CIRUGÍA ESPAÑOLA

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Original article

Laparoscopic treatment of hepatic hydatid cysts: techniques and post-operative complications

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ARTICLE INFO

Article history:
Received October 14, 2008
Accepted March 3, 2009
Online June 4, 2009

Keywords:
Hepatic echinococcosis
Laparoscopy
Postoperative complications

A B S T R A C T

Introduction: We evaluate our experience in the surgical laparoscopic treatment of hepatic hydatid cysts with the same criteria that we use in open surgery.
Material and methods: A retrospective study of 8 operated patients and their intra- and postoperative complications.
Results: We performed the scheduled surgery on 7 patients; bleeding was the reason for conversion to open surgery in the remaining one. We made 4 complete peri-cystectomies, 3 de-roofing, and 1 hepatic resection. Two patients had postoperative bile leaks: the first one had an external leak that needed an endoscopic sphincterotomy and the other developed an abscess that needed reintervention for drainage. This patient also had a right hepatic vein thrombosis that disappeared spontaneously. Finally, 3 patients had hypernatremia without clinical symptoms.
Conclusions: Many of the open surgery techniques for hepatic hydatid cysts can be performed laparoscopically, without any specific instruments. Our complications with laparoscopic treatment of hepatic hydatid cysts were similar to those of open surgery.

Tratamiento laparoscópico de los quistes hidatídicos hepáticos: técnicas y complicaciones postoperatorias

Palabras clave:
Hidatidosis hepática
Laparoscopia
Complicaciones postoperatorias

R E S U M E N

Introducción: Análisis de nuestra experiencia en la intervención de quistes hidatídicos hepáticos mediante cirugía laparoscópica con criterios similares a los de la cirugía abierta.
Material y métodos: Estudio retrospectivo de 8 pacientes operados y de las complicaciones intraoperatorias y postoperatorias.
Resultados: En 7 pacientes se completó la intervención planificada por laparoscopia, en uno fue necesaria reconversión por hemorragia. Se realizaron 4 quistoperiquistectomías,

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3 resecciones de cúpula saliente y 1 resección hepática. Dos pacientes sufrieron fístulas biliares: una de ellas (externa) necesitó una esfinterectomía endoscópica y la otra desarrolló un absceso que fue necesario reintervenir y drenar. En esta paciente se observó una trombosis de vena suprahepática derecha que se resolvió espontáneamente; 3 enfermos desarrollaron hipernatremia sin repercusión clínica.

Conclusiones: Muchas de las técnicas descritas en cirugía abierta son realizables por laparoscopia, sin necesidad de instrumentación específica para los quistes hidatídicos. Las complicaciones encontradas son similares a las de la cirugía abierta.

Introduction

Various techniques for the curative treatment of hepatic hydatid cysts (HC)[1] have been described:

- Percutaneous needle aspiration, injection of hypertonic saline solution, and reaspiration of the content
- Resection of the protruding dome with aspiration-exeresis of its content (RPD)
- Cyst-pericystectomy (CPC)
- Hepatic resection (HR)

Surgical treatment (PDR, CPC, HR) is considered as the standard. However, there is no clear consensus regarding the technical options. In general, surgeons from non-endemic areas prefer radical techniques and those from endemic areas use more conservative techniques.[2] In any case, the current trend is to leave a soft or flexible residual cavity that correctly treats the biliary connections: this is achieved by performing a complete exeresis of the HC (CPC or HR).[3]

When considering the different types of interventions, the location and the characteristics of the HC[4,5] are fundamental.

Since 1992, laparoscopic treatment is being used more and more frequently.[6]

In this paper, we will analyse our initial experience when treating HC with laparoscopy, using classically used techniques, and the complications that we found. There are few publications on this topic in Spain.[7-9]

Material and methods

The clinical histories of 8 patients that had undergone laparoscopic surgery of hepatic HC were studied retrospectively. There were 6 women and 2 men, with an average age of 48.5 (interval, 30-81) years old. The locations and sizes are presented in Table 1 (Figures 1-5).

Among the relevant antecedents, the following should be mentioned: obesity (case 1), cardiopathy (case 4), recent tuberculosis (case 6), recent pneumothorax (case 6), biliary lithiasis (cases 2 and 4), cholangitis (case 7), chronic hepatopathy (cases 6 and 7).

