

ORIGINAL ARTICLE

The role of omentoplasty in the surgical management of remnant cavity in hepatic hydatid cyst

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Background. Cyst hydatid disease of the liver is still endemic in certain regions of the world. Currently, surgical operation remains the treatment of choice in hydatidosis. The cyst cavity can be managed by using capitonnage, external drainage, introflexion or omentoplasty. **Methods.** Two hundred and thirty-five patients operated for hydatid cyst between January 1990 and February 2001 were analysed retrospectively. Either omentoplasty, external drainage, capitonnage or introflexion were used to treat residual cyst cavity. **Results.** Patients were categorised into three groups to evaluate complications: omentoplasty alone (group A), omentoplasty combined with other techniques (group B) and other techniques (group C). The overall mortality rates were <1%. Overall morbidity rates were 8.8% for group A, 19% for group B and 25% for group C, respectively. Mean hospital stay was 7.6 days for group A, 11.9 days for group B and 15.8 days for group C. **Discussion.** Postoperative surgical site infection, bile fistula, recurrence rate and overall morbidity were seen less frequently in patients who underwent omentoplasty in our series. Mean duration of hospital stay was significantly shorter in patients who underwent omentoplasty operations. Because omentum has a high absorptive capacity and the capability to fill the residual cavity, we recommend omentoplasty to manage patients with hydatid cyst of the liver, whether complicated or uncomplicated.

Key Words: *Hydatid cyst, omentum, omentoplasty, postoperative morbidity*

Introduction

Hydatid cysts occur throughout the world and are endemic in Eastern Europe, the Middle East, South America, Australia and South Africa, especially in pastoral and farming regions. Treatment of echinococcal infestation has a major impact on the health care economy in an endemic region [1]. Liver hydatid cysts are often diagnosed incidentally. A history of travel to or immigration from a region where the disease is endemic and finding a liver mass during physical examination warrants suspicion of echinococcal disease. Nearly 75% of patients have an asymptomatic abdominal mass. Right upper quadrant pain and dyspepsia are the commonest complaints. Imaging techniques are of paramount importance because most liver hydatid cysts are either asymptomatic or produce only mild and non-specific symptoms, and they are not easy to evaluate by physical examination. Ultrasonography, CT scan and, less frequently, MRI studies are used to classify and delineate cystic liver lesions. Although CT scan is superior in determining the

location and spatial relationships between hydatid cysts and surrounding structures, ultrasonography is recommended as an initial diagnostic tool, because it is non-invasive, inexpensive and simple.

Operation is the treatment of choice for most individuals infected with *Echinococcus granulosus*. Use of antihelminthic medications complements surgical management but does not replace it. Although percutaneous aspiration of a hydatid liver cyst carries the risks of intraperitoneal rupture, parasitic spread and subsequent anaphylaxis, there are reports of successful management of liver hydatid cyst with percutaneous drainage in a limited number of patients [2,3]. All symptomatic patients and asymptomatic patients with cysts > 5 cm in diameter should be considered surgical candidates. The liver cyst can be managed surgically by partial or total cyst resection. After partial cyst resection, the cavity can be managed by leaving it open to the peritoneum, omentoplasty, external drainage, introflexion or reapproximation (capitonnage). We have reviewed the results of the various surgical techniques used in patients operated for liver hydatid cyst between 1990 and 2001.

Table I. Surgical management of liver hydatid cyst

Operative techniques	No. of patients	%
Omentoplasty	156	66.4
Omentoplasty + external drainage	17	7.2
Omentoplasty + capitonnage	19	8
Omentoplasty + introflexion	11	4.6
External drainage	15	6.3
Capitonnage	8	3.4
Introflexion	6	2.5
Laparoscopic omentoplasty	3	1.2
Total	235	

