

ADVANTAGES OF LAPAROSCOPIC TREATMENT IN HEPATIC HYDATID CYST AND CURRENT THERAPEUTIC MANAGEMENT

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ABSTRACT

This 7-year retrospective study presents our results on the laparoscopic treatment of hepatic hydatid cysts, with the aim of demonstrating the advantages of minimally invasive surgery, safety and efficacy of the procedure.

The study group included 33 patients, 22 female and 11 male, aged 20-74 years, who were diagnosed and subsequently underwent laparoscopic surgery.

Diagnosis was based on history, clinical examination and biological, imaging investigations (abdominal ultrasound, CT scan of the abdomen).

The results of the study reveal a female predominance, the highest number of patients was recorded between the age group 61-70 years, while the second place was occupied by the age groups 31-40 and 51-60 years. The most common symptom was abdominal pain.

The surgical procedure used was laparoscopic Lagrot partial perichystectomy. Case conversion was required in eight patients.

Based on our experience, we can state that laparoscopic surgery in the treatment of hepatic hydatid cyst is safe, effective and plays an essential role in the management of hepatic hydatid disease, with proven advantages over surgeries performed by the classical route.

Keywords : hepatic hydatid cyst, laparoscopy, laparoscopic perichystectomy, echinococcosis.

Introduction

Hepatic hydatid disease is a parasitic zoonosis caused by the larval cestode of the tapeworm *Echinococcus granulosus* living in the small intestine of dogs (1, 2). In Romania it is a common disease due to the geographical position and economic status, frequently in Constanta (Dobrogea) (3, 4). In terms of location, hydatid cyst develops more frequently in the liver (50% to 93%) [1]. Most of the time the patient's symptoms are hidden. If not discovered and treated, they may grow in size to form fistulas in the biliary system or rupture into the abdominal cavity causing dissemination of daughter vesicles

(5, 6).

In recent years, treatment options for hepatic hydatid cyst have increased (medical treatment, percutaneous drainage), but surgery remains the mainstay of therapy (1).

Indications for laparoscopic treatment of hepatic hydatid cyst have changed dramatically due to the increasing possibility of laparoscopic surgery (7, 8). Laparoscopic treatment of hepatic hydatid cyst is a very good, encouraging option with minimal morbidity and mortality (9). The aim of this study was to demonstrate the advantages of laparoscopic treatment.

Method

We conducted a retrospective study for patients in the Surgery I Clinic of the “Sfântul Apostol Andrei” Emergency Clinical County Hospital of Constanta, over a period of 7 years, from January 2017 to December 2023.

The study group comprises 33 patients, 22 female and 11 male, aged between 20 and 74 years, who were diagnosed and subsequently underwent surgery.

The most common complaints that patients presented were pain in the epigastrium and/or right hypochondrium, nausea, poor appetite or the presence of a palpable pseudotumoural formation at this level.

Patients were diagnosed on the basis of history, clinical examination, enzyme-linked immunosorbent assay (ELISA), abdominal ultrasound, computed tomography and/or nuclear magnetic resonance.

In this study we excluded patients with deep intraparenchymal cysts, inaccessible cysts and recurrent hydatid cysts, cysts with heterogeneous ultrasonographic pattern (hyperechogenic inside) and cysts with calcified walls according to Gharbi classification IV, V respectively, patients who presented more than three hydatid cysts.

Out of 25 cases, 20 patients were admitted through the outpatient service and were preoperatively prepared with antiparasitic treatment (Albendazole), the dose of administration being 800 mg/day for 28 days.

Surgeries were performed under general anaesthesia. Antibiotic was administered at the time of induction, as well as 8 mg of dexamethasone as a method of preventing anaphylactic shock.

The laparoscopic approach is initially standardized with the insertion of the optical trocar for visualization and identification of the hepatic hydatid cyst, the rest of the trocars being influenced by the case.

