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Review

World review of laparoscopic treatment of liver cystic echinococcosis—914 patients

Tuerhongjiang Tuxun, Jin-hui Zhang, Jin-ming Zhao, Qin-wen Tai, Mierxiati Abudurexti, Hai-Zhang Ma, Hao Wen *

Liver and Laparoscopic Surgery Department, Digestive and Vascular Surgery Center, 1st Affiliated Hospital of Xinjiang Medical University, No.137, Liyushan Road, Xinshi District, Urumqi, 830054, China

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SUMMARY

Objective: The aim of this study was to provide a review of the world literature on the laparoscopic treatment of liver hydatid cyst.
Methods: We conducted a literature search using PubMed, screening all English language publications on the laparoscopic treatment of liver hydatid cysts. Operative characteristics, perioperative morbidity, and clinical outcomes were tabulated.
Results: A total of 57 published articles including 914 patients with 1116 hydatid cysts were identified. Of the resections done in the 914 patients, 89.17% were performed totally laparoscopically and 5.58% were gasless. The most common procedure was cystectomy (60.39%), followed by partial pericystectomy (14.77%) and pericystectomy (8.21%); the rest were segmentectomies. Conversion to open laparotomy occurred in 4.92% of reported cases (45/914). The common cause of conversion was anatomical limitations/inaccessible locations (16/45). The overall mortality was 0.22% (2/914 patients) and morbidity was 15.07%, with no intraoperative deaths reported. The most common complication was bile leakage (57/914). The postoperative recurrence was 1.09% (10/914 patients).
Conclusions: The laparoscopic approach is safe with acceptable mortality and morbidity for both conservative and radical resections in selected patients. Clinical outcomes are comparable to open surgery, albeit in a selected group of patients.

1. Introduction

Human hydatid disease (cystic echinococcosis, CE) is a chronic parasitic infection caused by the larval stage of the cestode *Echinococcus granulosus*. It continues to be a substantial cause of morbidity and mortality in many parts of the world, especially in China, Eastern Europe, the Mediterranean countries, and the Far East.[1]

The liver is the most commonly affected organ and accounts for approximately 75% of cases, followed by the lungs and the spleen. Although recent advances have been made in the method of diagnosis and in medical and interventional therapy, surgery remains the mainstay of treatment. Several surgical techniques have been advocated, ranging from aspiration to radical resection.[2]

The surgical treatment of liver hydatid disease has evolved dramatically with the improved understanding of anatomical segmentation, progressive imaging technology by computed tomography (CT) and magnetic resonance imaging (MRI), improved anesthesia, perioperative chemotherapy, and postoperative nursing and physical therapy, as well as technological advances and modifications in laparoscopy. Although early reported laparoscopic treatment of liver hydatid disease was confined to simple drainage, more advanced laparoscopic methods are now possible, including pericystectomy and even segmentectomy and hepatectomy for selected cases.[3–7] It is the increasing experience in laparoscopic surgery and improved knowledge of cystic pressure during pneumo-peritoneum that has paved the way for the laparoscopic treatment of hydatid cysts.[8]

The purpose of this study was to provide a comprehensive review of the English language literature on all reported cases of laparoscopic liver hydatid cysts. Emphasis is placed on the types of surgical resection, operative approach, and collective morbidity and mortality. In addition, the early and late outcomes of hydatid cysts after laparoscopic treatment are summarized.

* Corresponding author. Tel.: +86 991 436 2844; fax: +86 991 436 2844.
E-mail address: Dr.wenhao@163.com (H. Wen).

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2. Methods

A literature search of published cases of the laparoscopic treatment of liver hydatid cysts was performed using the PubMed database; publications were in the English language. Search phrases were "laparoscopic treatment of liver hydatid cyst/echinococcosis", "laparoscopic treatment of hepatic hydatid cyst/echinococcosis", and "minimally invasive treatment of liver hydatid cyst/echinococcosis". All titles and abstracts were screened selecting those related to the theme of this review. A total of 83 publications consisting of reviews and series on the laparoscopic treatment of hydatid cysts were identified, and each was carefully reviewed. All data were screened and obvious duplicate data were not included in the total number of patients. Reviews and duplicates were removed, resulting in 57 papers containing unique patient data on the laparoscopic treatment of hydatid cysts. When there was more than one publication on the laparoscopic treatment of hydatid cysts from the same team, the actual number of cases performed was clarified to eliminate any potential 'double-counting'. The stage of the cysts was categorized in accordance with the World Health Organization Informal Working Group on Echinococcosis (WHO/IWGE) classification.[9,10] The operative approach (total laparoscopic/hand-assisted/gasless laparoscopic), and extent of resection (cystectomy/pericystectomy/liver resection) were delineated and tabulated. Reasons for conversion to open laparotomy, perioperative deaths, and complications were collected. The recurrence of hydatid cysts was also analyzed.