The majority of the patients suffered abdominal pain as an initial symptom (7 cases). In one case, a HC was diagnosed from a possible anaphylactic reaction (case 1), and in another, from sepsis (case 7). The serology of hydatidosis was positive in 4 cases. The diagnosis was confirmed using echography and computerised tomography (CT) in all of the cases. Moreover, the magnetic resonance (MR) and cholangiography-MR (C-MR) was used (in cases 1, 3, 4, 5, and 7) for the preoperatory diagnosis of complicated HC.

Previous treatment with albendazol was always used, with at least 1 treatment cycle.

The surgical techniques were chosen depending on the location, size of the lesions and general conditions of the patients. Whenever possible, complete resections of the HC were performed. Laparoscopic interventions were considered in 8 of the patients: 3 RPD, 4 CPC, and 1 HR of the 2-3 segments (Table 1). Moreover, concomitant interventions were indicated

Table – Characteristics of the hepatic hydatid cysts, interventions, complications, and postoperatory hospital stays

Patients	Size	Location	Technique	Complications	Postoperatory hospital stay
1	5.5 cm	S 4 (Figure 1)	CPC	No	6 days
2	3 cm	S 2–3 (Figure 2)	HR	No	12 days
3	6 cm	S 7	RPD	Asymptomatic hypernatremia	6 days
4	7 cm	S 6-7 (Figure 3)	CPC	Preoperatory haemorrhage/ reconversion	12 days
5	4.8 cm	S 6	CPC	Abdominal pain, diarrhoea	6 days
6	10 cm	S 7–8	RPD	Asymptomatic hypernatremia, biliary fistula abscess: laparoscopic re-intervention. Partial thrombosis of the RSHV (Figure 4)	5 days
7	14 cm	S 6-7 (Figure 5)	RPD	Biliary fistula – ERCP+sphincterectomy after the operation	67 days
8	3 cm	S 4	CPC	Asymptomatic hypernatremia	7 days

CPC indicates cyst-pericystectomy; HR, hepatic resection; RPD, resection of the protruding dome; RSHV, right suprahepatic vein; S, segment.

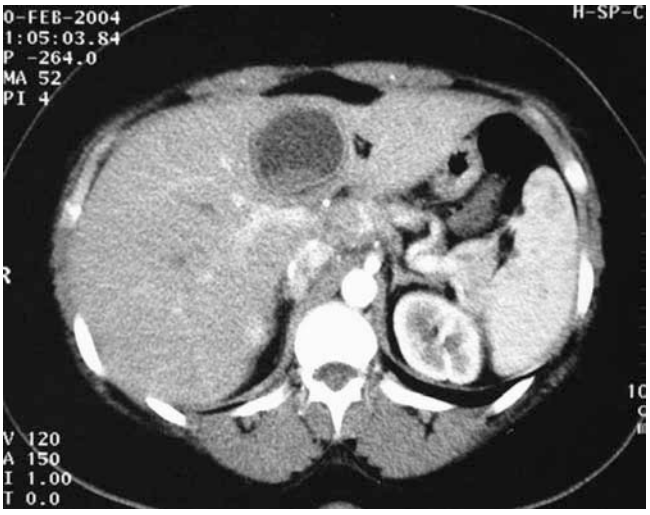

Figure 1 – Case 1: hydatid cyst in segment 4 above the portal bifurcation.

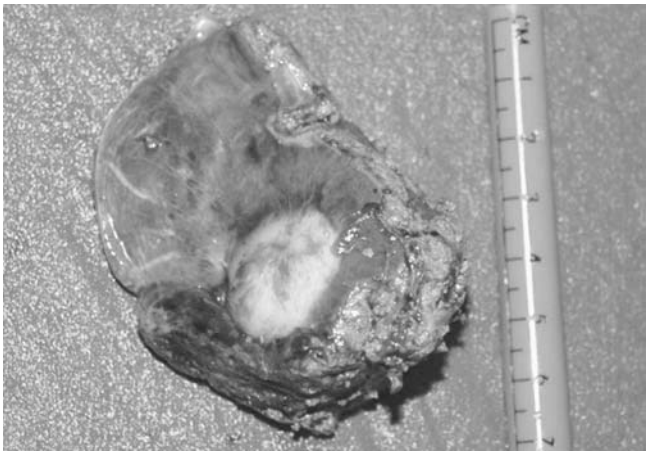

Figure 2 – Case 2: segmentary hepatectomy from hydatid cyst in segments 2-3.

Figure 3 – Case 4: hydatid cyst in segment 6 closely related to the vena cava.