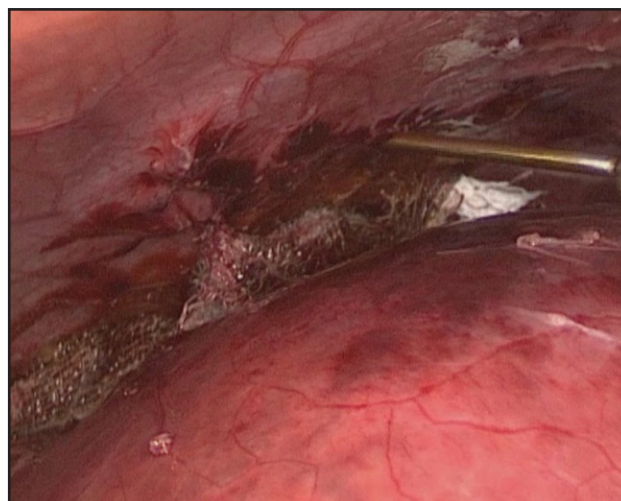


Figure 1 - Isolation of the field with meshes and soaking them with betadine

After introducing the working trocars, we isolate the operative field by inserting meshes soaked in scolicidal agents/substances (betadine in our case) circumferential to the lesion thus preventing the risk of contaminating the abdominal cavity (Figure 1).

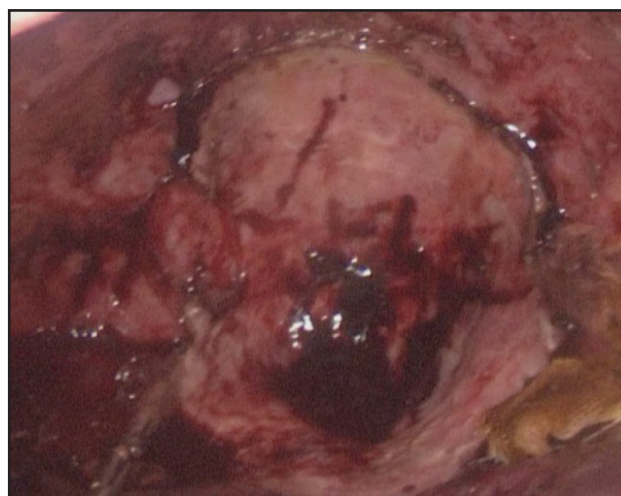


Figure 2 Partial perichystectomy and removal of the proligerous membrane.

Once isolation is achieved, we treat the hepatic hydatid cyst by puncture, aspiration of the fluid and introduction of scolicid fluid (betadine) on the same needle. Taking into account the previous step, after waiting 10 minutes, we aspirate the introduced fluid, performing partial perichystectomy with removal of the proligerous membrane (Figures 2,3) as well as the daughter cells.

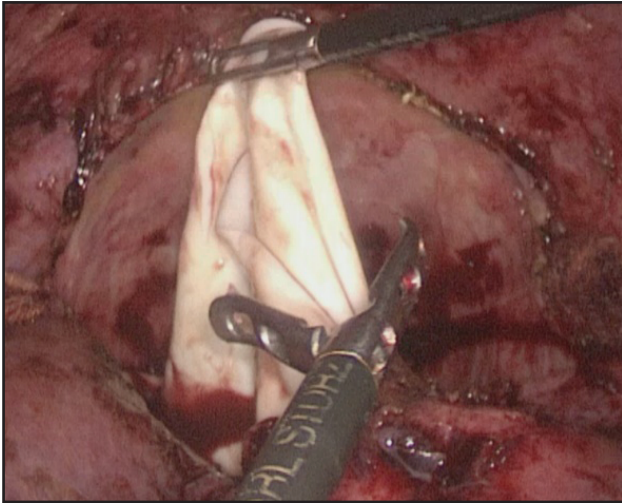


Figure 3 - Partial perichystectomy and removal of the proligerous membrane.

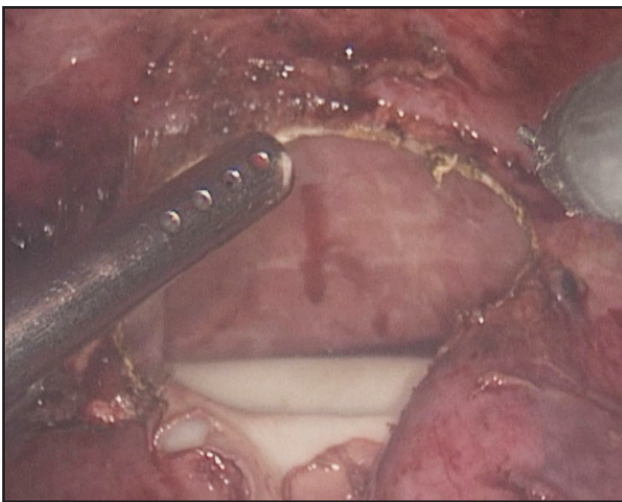


Figure 4 Checking the remaining cavity.