3. Results

3.1. Total number of published articles on laparoscopic treatment of liver hydatid cysts

The PubMed search identified a total of 83 publications on the laparoscopic treatment of liver hydatid cysts. Eighteen publications were review articles, editorials, or surgical technique reports.[8,11–26] After eliminating duplicate series,[27–34] 57 remaining original publications, mainly from endemic regions, accounted for 914 cases around the world. There were 30 original studies with more than five patients (Table 1) and another 27 publications were series or individual reports that contained between one and five patients (Table 2).

3.2. Indications for laparoscopic treatment of hydatid cysts

Since the first laparoscopic treatment of hydatid disease was described in 1992,[35] there has been steady growth in the reported laparoscopic treatment of hydatid cysts, with more than 900 cases reported in the English language literature (Figure 1). Of the reported 914 cases, 466 were male patients and 368 were female; the sex was uncertain for the remaining 80 patients. The age of patients ranged from 3 to 70 years, and the cyst diameter ranged from 3 to 18 cm. Excluding those publications in which the mean diameters of the cystic lesions were not documented, the distribution of mean cyst diameter was as follows: 1–4 cm, 3.44%; 5–10 cm, 84.05%; 10–15 cm, 11.48%; >15 cm, 1.02% (Figure 2a). A total number of 1116 cysts were reported in the 914 hydatid patients. Among these, 643 were located in the right lobe, 295 in the left lobe, and 32 were bilateral; the location was undocumented for the remaining 146 cysts. Multiorgan hydatid cysts were recorded in 17 patients including: liver + spleen (seven cases), liver + lung (four cases), liver + abdominal cavity (three cases), liver + pelvic cavity (two cases), liver + retroperitoneal cavity (two cases), and liver + lung + spleen + abdominal cavity (one case). According to the WHO/IWGE classification,[9,10] of the reported laparoscopic resections of 914 patients with 1116 hydatid cysts, 46.86% (523/1116) were for type 1 cysts, 19.44% were for type 3 cysts, 7.0% were for type 2 cysts, 5.19% were for type 4 cysts, 1.25% were for type 5 cysts, and the rest were indeterminate (Figure 2b). The diagnosis of hydatid disease was confirmed by postoperative histological examination in all patients.

Table 1
Publications on the laparoscopic treatment of hydatid cysts with more than five patients (listed by number of patients)

Author	Origin	Year	Journal	Number of patients	Male	Female
Berberoglu M[38]	Turkey	1999	*Surg Endosc*	87	38	49
Khoury G[40]	Lebanon	2000	*Surg Endosc*	83	43	40
Chen W[50]	China	2007	*Am J Surg*	76	52	24
Palanivelu C[5]	India	2006	*JSLS*	66	55	11
Zaharie F[68]	Romania	2013	*Surg Endosc*	62	33	29
Ertem M[47]	Turkey	2002	*Arch Surg*	48	32	16
Tai QW[44]	China	2013	*Surg Laparosc Endosc Percutan Tech*	46	26	20
Rooh ul M[52]	Pakistan	2011	*J Coll Physicians Surg Pak*	43	17	26
Sinha R[74]	India	2001	*JSLS*	34	NG	NG
Maazoun K[51]	France	2007	*J Pediatr Surg*	34	17	17
Bickel A[69]	Israel	2001	*Arch Surg*	31	10	21
Seven R[46]	Turkey	2000	*Surgery*	30	13	17
Yagci G[55]	Turkey	2005	*World J Surg*	30	23	7
Georgescu SO[49]	Romania	2005	*Rom J Gastroenterol*	24	16	8
Alper A[45]	Turkey	1995	*World J Surg*	22	NG	NG
Popescu I[4]	Romania	2005	*Rom J Gastroenterol*	19	12	7
Baskaran V[48]	India	2004	*JSLS*	18	11	7
Chowbey PK[75]	India	2003	*J Laparoendosc Adv Surg Tech A*	15	11	4
Altinli E[76]	Turkey	2002	*JSLS*	13	5	8
Dervisoglu A[70]	Turkey	2005	*Hepatogastroenterology*	12	NG	NG
Al-Shareef Z[41]	Saudi Arabia	2002	*JSLS*	10	3	7
Sharma D[77]	India	2009	*Surg Laparosc Endosc Percutan Tech*	10	4	6
Misra MC[53]	India	2010	*Surg Laparosc Endosc Percutan Tech*	9	7	2
Manterola C[78]	Chile	2002	*Surg Endosc*	8	3	5
Zengin K[42]	Turkey	2003	*Surg Laparosc Endosc Percutan Tech*	8	5	3
Bickel A[39]	Israel	1994	*J Laparoendosc Surg*	7	NG	NG
Polat FR[54]	Turkey	2012	*Surg Laparosc Endosc Percutan Tech*	7	3	4
Saglam A[79]	Turkey	1996	*Surg Laparosc Endosc*	6	1	5
Katkhouda N[80]	France	1999	*Ann Surg*	6	3	3
Ramachandran CS[81]	India	2001	*Surg Laparosc Endosc Percutan Tech*	6	4	2

NG, Not given in the literature.