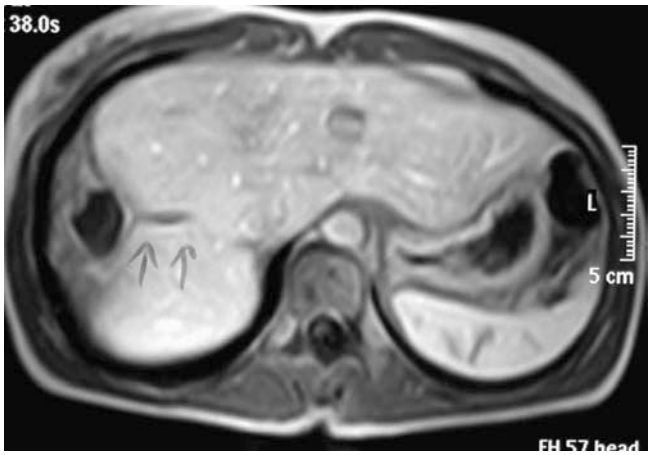

Figure 4 – Case 6: partial thrombosis of the right suprahepatic vein after draining the abscess.

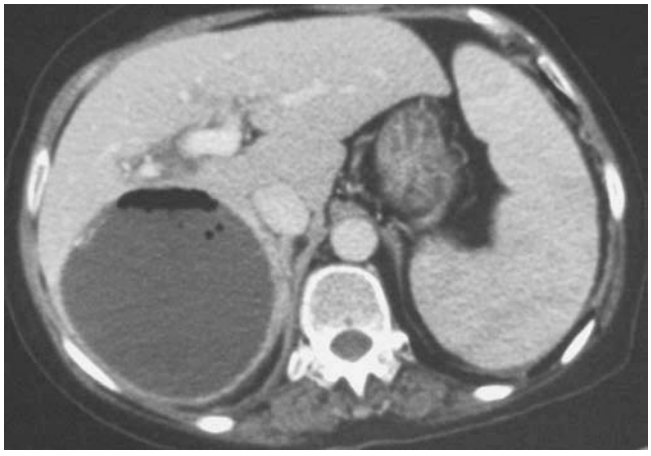

Figure 5 – Case 7: hydatid cyst with complications in segments 6-7.

depending on the preoperatory findings: cholecystectomy (cases 2, 4, and 7) and intraoperatory cholangiography (case 7).

Regarding the intervention, after creating a pneumoperitoneum and placing the trocars depending on the location of the injury, the surgical field was protected with gauze bandages soaked in hypertonic saline solution at 20% and the cyst was punctured and irrigated to drain and sterilyze it (percutaneously).

To dissect the hepatic parenchyma and that of the capsule of the HC, Harmonic Ethicon,™ and Ligasure Tyco™ were used according to the surgeons' preferences. Endoscopic staples were used for the vascular and biliary elements when needed. The hepatic pedicle was controlled using a band in 3 cases (1, 2, and 4), but clamping was only necessary in case 4.

Some sort of treatment of the residual cavity or the edges of the resection were always carried out: epiploplasty (case 3), Tissucol® (cases 1, 2, 4, 5, and 7), Tachosil® (case 6), or Glubran® (case 8).

The extraction was performed systematically, using a plastic bag (Endocatch Tyco™) to isolate the cyst and the bandages from the wall.

Aspirative Rendon-type drains were used in all of the cases.

Results

The planned intervention was carried out in all of the cases except one where a reconversion was necessary because of bleeding. An important biliary fistula and an abscessed HC were observed in case 7. In this case, a trans-cystic drain was used, that was not effective.

The following specific complications were observed (Table 1):

- Haemorrhage (case 4) of a suprahepatic vain (SHV). After the reconversion, the CPC was completed successfully but a blood transfusion and plasma were needed to reanimate the patient
- Biliary fistulas in 2 cases. In case 7, an endoscopic retrograde cholangiopancreatography (ERCP) with a postoperatory sphincterectomy had to be performed
- Hepatic abscess (case 6) related with a fistula and that made a laparoscopic re-intervention necessary after 21 days, with lavage and draining of the lavage using a Saratoga Axiom™. Subsequently, in the control CT, we observed that the patient presented a partial thrombosis of the right SHV, without clinical repercussions, that disappeared spontaneously
- Asymptomatic hypernatremia in 3 cases

Discussion

In our opinion, all of the classic surgical techniques used to treat HC can be carried out using laparoscopy and, therefore, the treatment criteria should be similar.