Patients and methods

Medical records of all patients who were diagnosed with liver hydatid cyst and hospitalised between January 1990 and February 2001 were retrospectively reviewed. A total of 235 patients were operated in our department. The most frequent complaint was vague upper abdominal pain. Thirty-one patients (13%) were asymptomatic and the cyst was diagnosed by incidental findings on scanning. Of the serological tests, the indirect haemagglutination test was used widely (206 patients, 86%) and was positive in 186 patients (90%). Ultrasonography was used in 214 patients (91%) and abdominal CT scan in 151 patients (64%). Cysts were single in 191 patients (81%) and multiple in 44 patients (19%). Liver hydatid cysts were found in the right lobe in 174 patients (74%), the left lobe in 32 patients (14%) and both lobes in 29 patients (12%). Patients received a first generation cephalosporin by intravenous injection before the incision. Right subcostal incision was preferred, but midline and right paramedian incisions were also used. Ten percent hypertonic saline solution was used as a scolicedal agent; and no related complications were seen. Albendazole (10 mg/kg/day) was used in patients who were contaminated during operation. Postoperative surveillance protocols included a clinical and radiological evaluation every 6 months for the first 2 years and once a year thereafter. If a patient had an adequate viable flap of omentum to fill the cavity of the cyst, omentoplasty was the procedure of choice. In a complicated cyst, management of the residual pericystic cavity would sometimes necessitate carrying out

another technique or a combination of other techniques. Operative techniques for managing pericystic cavity of liver hydatid cyst are shown in Table I.

Statistical Package for Social Science (SPSS) software was used for data analysis. Statistical comparison of differences between the groups was performed using Fisher's exact probability test. T-test was used for the hospital stay. Statistical significance was accepted at $p < 0.05$.

Results

A total of 235 patients had a diagnosis of liver hydatid cyst. There were two deaths in this series (mortality < 1%). One patient with an intra-abdominal perforation died from anaphylactic shock. One patient died on postoperative day 12 from a stroke. Intra-abdominal abscesses developed in two patients (0.4%); one was managed with percutaneous drainage and the other by open operation. The median postoperative follow-up period was 26 months (36.6 ± 6.2). Twelve patients in group A, 4 patients in group B and 2 patients in group C were lost to follow-up.

The distribution of postoperative complications and mean hospital stay for the 235 patients with liver hydatid cyst who underwent surgery are shown in Table II. More than one postoperative complication occurred in 65% (31/47) of those who developed complications. Patients were categorised into three groups for evaluating complications (Table III): omentoplasty alone (group A), omentoplasty combined with other techniques (group B) and other techniques (group C). Omentoplasty had the lowest rate of surgical site infection (SSI). There was no significant difference between groups A and B, regarding SSI, but group C had a higher rate of SSI (17%, $p = 0.05$ versus group A). Bile fistula, an important complication of operation, was more common in groups B and C than in group A (Table IV). Patients in group C had a significantly higher recurrence rate than patients in group A. Table IV summarises postoperative complication rates, mean hospital stays and statistical comparisons among the groups. Sixteen patients (11.7%) had intrabiliary rupture of the liver hydatid cyst. Their cavity

Table II. Postoperative complications and mean hospital stay in 235 patients who underwent operative treatment for liver hydatid cyst

Procedure	Surgical site infection	Peritoneal abscess	Bile fistula	Recurrence	Overall morbidity	Mean hospital stay
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Omentoplasty	6 (3.8)	1 (0.6)	6 (3.8)	5 (2.1)	14 (5.9)	7.6
Omentoplasty + external drainage	1 (5.8)	1 (5.8)	2 (11.7)	2 (11.7)	3 (17.6)	11.8
Omentoplasty + capitonnage	2 (10.5)	0	2 (10.5)	2 (10.5)	3 (15.7)	9.4
Omentoplasty + introflexion	1 (9)	0	2 (18.1)	1 (9)	2 (18.1)	12.3
External drainage	3 (20)	0	3 (20)	3 (20)	4 (26.6)	16.2
Capitonnage	2 (25)	0	2 (25)	2 (25)	2 (25)	12.1
Introflexion	1 (16.6)	0	2 (33.3)	1 (16.6)	2 (33.3)	9.9
Laparoscopic omentoplasty	0	0	0	1 (33.3)	1 (33.3)	11.2
Total	16 (6.8)	2 (0.8)	20 (8.5)	16 (6.8)	31 (13.1)	9.7

Table III. Patients in the three groups

Group	n	%	Operative technique
Group A	156	66.3	Omentoplasty*
Group B	47	20.0	Omentoplasty combined with other techniques†
Group C	32	13.6	Other techniques without omentoplasty

* Including laparoscopic omentoplasty.

