Laparoscopic versus open surgery for hydatid disease of the liver.

A single center experience

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Ozgur Bostanci, Kinyas Kartal, Pinar Yazici, Onder Karabay, Muharrem Battal, Mehmet Mihmanli

Sisli Hamidiye Etfal Training and Research Hospital, Sisli, Istanbul, Turkey

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BACKGROUND: *Cystic Echinococcosis is a chronic parasitic infection, which is still an important problem in rural areas. Due to the development in technology, laparoscopic surgery has been introduced for the surgical treatment of hydatid disease of the liver (HD-L). The present study aimed to evaluate the clinical outcomes of laparoscopic versus open surgery for HD-L in a comparative analysis.*
METHODS: *Between January 2010 and March 2014, medical records of 83 patients who underwent surgery for HD-L were retrospectively analyzed. Patients' demographic data, cystic features, operative details and postoperative outcomes were reviewed from the database. All patients were divided in two groups regarding the surgical approach; Group A (open surgery, n= 69) and Group B (laparoscopic surgery, n= 14)*
RESULTS: *Both groups were similar regarding demographic variables and cystic features. In group B, mean operative time was significantly lower when compared to Group A (89±28 minutes vs. 144±19 minutes, respectively p<0,01). Hospital stay was also lower in laparoscopic group (3.38±0.7 vs 8.81±5.4 p<0,01). Overall postoperative complication was 19% and it was similar between groups. incidence of biliary fistula was 15% (n=13).*
CONCLUSION: *Laparoscopic approach in the treatment of HD-L is safe and feasible. Additionally, it has some advantages including shorter operative time and hospital length of stay.*

KEY WORDS: Conventional surgery, Hydatid disease of the liver, Laparoscopic approach, Surgical treatment

Introduction

Despite advances in diagnosis and treatment of Cystic Echinococcosis (human hydatid disease, CE), it is still an important public health problem especially in regions where CE is endemic such as Mediterranean, Middle East, South America,New Zealand and Turkey.
Although there are alternative treatment modalities such as medical therapy and percutaneous aspiration of simple hydatid cyst, surgical treatment remains first-line treatment particularly for complicated cysts providing similar results regarding complications [1,2]. A variety of surgical procedures have been described using conventional open techniques, including pericystectomy, unroofing the cyst with omentoplasty, marsupialisation and liver resection [3-5]. Over the last two decades, laparoscopic surgical approach in the treatment of hydatid cysts has gained increasing popularity [6].
The key point in hydatid cyst surgery is to avoid fluid spillage, which can lead to secondary seeding of infection and/or anaphylaxis.These frightening possibilities are the biggest obstacle in the use of laparoscopic techniques

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Correspondence to: Kinyas Kartal, MD, Sisli Etfal Training and Research Hospital, Halaskargazi Cad. Etfal Sokak, 34371 Istanbul, Turkey (e-mail: drkinyaskartal@gmail.com)

in hydatid cyst surgery. Recent studies noted the safety and efficacy of laparoscopic approach for HD-L [7]. However, it is still kept for selected cases. The type of surgery performed depends on many factors, the most important of which is surgeon preference and experience in addition to the cystic features.
This study presented the outcome of both open and laparoscopic treatments for HD-L from 14-year single institution experience. In this comparative study of surgical approaches for HD-L, we investigated the safety and feasibility of laparoscopic approach.

Patients and Methods

Between January 2010 and March 2014, all patients with hydatid cyst of the liver who underwent surgical treatment at Sisli Hamidiye Etfal Training and Research Hospital, Istanbul, were retrospectively reviewed. Recurrence patients and those with preoperatively diagnosed biliary fistula were not included. Diagnosis of echinococcal cysts was based on patients' history, physical examination, ultrasound (US) and computed tomography (CT) scan. In case of suspicion for cystobiliary fistula, magnetic resonance cholangiopancreatography (MRCP) was performed. Albendazole at a dose of 10-15 mg/kg was given. This treatment was started one month before surgery and continued at least three-months following surgery.
Data collection included patient's demographic characteristics, signs and symptoms on presentation, clinical findings, Gharbi classification and other features of hydatid cysts, surgical procedure, and postoperative outcome [8]. Eighty-three patients were divided into two groups regarding surgical approach: Group A (conventional open surgery, n=69) and Group B (laparoscopic surgery, n=14). The selection criteria for laparoscopic approach were as follows: (1) location of the cysts, especially locations in peripheral and anterior segments of the liver, (2) the number of cysts (less than three), and (3) those without any communication with biliary system and close relation to major vascular structures, (4) Gharbi classification; type I- III.