As in our series, the most used laparoscopic techniques, according to the existing literature, are the PDR (3 in our series) or the CPC (4 of our patients). Size, location and the general conditions of the patients determined the technique to be used.[6]

Special techniques and materials have been described for the laparoscopic interventions (trocars with umbrellas for drainage,[10] tube-trocar systems[11]) that aid in avoiding abdominal cavity contamination. With concerns about isolation and sterilisation with hypertonic solution, similar to those used in open surgery, we operated on our patients with normal laparoscopic instruments, without observing any type of complications or anaphylactic shock.[12]

Whenever possible, complete resections of the HC were performed. In 2 cases we performed CPC for HC located in segment 4 (Figure 1) over the hilar portal elements (making it a high risk area for biliary or vascular lesions), where the pedicle was visualised, without any relevant complications in the biliary duct or vascular elements.

When considering the different types of interventions, the location and the characteristics of the HC are fundamental. The ultrasound classification of Gharbi et al[4] helps in treatment orientation. Beforehand, it is very important to know if there are adherences or if any neighboring structures are compressed, if there are biliary connections or signs of infection or ruptures. To do so, the CT, MR, and C-MR are fundamental.

Our only intraoperatory complication, that was serious, was a haemorrhage. A reconversion was necessary in this case and a CPC was performed by laparoscopy, after a pedicular clamping. We believe that said complication was the result of a poor orientation regarding which type of intervention to use: trying to perform a CPC in a large-sized cyst adhered to the vena cava (Figure 3). A laparoscopic RPD would have been safer in this patient.

We have performed laparoscopic interventions on infected HC and those connected to the biliary duct,[5] in spite of the fact that existing literature mentions these as possible contraindications.[13] In one case of a connection with the biliary duct, a persistent biliary fistula made it necessary to carry out an endoscopic sphincterectomy, without any postoperatory septic complications. However, this type of complications lengthen the hospital stay and, therefore, other possible treatment methodologies should be analysed (for example: previous sphincterectomy, treatment of the residual cavity, etc).

When evaluating the usefulness of laparoscopic surgery (after using different techniques), the most important aspect seems to be the analysis of complications:

1. Intraoperatory haemorrhages are the most feared complication when choosing an “aggressive” treatment of hydatid cysts. The location of the cysts and their proximity to the SHV and the vena cava should determine, in our opinion, the HC treatment strategy to be used. The only case of a reconversion to laparotomy in this group of patients took place because of a haemorrhage of a branch of a SHV that was difficult to control during the CPC. When performing the laparotomy and evacuating the pneumoperitoneum, the haemorrhage initially got worse, but we were able to control it and complete the intervention successfully.
2. In the conservative surgery of the HC, the main postoperatory problems come from the treatment of the residual cavity. Postoperatory biliary leaks are a frequent complication, probably the most frequent (10% of the series of Skroubis et al,[14] 2002). In our study, we observed biliary fistulas in 2 cases. These were clinically manifested as external biliary fistulas (that made a postoperatory ERCP necessary with an endoscopic sphincterectomy and lengthened considerably the postoperatory hospital stay) and as a late abscess. The prevention of these fistulas has been proposed using an epiploplasty, a procedure that would decrease the postoperatory complications and hospital stay.[15] However, according to the existing literature, its use has gone down over the last few years.[14] In our study, it was performed once with good results. It was not used in 2 cases that later developed fistulas (that were treated with Tachosil® and Tissucol®). We do not believe that we can make conclusions about its use in this context. Case 7 presented a large biliary connection

in an infected HC: this would probably determine the failure of any measure used to avoid a postoperatory fistula after a RPD. When a leak is detected during the intervention, an external biliary drain (Pedinelli type) might be more useful, that would allow for a biliary decompression and posterior radiologic controls. We used it in said case, but, unfortunately, it was not effective in the postoperatory period, making an endoscopic sphincterectomy necessary. One must keep in mind that the majority of the low-output fistulas (<300 mL) close spontaneously and they are the most productive ones, or those that persist, that may need endoscopic treatment (sphincterectomy, naso-biliary intubation), as in our case.