The remaining cavity is checked to exclude a biliary fistula or remaining hydatid material (Figure 4).

In some cases, when required, we have performed the filling of the cyst cavity with omentum. The surgery is completed with haemostasis control, lavage, drainage of the remaining cavity as well as the abdominal cavity.

Postoperatively, drainage tubes will be removed over 72 hours or more and only in the absence of bile or serosanguinol drainage.

Results

During the study period January 2017 - December 2023, out of 33 patients, laparoscopic cystectomy and partial perichystectomy was

performed in 25 patients of which 17 female and 8 male, 8 patients required conversion. The largest number of patients was in the 61-70 age group, while the second largest number was in the 31-40 and 51-60 age groups.

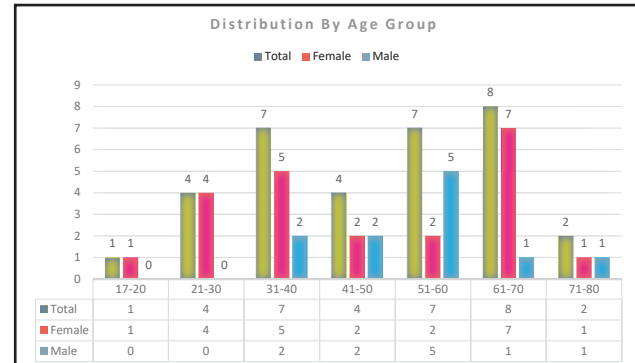


Figure 5 Distribution by age group

In our study we observed a preponderance of female 22 cases (66.6%) compared to male 11 cases (33.3%). The majority of patients came from rural areas 24 (72%) and 9 cases from urban areas (28%) (Figure 6).

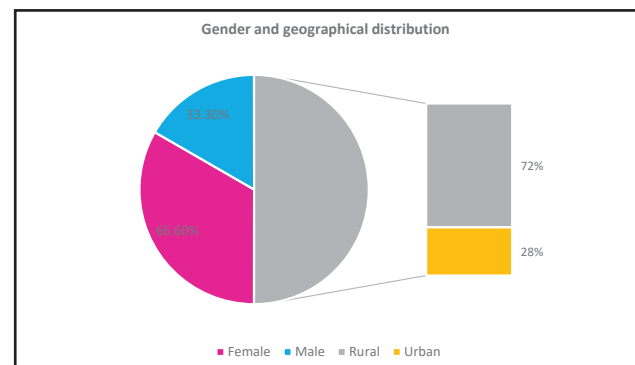


Figure 6 Gender and geographical distribution

Of the 33 patients diagnosed with hepatic hydatid cyst, the majority presented as symptoms abdominal pain 19 (57%), palpable mass 15 (45%), nausea and vomiting 7 (21%), jaundice (9%) (Table 1).

Table 1 Symptoms

Symptom	Number of cases	Percentage
Nausea and vomiting	7	21%
Abdominal pain	19	57%
Jaundice syndrome	3	9%
Fever	3	9%
Palpable mass	15	45%
Acute abdomen	6	18%



Figure 7 - Hepatic hydatid cyst located in the right hepatic lobe.

Diagnosis was established in chronic patients on the basis of the Elisa test, abdominal CT/NMRI or abdominal ultrasound, in acute patients the diagnosis was established on the basis of abdominal and pelvic CT, the Elisa test taking a few days to find out the result.

Of the 25 patients operated on laparoscopically the most affected was the right liver lobe, 17 (68%), with the left liver lobe being affected in 32% (8 patients).

The average duration of surgery was about 90 minutes, +/- 20 minutes.

In the 25 cases operated on laparoscopically, intraoperative biliary fistula was present in one case requiring suturing. Postoperative biliary fistula was noted in five cases, in three cases we performed ERCP (endoscopic retrograde papillary sphincterotomy), and in two cases, biliary drainage gradually remitted, ceasing spontaneously without further intervention.

