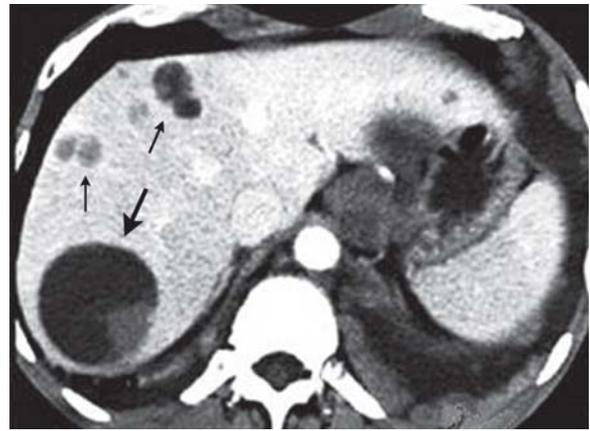


Fig. 6: Multiple hydatids liver that required postoperative albendazole therapy



Fig. 5: Magnetic resonance imaging of sagittal hepatic cysts

contact of hydatid fluid to blood stream after accidental laceration of the liver. Bile leakage was observed in one patient on the second postoperative day, which was managed by endoscopic sphincterotomy. The leakage gradually ceased within 6 days. This patient was discharged on the tenth postoperative day, in other patient, an infected subhepatic collection developed after discharge from the hospital. This patient was rehospitalized with pain and high fever, and the collection was drained percutaneously guided by ultrasound. The mean length of hospital stay was 4.3 days (range 4-10 days). The mean follow-up was 15.6 months (range 6-25 months). Radiological and serological test results showed no recurrences for all patients.

Table 1: Symptomatology of patients with liver hydatid cyst

Symptom	No.	%
Pain	18	56.20
Abdominal mass	12	37.50
Dyspepsia	4	12.50
Jaundice	2	6.25

DISCUSSION

In our study, 72.8% of the patients were symptomatic, while 27.2% were asymptomatic. In all of the patients, the cysts found were ≥ 6 cm. The choice of the better management of hydatid cyst of the liver is very difficult because of variable clinicopathological aspects. The treatment should be individualized to the morphology, size, number and location of the cysts. Hydatid liver disease is still endemic in certain regions of the world. The incidence of hydatid disease in Turkey ranges from 2/10,00,000 to 1/2,000 in different studies. The progresses fulfilled in the latest years by laparoscopic management have made the applications of this technique possible to a more and more number of growing cases. It is sure that the Palanivelu Hydatid System (PHS) has revolutionized the treatment of hydatid cyst of the liver because this sealed procedure not only avoids any spillage of the fluid but also allows intracystic magnified visualization for cyst biliary communications. By its application, fields are excluded only deep intraparenchymal or posterior cysts situated close to the vena cava. Consequently, reduced time range hospitalization that is for the laparoscopy, in the opinion of some authors, of 3 to 12 day against the mean hospitalization time range in the open that is of 9 to 20 days; mortality with the laparoscopic procedure goes down to almost 0% and morbidity has determinate dramatic and sensible reduction of the recurrence.^{8,9}

CONCLUSION

It is better and safe to use laparoscopy in treatment of hydatid liver with less morbidity, mortality and recurrence rate in comparison with open technique.

It is recommended to use postoperative albendazole therapy.

REFERENCES

1. Dervenis C, Delis S, Avgerinos C, Madariaga J, Milicevic M. Changing concepts in the management of liver hydatid disease. *J Gastrointest Surg.* Jul-Aug 2005;9(6):869-77.

2. Stephan A, Keith DL, Zinner MJ, Schwartz SI, Harold Ellis. Liver abscess and hydatid cyst disease. *Mangot's abdominal operations* Prentice Hall International Inc 1997;1534-37.
3. Moro PL, McDonald J, Gilman RH, et al. Epidemiology of *Echinococcus granulosus* infection in central Peruvian Andes. *Bull: World Health Organization Organ* 1997;75(6): 553-61.
4. Perek A, Numan F, Durgan V, et al. Management of a patient with hepatic, thoracic–pelvic and omental hydatid cyst and post-operative biliocutaneous fistula. A case report. *Hepato gastroenterology* 1999.
5. Bach, Lefler E, Barash EF, Eitan A. Laparoscopic approach to hidatid liver cyst. Is it logical? Physical, experimental and practical aspects. *J Surgical Endoscopy* 1998;12(8).
6. Bickel A, Loberant N, Singer-Jordan J, Goldfeld M, Eitan A. The laparoscopic approach to abdominal hydatid cysts. *Arch Surg* 2001;136. Ertem M, Karahasanoglu T, Yavuz N, Erguney S. Laparoscopically treated liver hydatid cysts. *Arch Surg* 2002;137:1170-73.
7. Eren Berber is currently a fellow at The Cleveland Clinic Foundation Department of General Surgery. Istanbul University, Istanbul Faculty of Medicine, Department of Surgery, Istanbul, Turkey.
8. Jenkins DJ, Romig T, Thompson RC. Emergence/re-emergence of *Echinococcus* spp: a global update. *Int J Parasitol* 2005;35: 1205-19.
9. Topcu O, Sumer Z, Tuncer E, Aydin C, Koyuncu A. Efficacy of chlorhexidine gluconate during surgery for hydatid cyst. *World J Surg* 2009;33:1274-80.
10. Secchi MA, Pettinari R, Mercapide C, Bracco R, Castilla C, Cassone E, Sisco P, Andriani O, Rossi L, Grondona J, et al. Surgical management of liver hydatidosis: A multicentre series of 1412 patients. *Liver Int* 2010;30:85-93.
11. Aydin U, Yazici P, Onen Z, Ozsoy M, Zeytunlu M, Kiliç M, Coker A. The optimal treatment of hydatid cyst of the liver: Radical surgery with a significant reduced risk of recurrence. *Turk J Gastroenterol* 2008;19:33-39.