Surgical procedure: Radical surgery referred to pericystectomy and liver resection, whereas conservative surgery involved the unroofing of the cyst and removal of the cyst content, together with partial cyst resection. Right subcostal laparotomy incision was used in most of the patients. In laparoscopic cases, placement of fourtrocars was performed. ın both types of surgical interventions, fluid in cyst was aspirated using a veress needle until the tension of cyst disappeared and then injection of hypertonic saline solution (3%) into the cyst was applied and kept in for 10 minutes to obtain scolocidal effect. Following unroofing providing access of aspirator into the cavity, all cyst contents were aspirated. Surgical procedure was completed based on the patients' comorbidities and the location and relations of cyst with vascular and biliary structures, as well as the surgeon's preference and experience.

Statistical Analysis

Statistical analysis was performed using SPSS ver. 20 (SPSS, Chicago, IL, USA). All continuous data were presented as means± standard deviations. Statistical significance of the findings was analyzed using the two-tailed Student's t-test, and Wilcoxon related two-sample test. The Fisher exact test was employed for testing statistical significance of association between two discrete variables and Spearman's rank correlation was used. A P-value less than 0.05 was considered to be statistically significant.

Results

There were 47 male (56%) and 36 female (44%), with a mean age of 41± 10years (range: 16-67). Mean diameter of cystswas 9±4cm (range: 4-21). Cyst location was right lobe in 62% of the patients and left lobe in 38% of the patients. Most of the cysts (8/12, 66%) were located in anterior segments. In 12 patients, the lesion was found bilaterally located. Only in one patient, extrahepatic location (spleen) was detected. The demographic characteristics and cystic features, including Gharbi classification, were shown in Table I.
All these parameters were similar between groups. Clinical findings included distension (due to cyst pressure to stomach) (n=24), abdominal pain (n=31) and incidentally diagnosis during work-up for a different medical encounter (n=28).

Table I - *Demographic characteristics and cystic features of the patients.*

Gender	
Male	47
Female	36
Age (years), mean±SD	41.6 ± 10.5 (16-67)
Location (n, %)	
Right	52 (62 %)
Left	32 (38 %)
Bilateral	12 (14 %)
Cyst diameter (cm), mean±SD	9,2±4,1 (range: 4-21 cm)
The number of cysts (cm), mean ±SD	3.2 ±1.1 (1-6)
Gharbi classification*	
Type I	1
Type II	38
Type III	41
Type IV	3

*Type V classification was not observed

TABLE II - *Comparison of surgical data and postoperative details in both groups*

	Group A (n=69)	Group B (n=14)	p
Surgical procedure			NS
Radical surgery	12	0	
Conservative surgery*	57	14	
Concomitant surgery**	12	7	
Operative time (mins.)	89,2±28	144.6±19	0,0001
Hospital stay (days)	8.8±5.4	3.3±.0,7	0,001
Postoperative complications	14***(20%)	2(14%)	NS
Fistula formation	12 (17%)	1	NS
Intra-abdominal fluid collection	3 (4%)	0	NS
Wound infection	4 (5%)	1	NS
Pulmonary infection	2 (2.8%)	0	NS
Recurrence	3 (4%)	0	NS

*Unroofing-drainage, +/- Omentoplasty or capitonagge.
** Cholecystectomy and splenectomy
***Fourteen patients had 24 complications

Details about operative data and postoperative period in both groups were summarized in Table II.
Surgical techniques included conservative approaches such as unroofing of the cystic cavity with drainage and pericystectomy procedure, and radical surgery. Omentoplasty was added in 24 patients. Fifteen of these patients were in Group B while 9 were in Group A. Cholecystectomy was performed in 19 patients (22%) due to concomitant cholelithiasis (n=12) or a close relationship between hydatid cyst and gallbladder (n=7). Splenectomy was performed in one patient due to concomitant splenic hydatid disease. Only one patient was converted to open surgery due to inadequate evacuation of cystic cavity and high risk for spillage of cysts.
There was no operative mortality in both groups. Postoperative complications with an overall rate of 19% (n=16) included biliary fistula formation (n=13, 15%), intra-abdominal fluid collection, surgical site infection and respiratory system problems (Table II). Although it was lower in laparoscopic group, there were no statistically significant differences between groups.
Thirteen patients(15%) had communication between the cysts and biliary tract. This communication was detected during preoperative evaluation (MRCP) in 3 patients and during surgery in 8patients (61%) whereas 2 cases were diagnosed in the postoperative period due to bile in drain tube. These communications were repaired primarily (n=11) and treated by interventional procedures (sphincterotomy and/or stenting, percutaneous drainage) (n=2). Four patients required postoperative interventional treatments in addition to surgical repair.
Wound infection was treated by meticulous wound care. Postoperative fluid collection or abscesses did not require surgery and was treated with percutaneous intervention. Overall recurrence rate was 3.6%. Recurrence was observed in 3 cases in Group A during a median follow-up period of 28 months (range: 12-49 months)