Only one patient admitted in emergency with the diagnosis of hepatic hydatid cyst segments VII, VIII ruptured in the abdominal cavity developed circulatory arrest by anaphylactic reaction during surgery, resuming cardiac activity after about 2 minutes, postoperatively the patient's evolution was favorable, being discharged after 12 days.

Discussions

Initially, laparoscopic surgery was not widely used in the treatment of hepatic hydatid cyst because of the fear that the risk of intra-abdominal dissemination and recurrence rate might be higher compared to classical surgery (10, 11). Different authors have tried to minimize the risks of laparoscopy by administering pre and postoperative drug treatment with Albendazole, by isolating the hepatic hydatid cyst with meshes soaked in scolic substances (betadine) circumferential to the lesion thus preventing the

risk of contamination of the abdominal cavity (5, 12). The actual risk of contamination is very low and the recurrence rate is higher in cases that have undergone surgery by the classical route (13).

The indications for laparoscopic treatment of hepatic hydatid cysts are constantly changing, it should not be forgotten that about 15 years ago, laparoscopic surgery was performed only on hydatid cysts smaller than 5 cm, with peripheral location and without daughter vesicles. As a contraindication to laparoscopic treatment would be for hepatic hydatid cysts that are located on the posterior aspect (14).

Laparoscopic treatment of hepatic hydatid cyst follows the same surgical steps as in classical surgery, inactivation of the parasite, evacuation of the cyst contents and management of the residual cavity (11, 15, 16).

A great advantage of laparoscopy is that we can examine the inside of the cystic cavity, the image being two or three times larger, thus having the possibility to reveal and remove debris from the proliger membrane or we can observe a biliocystic communication, which can be approached laparoscopically by applying an x-wire or a clip.

Our 7-year retrospective study aims to study socio-demographic, clinical factors, investigations and efficacy of laparoscopic treatment.

In this study, we observe that the highest percentage (47%) of patients was in the age group curved between 61-70, followed by the age groups 31-40 and 51-60 years (42%), and the lowest percentage was observed in the age group 17-20 years (3.03%) (Table 1). Most studies show a higher incidence in the 3rd and 4th decade as well as affecting more female patients as observed in our study (1, 17, 18).

Hydatid pathology is more common in

rural areas and most likely in patients with low social and economic status (Chart 1).

Hydatid disease is a slowly progressive disease, symptoms and complications appear late. Most of the symptoms are due to bile duct compression, the patient presents with jaundice, abdominal pain, pruritus (16).

As in the present study, the most common symptom reported by patients was abdominal pain in 19 cases (57%), this symptom was also reported by other writers (5, 19).

The most affected lobe was the right lobe in the proportion of 68%, compared to the left lobe 32%.

Imaging methods for the diagnosis of hepatic hydatid cyst are abdominal ultrasonography and computed tomography (20), these investigations show us best the location of the hydatid cyst, its size, its relationship with adjacent structures, detection of proligerous membrane, its calcification or rupture.

Multiple treatment modalities have been described in the literature, such as drug treatment, percutaneous drainage, but surgical treatment remains the main indication.

Laparoscopic surgery was applied to 33 patients, 25 were resolved by this route, 8 cases required conversion due to unsatisfactory access, exposure and anatomy.

Different laparoscopic techniques described include total perichystectomy, partial perichystectomy, partial perichystectomy with epiploic plumping, ideal cystectomy (9, 21). Laparoscopic perichystectomy can be considered the gold standard for the management of hydatid cysts, remote from the main vessels, located peripherally (22).

After perichystectomy, most authors indicate drainage of the residual cavity and epiploon filling [23]. Epiploon filling is recommended in complicated or uncomplicated hepatic hydatid cysts because of the high absorptive capacity of the epiploon and its ability to fill the residual cavity (23, 24).

Intraoperative and postoperative complications are indicators of the success of laparoscopic surgery and have a major impact on the surgical outcome. In the 25 cases operated on laparoscopically, intraoperative biliary fistula was present in one case requiring suturing.

Postoperative biliary fistula was noted in five cases, in three cases we performed ERCP (retrograde endoscopic papillary sphincterotomy), and in two cases, biliary drainage gradually remitted, ceasing spontaneously without further intervention.

In other studies, other postoperative complications such as pancreatic fistula have been observed, in our study not reported (18, 25-27).