3. According to our experience, the development of abscesses was related, without a doubt, with a low-output biliary fistula. Here, a percutaneous drainage or surgery can be used, depending on the location. In our case, another intervention was performed by laparoscopy and the abscess was adequately treated and the fistula healed spontaneously.
4. We use, in all cases, hypertonic saline solution to sterilise the content of the cyst and to avoid its dissemination in the abdominal cavity. Postoperatory hypernatremias were observed in various cases and they were monitored, but not clinical repercussions were observed.
5. In the postoperatory period of case 6, that had presented a complication of an abscess that needed to be operated on again, we observed a partial thrombosis of the RSHV in the control CT, that was most likely related to the retraction and inflammation of the adjacent cyst. In the long-term, we have not observed any clinical repercussions or signs of chronic hepatopathies, and in the last few controls, repermeabilization of the vein was observed. However, a different strategy could be used in patients with large injuries adjacent to vascular structures: hepatic resection. A possible increase in morbidity-mortality must be weighed.

When analysing the complications outlined in the existing literature and those from our own experience, we believe that they cannot be caused by the use of laparoscopy, but by the deficiencies in the previous planning and/or the surgery technique.

As a final point, we would like to highlight the importance of using laparoscopic surgery in this pathological process. In this initial experience, we tried to adequately complete and develop the techniques proposed and carry out exhaustive postoperatory follow-up. This is not a study aimed to demonstrate the advantages of the laparoscopy, but in our experience (in this one and that of other illnesses), these are evident regarding the quality of the surgical act, the tolerance that patients with previous serious illnesses experience, the postoperatory comfort and the morbidity at the mid to long-term. All of this justifies, for us, the efforts dedicated to the introduction of these new techniques.

Conclusions

Many of the techniques described for open surgery can be done by laparoscopy without needing any specific instruments for the HC.

The complications that we encountered were similar to those from open surgery.

Part of this study was presented in the XIII Extraordinary Meeting of the Galician and Asturian Societies of Digestive Pathology, that took place in Orense on October 27-28, 2006.

REFERENCES

1. Dziri C, Haouet K, Fingerhut A. Treatment of hydatid cyst of the liver: where is the evidence?. World J Surg. 2004;28:731–6.
2. Kayaalp C. Hydatid disease of the liver. J Gastroenterol Hepatol. 2005;20:331.
3. Franco D, Vons C. Traitement chirurgical des kystes hydatiques du foie. Techniques chirurgicales—Appareil digestif. Encycl Méd Chir. 1999;40-775:11.
4. Gharbi HA, Hassine W, Brauner MW, Dupuch K. Ultrasound examination of the hydatic liver. Radiology. 1981;139:459–63.
5. Silva MA, Mirza DF, Bramhall SR, Mayer AD, McMaster P. Treatment of hydatid disease of the liver. Dig Surg. 2004;21:227–34.
6. 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;29:1670–9.
7. Luján JA, Parrilla P, Robles R, García J. Laparoscopic treatment of a liver hydatid cyst. Br J Surg. 1993;80:907–8.
8. Cugat E, García MI, Bretcha P, Rodriguez A, Marco C. Laparoscopia y cirugía hepática: técnica e indicaciones. Cir Esp. 2004;75:23–8.
9. Cugat E, Olsina JJ, Rotellar F, Artigas V, Suárez MA, Moreno-Sanz C, et al. Resultados iniciales del Registro Nacional de Cirugía Hepática por Laparoscopia. Cir Esp. 2005;78:152–60.
10. Seven R, Berber E, Mercan S, Eminoglu L, Budak D. Laparoscopic treatment of hepatic hydatid cysts. Surgery. 2000;128:36–40.
11. Palanivelu C, Senthilkumar R, Jani K, Rajan PS, Sendhilkumar K, Parthasarthi R, et al. Palanivelu hydatid system for safe and efficacious laparoscopic management of hepatic hydatid disease. Surg Endosc. 2006;20:1909–13.
12. Khoury G, Jabbour-Khoury S, Soueidi A, Nabbout G, Baraka A. Anaphylactic shock complicating laparoscopic treatment of hydatid cysts of the liver. Surg Endosc. 1998;12:452–4.
13. Kjossev KT, Losanoff JE. Classification of hydatid liver cysts. J Gastroenterol Hepatol. 2005;20:352–9.
14. Skroubis G, Vagianos C, Polydorou A, Tzoracoleftherakis E, Androulakis J. Significance of bile leaks complicating con- servative surgery for liver hydatidosis. World J Surg. 2002;26:704–8.
15. Ozacmak ID, Ekiz F, Ozmen V, Isik A. Management of residual cavity after partial cystectomy for hepatic hydatidosis: comparison of omentoplasty with external drainage. Eur J Surg. 2000;166:696–9.