Discussion

Surgical treatment still remains the primary treatment and the best option for complete cure in HD-L (9). The type of surgical approach depends on cystic features including size, any adjunct complications, as well as surgeon personal preferences. As laparoscopic approach has been performed for numerous surgical procedures due to the developments in technology and increasing number of surgeons experienced in minimal invasive surgery, it has also been popularized in the surgical treatment of HD-L.
The use of a laparoscopic approach for treatment of HD-L was first described in 1992 [9]. So far, its feasibility and safety have been questioned mostly in retrospective series. Some studies in the literature about laparoscopic approach for HD-L are shown in Table II. The advantages of laparoscopic approach compared to open surgery include a shorter hospital stay[10,11], which we also encountered in our study, a lower incidence of wound infection and less postoperative pain. Besides, the disadvantages are an increased risk of cyst fluid spillage, and difficulty in aspirating cysts contents [12]. Additionally, for laparoscopic approach, it is believed that location is important factor to select the patients. Particularly anteriorly located ones are more appropriate for laparoscopic treatment[13]. However, a comparative study by Zaharie et al, showed that a laparoscopic approach is safe for the treatment of HD-L in almost all segments [9]. In this study, right lobe of the liver was found to have two-fold increased risk of hydatid disease. Similar results have also

been available in previous reports [14-16]. However, regarding anterior/posterior locations, there was found no difference.

Laparoscopic surgical treatment of HD-L has reported to be safe in selected cases, with low conversion and morbidity rates[17,18]. In this study, although the postoperative morbidity was found to be lower in laparoscopic group, it was not statistically significant. Although some studies suggested lower recurrence rates [19,20], increased risk of spillage due to elevated intraabdominal pressures caused by pneumoperitoneum has been also noted [21].

Overall rate of biliary fistula (15%) is consistent with previous studies reporting a rate ranging between 3% and 37% [22-25]. Although it was not statistically significant, postoperative biliary fistula rate was found lower in the laparoscopic group (14% vs 15%).This may be due to the fact that open surgery is more invasive and traumatic than laparoscopic techniques. Another explanation for this result is that laparoscopically treated cysts were smaller and located mostly peripherally including tertiary biliary ducts, which are prone to spontaneous closure.

Except biliary fistula formation, complications such as wound infection, respiratory problems and recurrence rates did not differ significantly between the two groups. Palanivelu et al. has stated that laparoscopicmanagement decreases the severity of complications as compared with that in open surgery [26]. In the present study, mild complications were more observed in laparoscopic group compared to the open surgery group.

There are a few limitations of this study. As the sample size in laparoscopic group was small, it was difficult to draw strong conclusions. Although, for laparoscopic surgery patients, there were some inclusion criteria (non-homogenous groups), cystic features including locations and diameters were similar between groups. This encouraged us to express postoperative morbidity related to hydatid cysts. Lastly, because follow-up to time is not enough long to note any data about recurrences, this topic was not extensively mentioned in discussion.

In conclusion, we suggest that the laparoscopic approach in the managementof HD-L is safe and feasible. It has advantagesincluding shorter operative time and hospital length of stay with relatively decreased postoperative complication rate. With proper patient selection, laparoscopic treatment of hydatid disease of the liver provides better results.

Riassunto

PREMESSA: L'echinococcosi cistica è una infezione cronica parassitaria, tutt'ora un importante problema in aree rurali. Grazie allo sviluppo tecnologico la chirurgia laparoscopica è stata estesa al trattamento delle cisti idatidee del fegato (HD-L). Questo studio si è proposto di valutare e paragonare analiticamente i risultati clinici tra tecnica chirurgica ad addome aperto e tecnica laparoscopica nella HD-L.

MATERIALE E METODO DI STUDIO: si è proceduto all'analisi retrospettiva delle cartelle cliniche di 83 pazienti sottoposti a trattamento chirurgico per HD-L tra gennaio 2010 e marzo 2014, facendo riferimento ai dati demografici, le caratteristiche delle cisti, particolari operatori e risultati postoperatori. Tutti i pazienti sono stati raggruppati secondo l'approccio chirurgico: Gruppo A (69 pazienti operati con tecnica open) e Gruppo B (14 pazienti trattati con tecnica laparoscopica).

RISULTATI: i due gruppi sono risultati paragonabili per gli elementi demografici e per le caratteristiche delle cisti. Nel Gruppo B i tempi operatori sono risultati significativamente più brevi rispetto al Gruppo A (89±28 minuti vs. 144±19 minuti rispettivamente, p<0,01). La durata della degenza postoperatoria è stata analogamente più breve nel Gruppo B di chirurgia laparoscopica (3.38±0.7 vs 8.81±5.4 p<0,01). Le complicanze postoperatorie sono state percentualmente simili nei due gruppi (19%), con incidenza di fistole biliari in 13 pazienti, pari complessivamente al 15%.

CONCLUSIONI: l'approccio laparoscopico per il trattamento della HD-L è possibile e sicura. Inoltra esso presenta alcuni vantaggi in termini di durata dell'intervento e della degenza ospedaliera.

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