Unfortunately, in our study conversion was required in 8 patients due to inadequate exposure during laparoscopy, access, generalized hydatid peritonitis, complicated hepatic hydatid cyst ruptured in the intrahepatic bile duct.

Recurrence of hepatic or extrahepatic hydatid cyst may be due to inadequate treatment of the primary disease, contamination of the abdominal cavity previously. As reported in previous studies, recurrence is less common in laparoscopic surgery compared to open surgery (28). In our study, no recurrence was found.

Antiparasitic treatment with Albendazole, is an essential adjuvant for laparoscopic surgery, administered pre and postoperatively, as it significantly reduces hydatid cyst viability and can prevent recurrence (2). Preoperative use of Albendazole also reduces cyst tension, facilitating surgery and reducing the risk of spillage of contents into the abdominal cavity (16). To reduce the chance of recurrence, after perichystectomy and cavity control we can insert the large epiploon (21, 29).

In our experience, laparoscopy compared to open surgery has several advantages namely visualization and control of vascular and biliary structures during surgery, reduction of surgical aggression, postoperative pain, patients are mobilized early, oral feeding is started earlier, short hospitalization and recovery period, rapid socio-professional reintegration (13).

In our study we did not perform perichysto-digestive anastomoses or liver resections.

Anaphylactic shock is one of the limitations of laparoscopy, in our study, only one patient experienced anaphylactic reaction with circulatory arrest with resumption of cardiac activity after two minutes.

Conclusions

Laparoscopic surgery in the treatment of hepatic hydatid cyst is a safe method with a low morbidity, mortality and recurrence rate. Laparoscopic surgery offers the following advantages: minimal approach, using the same steps as in open surgery, eliminating the disadvantages of a large incision, postoperative pain, length of hospitalisation and socio-professional reintegration.

Conflict of interest declaration

The authors declare no conflict of interest.
All authors have common law.

References

1. Rooh ul M, Kamran K, Khalil J, Gul T, Farid S. Laparoscopic treatment of hepatic hydatid cyst. *J Coll Physicians Surg Pak*. 2011 Aug;21(8):468-71.
2. Karaliotas C, Broelsch CE, Habib N. Liver and Biliary Tract Surgery: Embryological Anatomy to 3D-Imaging and Transplant Innovations 2006. 1-638 p.
3. Popescu I. Chirurgia ficatului: Editura Universitara "Carol Davila" 2004.
4. Alecu A, Lungu C. Ecografia laparoscopică: Editura Universitară "Carol Davila" (București) 2003.
5. Palanivelu C, Jani K, Malladi V, Senthilkumar R, Rajan PS, Senthilkumar K, et al. Laparoscopic management of hepatic hydatid disease. *Jsls*. 2006 Jan-Mar;10(1):56-62.
6. WK H, CS G, AS. D. Hydatid disease. In: PJ; M, WC W, editors. *Oxford textbook of surgery* 2nd ed: New York: Oxford University Press; 2000. p. 3298-305.
7. Sokouti M, Sadeghi R, Pashazadeh S, Abadi SEH, Sokouti M, Rezaei-Hachesu P, et al. A systematic review and meta-analysis on the treatment of liver hydatid cyst: Comparing laparoscopic and open surgeries. *Arab J Gastroenterol*. 2017 Sep;18(3):127-35.
8. Tuxun T, Zhang JH, Zhao JM, Tai QW, Abudurexti M, Ma HZ, et al. World review of laparoscopic treatment of liver cystic echinococcosis--914 patients. *Int J Infect Dis*. 2014 Jul;24:43-50.
9. Ertem M, Karahasanoglu T, Yavuz N, Erguney S. Laparoscopically treated liver hydatid cysts. *Arch Surg*. 2002 Oct;137(10):1170-3.
10. Derveniz C, Delis S, Avgerinos C, Madariaga J, Milicevic M. Changing concepts in the management of liver hydatid disease. *J Gastrointest Surg*. 2005 Jul-Aug;9(6):869-77.
11. Rihani H, El-Nabulsi B, Aziz A, Ziadat M, Al-Jarrah R. Laparoscopic approach to liver hydatid cyst. Is it safe. *JRMS*. 2005 01/01;12.
12. Ayles HM, Corbett EL, Taylor I, Cowie AG, Bligh J, Walmsley K, et al. A combined medical and surgical approach to hydatid disease: 12 years' experience at the Hospital for Tropical Diseases, London. *Ann R Coll Surg Engl*. 2002 Mar;84(2):100-5.
13. Manterola C, Fernández O, Muñoz S, Vial M, Losada H, Carrasco R, et al. Laparoscopic pericystectomy for liver hydatid cysts. *Surg Endosc*. 2002 Mar;16(3):521-4.
14. Zaharie F, Bartos D, Mocan L, Zaharie R, Iancu C, Tomus C. Open or laparoscopic treatment for hydatid disease of the liver? A 10-year single-institution experience. *Surg Endosc*. 2013 Jun;27(6):2110-6.
15. Hasan HM, El-Sayed OM. Laparoscopic treatment of liver hydatid cyst. *J Med Biomed Sci* 2010;1:47-51.
16. Shaikh A, Tandur A, Pathrabe Y, Patil D, Bhandarwar A, Shaikh N. Laparoscopic management in hydatid disease of liver: a series of 35 cases. *International Surgery Journal*. 2021 03/15;Vol 8.
17. Samala DS, Gedam MC, Gajbhiye R. Laparoscopic Management of Hydatid Cyst of Liver with Palanivelu Hydatid System over a Period of 3 Years: A Case Series of 32 Patients. *Indian J Surg*. 2015 Dec;77(Suppl 3):918-22.
18. Darbari A, Jauhari A, Shrivastava A. Management of hepatic hydatidosis by open versus laparoscopic surgery. *International Journal of Research in Medical Sciences*. 2014 01/01;2:1371.
19. Chautems R, Buhler L, Gold B, Chilcott M, Morel P, Mentha G. Long term results after complete or incomplete surgical resection of liver hydatid disease. *Swiss Med Wkly*. 2003 May 3;133(17-18):258-62.