† Other techniques = capitonnage, external drainage, introflexion.

management was carried out by using omentoplasty. One patient who was treated with laparoscopic omentoplasty had persistent bile fistula and was managed by endoscopic sphincterotomy. The other 14 fistulas closed simultaneously. To reduce intrabiliary pressure, we performed transduodenal sphincteroplasty for 19 patients, choledochoduodenostomy for two patients, and T-tube insertion for 4 patients in order to decompress intrabiliary pressure.

Discussion

Liver hydatid disease is still a health problem in certain regions of the world, and is often discovered incidentally on ultrasonography. It is generally accepted that systemic albendazole treatment is not an alternative to surgical treatment but can be given as an adjuvant to operation. All symptomatic and asymptomatic patients with cysts > 5 cm in diameter should be considered as surgical candidates. The liver hydatid cyst can be managed surgically by partial or total cyst resection. There are many surgical techniques for treating liver hydatid disease, varying from conservative to radical approaches. Radical surgery such as hepatectomy is rarely indicated in special conditions [4]. The aim of the operation is to remove all living parasites and daughter cysts.

Following the evacuation of hydatid cyst content, the management of the residual cavity remains controversial. Many alternative techniques are available, depending on the size and location of the cyst, the presence or absence of complications and the surgeon’s experience. The cyst can be opened to the peritoneum

if it is superficial, uncomplicated or unilocular. Capitonage implies obliteration of the pericystic walls by suture with absorbable materials after excising the redundant cyst cavity. If the cyst is located deeply in the liver, capitonnage can be an effective option, but it is difficult if the cyst wall is calcified and thickened. External drainage is achieved by placing a catheter into the cyst and is indicated in the presence of infection. However, the routine use of external drains after partial resection of an uncomplicated liver hydatid cyst increases postoperative morbidity and prolongs hospital stay. Introflexion can be accomplished by rolling the edge of the cyst to the bottom of the cavity and fixing it with fixing sutures. Omentoplasty implies placing a viable pedicle flap of omentum into the cyst cavity. It is generally used for single, uncomplicated hydatid cysts, but it also can be combined with external drainage for infected cysts. Omentoplasty is thought to assist healing of the raw surface and to promote resorption of serosal fluid; it also brings macrophages to septic foci. Omentum is well known as the ‘policeman’ of the abdomen. It can passively move to a site of intra-abdominal inflammation, when it becomes adherent. Omentum can also seal off any leaks from viscus [5,6]. These features of omentum have led many surgeons (especially in our region) to treat liver hydatid cyst by using an omental pedicle flap.

Omentoplasty is the choice of operation in the treatment of uncomplicated hydatid cyst in our institute. In our experience with omentoplasty, a total of 16 (6.8%) surgical site infections (SSI) occurred in the 235 patients studied. Omentoplasty has the lowest SSI rate among all surgical techniques. There was no significant difference between groups A and B, regarding SSI; however, group C had a higher rate of SSI (17%) and the difference between groups A and C was significant. Bile fistula is an important complication of surgery. Comparing group A vs B and group A vs C, there was a significant statistical difference with respect to bile fistula, but the differences did not reach significance between groups B and C. We define recurrence as a hydatid cyst growing at the operative site. Recurrence rates were lower than with other surgical techniques, although the difference was not statistically significant. There was also an apparent difference in distribution of mean hospital stay among

Table IV. Surgical complications and mean hospital stay in three groups

Group	Surgical site infection n (%)	Bile fistula n (%)	Recurrence n (%)	Overall morbidity n (%)	Mean hospital stay (days)
Group A	6 (3.8)	6 (3.8)	5 (3.2)	14 (8.9)	7.6
Group B	4 (8.5)	6 (12.7)	5 (10.6)	8 (17)	11.9
Group C	6 (18.7)	7 (21.8)	6 (18.7)	9 (28.1)	15.8

Statistical differences among the groups:

Group A vs B; SSI=0.2, bile fistula=0.03, recurrence=0.05, overall morbidity=0.17, hospital stay<0.0001.

Group B vs C; SSI=0.3, bile fistula=0.35, recurrence=0.33, overall morbidity=0.27, hospital stay<0.0001.

Group A vs C; SSI=0.006, bile fistula=0.001, recurrence=0.003, overall morbidity=0.005, hospital stay <0.0001.