20. Gharbi HA, Hassine W, Brauner MW, Dupuch K. Ultrasound examination of the hydatid liver. *Radiology*. 1981 May;139(2):459-63.
21. Altinli E, Saribeyoglu K, Pekmezci S, Uras C, Taşçi H, Akçal T. An effective omentoplasty technique in laparoscopic surgery for hydatid disease of the liver. *Jsls*. 2002 Oct-Dec;6(4):323-6.
22. Bickel A, Loberant N, Singer-Jordan J, Goldfeld M, Daud G, Eitan A. The laparoscopic approach to abdominal hydatid cysts: a prospective nonselective study using the isolated hypobaric technique. *Arch Surg*. 2001 Jul;136(7):789-95.
23. Wani AA, Rashid A, Laharwal AR, Kakroo SM, Abbas M, Chalkoo MA. External tube drainage or omentoplasty in the management of residual hepatic hydatid cyst cavity: a prospective randomized controlled study. *Ger Med Sci*. 2013;11:Doc11.
24. Muftuoglu MA, Koksall N, Topaloglu U. The role of omentoplasty in the surgical management of remnant cavity in hepatic hydatid cyst. *HPB (Oxford)*. 2005;7(3):231-4.
25. Avgerinos ED, Pavlakis E, Stathouloupoulos A, Manoukas E, Skarpas G, Tsatsoulis P. Clinical presentations and surgical management of liver hydatidosis: our 20 year experience. *HPB (Oxford)*. 2006;8(3):189-93.
26. Alper A, Ariogul O, Emre A, Uras A, Okten A. Choledochoduodenostomy for intrabiliary rupture of hydatid cysts of liver. *Br J Surg*. 1987 Apr;74(4):243-5.
27. Chen W, Xusheng L. Laparoscopic surgical techniques in patients with hepatic hydatid cyst. *Am J Surg*. 2007 Aug;194(2):243-7.
28. Yagci G, Ustunsoz B, Kaymakcioglu N, Bozlar U, Gorgulu S, Simsek A, et al. Results of surgical, laparoscopic, and percutaneous treatment for hydatid disease of the liver: 10 years experience with 355 patients. *World J Surg*. 2005 Dec;29(12):1670-9.
29. Ertem M. False recurrence of laparoscopically treated hydatid cysts. *Surgery*. 2001 Mar;129(3):383.