SSI, surgical site infection.

the groups. Mean hospital stay was 7.6 days for omentoplasty alone, compared with 11.9 days for omentoplasty combined with other techniques and 15.8 days for other techniques. Postoperative surgical site infection, bile fistula, recurrence rate and overall morbidity were seen less frequently in patients who underwent omentoplasty in our series. We had difficulties with following up some patients from rural areas because of irregular visits to our surgical unit.

We give albendazole to patients in the postoperative period if there is a contamination with hydatid fluid during the operation. Many papers report that albendazole has a positive effect on clinical progression and assists shrinkage of the cyst, seroconversion and sterilisation of the cyst contents [7]. However, the necessity for long-term use and the large side-effect profile of albendazole limit its widespread use [8]. Several retrospective studies reported a lower morbidity rate by using omentoplasty compared with other techniques [9,10]. Uravic and colleagues have shown that, omentoplasty has the lowest morbidity and the shortest hospital stay among the surgical procedures [11]. Balik and associates analysed 304 cases of liver hydatid cyst and found that omentoplasty and capitonnage is superior to external drainage [12]. Recent data from the literature seem to suggest that there is still no consensus on the best treatment choice for liver hydatid cyst. Omentoplasty has been performed with satisfactory outcomes for a long time in our region. Our results confirm that omentoplasty with or without other techniques had fewer complications than other procedures, with a shorter hospital stay. It can also produce satisfactory results in treating complicated hydatid cysts [13]. Ultimately, a prospective randomised trial will be required to prove the superiority of omentoplasty over other techniques.

References

- [1] Barnes SA, Lillemoe KD. Liver abscess and hydatid cyst disease. In: Zinner MJ, Schwartz SI, Ellis H (eds). *Maingot's Abdominal Operations*, 10th edn. Stamford, CT: Appleton & Lange, 1997;1534–45.
- [2] Polat KY, Balik AA, Oren D. Percutaneous drainage of hydatid cyst of the liver: long-term results. *HPB* 2002;4:163–6.
- [3] Ormeci N, Soykan I, Bektas A, et al. A new percutaneous approach for the treatment of hydatid cysts of the liver. *Am J Gastroenterol* 2001;96:2225–30.
- [4] Aeberhard P, Fuhrmann R, Strahm P. Surgical treatment of hydatid disease of the liver: an experience outside the endemic area. *Hepatogastroenterology* 1996;43:627–36.
- [5] Sitting KM, Rohr MS, McDonald JC. Abdominal wall, umbilicus, peritoneum, mesenteries, omentum, and retroperitoneum. In: Sabiston DC (ed.). *Textbook of Surgery*, 5th edn. Philadelphia: WB Saunders, 1997;809–23.
- [6] Dziri C, Paquet JC, Hay JM, et al. Omentoplasty in the prevention of deep abdominal complications after surgery for hydatid disease of the liver: a multicenter, prospective, randomized trial. *French Associations for Surgical Research. J Am Coll Surg* 1999;188:281–9.
- [7] Morris DL, Dykas PW, Marriner S, et al. Albendazole – objective evidence of response in human hydatid disease. *JAMA* 1985;253:2053–7.
- [8] Morel P, Robert J, Rohner A. Surgical treatment of hydatid disease of the liver: a survey of 69 patients. *Surgery* 1988;104:859–62.
- [9] Mentis A, Yuzer Y, Ozbal O, Coker A, Ilter T, Musoglu A. Omentoplasty versus introflexion for hydatid liver cysts. *J R Coll Surg Edinb* 1993;38:82–5.
- [10] Safioleas M, Misiakos E, Manti C, Katsikas D, Skalkeas G. Diagnostic evaluation and surgical management of hydatid disease of the liver. *World J Surg* 1994;18:859–65.
- [11] Uravic M, Stimac D, Lenac T, et al. Diagnosis and treatment of liver hydatid disease. *Hepatogastroenterology* 1998;45:2265–9.
- [12] Balik AA, Basoglu M, Celebi F, et al. Surgical treatment of hydatid disease of the liver: review of 304 cases. *Arch Surg* 1999;134:1666–9.
- [13] Koksall N, Muftuoglu T, Gunerhan Y, Uzun MA, Kurt R. Management of intrabiliary ruptured hydatid disease of the liver. *Hepatogastroenterology* 2001;48:1094–6.