



Comparative Study of Laparoscopic Versus Open Surgery in Management of Liver Hydatid Cyst

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Abstract

Background: Cystic echinococcosis is a chronic parasitic infection echinococcosis is caused by parasite called *Echinococcus granulosus* and *Echinococcus multilocularis*. The modern treatment of hydatid cyst of the liver varies from surgical intervention to percutaneous drainage or medical therapy. 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 this disease in a comparative analysis.

Methods: Between January 2021 and November 2022, medical records of 144 patients who underwent surgery in Damascus university hospitals 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=108) and group B (laparoscopic surgery, n=36)

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 (50 minutes vs. 80 minutes, respectively $p < 0.01$). Hospital stay was also lower in laparoscopic group (3.30 ± 0.7 vs. 7.11 ± 5.4 $p < 0.01$). Overall postoperative complication was 19% and it was similar between groups. Incidence of biliary fistula was 16% in open and 11% in laparoscopic.

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.

Keywords: Conventional surgery; Hydatid disease of the liver; Laparoscopic approach; Surgical treatment

Introduction

Despite advances in diagnosis and treatment of Cystic Echinococcosis (CE) (human hydatid disease), 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 fluids 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 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. We investigated the safety and feasibility of laparoscopic approach.

Materials and Methods

Between January 2021 and November 2022, all patients with hydatid cyst of the liver who underwent surgical treatment at Damascus university hospitals, 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]. 144 patients were divided into two groups regarding surgical approach: Group A (conventional open surgery, n=108) and group B (laparoscopic surgery, n=36). The selection criteria for laparoscopic approach were as follows:

- Location of the cysts, especially locations in peripheral and anterior segments of the liver.
- The number of cysts (less than three).
- Those without any communication with biliary system and close relation to major vascular structures.
- Gharbi classification; type I- III.

Surgical procedure

Radical surgery referred to per cystectomy and liver resection, whereas conservative surgery involved the unroofing of the cyst and

removal of the cyst content, together with partial cyst resection. Rights subcostal laparotomy incision was used in most of the patients. In laparoscopic cases, placement of four trocars was performed. In 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. 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. P-value less than 0.05 were considered to be statistically significant.

Results

There were 61 male (43%) and 83 female (57%), with a mean age of 40 years (range: 16-67). Mean diameter of cysts was 9 ± 4 cm (range: 4-21). Cyst location was right lobe in 70% of the patients and left lobe in 30% of the patients. Most of the cysts (8/12, 66%) were located in anterior segments. In 20 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 1.

All these parameters were similar between groups. Clinical findings included distension (due to cyst pressure to stomach) (n=42), abdominal pain (n=56) and incidentally diagnosis during work-up for a different medical encounter (n=50).

Gender	
Female	83
Male	61
Age (years), mean ± SD	40
Location (n, %)	100 (70%)
Right	44 (30%)
Left	20 (14%)
Bilateral	9 ± 4
Cyst diameter (cm), mean ± SD	(Range: 4-21 cm)
The number of cysts (cm), mean ±SD	3.2 ± 1.1 (1-6)
Gharbi classification*	
Type I	2
Type II	66
Type III	71
Type IV	5
NCH: *Type V classification was not observed.	

Table 1: Demographic characteristics and cystic features of the patients.

Surgical techniques included conservative approaches such as unroofing of the cystic cavity with drainage and per cystectomy procedure, and radical surgery. Omentoplasty was added in 40 patients. 25 of these patients were in group B while 15 were in group A. Cholecystectomy was performed in 32 patients (22%) due to concomitant cholelithiasis (n=20) or a close relationship between hydatid cyst and gallbladder (n=11).

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=27) included biliary fistula formation (n=22, 15%). Although it was lower in laparoscopic group, there were no statistically significant differences between groups. 13 patients had communication between the cysts and biliary tract. This communication was detected during preoperative evaluation (MRCP) in 6 patients and during surgery in 14 patients (61%) whereas 3 cases were diagnosed in the postoperative period due to bile in drain tube. These communications were repaired primarily (n=19) and treated by interventional procedures (sphincterotomy and/or stenting, percutaneous drainage) (n=3). Three

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 3.1%. Recurrence was observed in 5 cases in group A during a median follow up period of 12 months.

Discussion

Surgical treatment still remains the primary treatment and the best option for complete cure in HD-L. The type of surgical approach depends on cystic feature 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 HDL 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. The advantages of laparoscopic approach compared to open surgery include a shorter hospital stay which we also encountered in our study, a lower incidence of wound infection and less postoperative pain [10,11]. 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 increased risk of spillage due to elevated intraabdominal pressures caused by pneumoperitoneum has been also noted [19-21].

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 laparoscopic management 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 (nonhomogenous groups), cystic features including locations and diameters were similar between groups. This encouraged us to express postoperative morbidity related to hydatid cysts [27]. 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 management of HD-L is safe and feasible. It has advantages including 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.

Conclusion

In present study suggest that patient of liver hydatid cyst treated by laparoscopy had less postoperative pain with minimal requirement of analgesia, early resumption of diet and daily routine activity, short hospital stay, least or no postoperative complications compared to open surgery. It is overall cost effective and last but not the least is better cosmetic outcome.

The laparoscopic management offers a better alternative to conventional open surgery for the management of liver hydatid cysts and is worthy to be considered for suitable situations. Treatment with laparoscopy require preoperative perfect diagnosis and location of liver hydatid cyst. Intra operative bleeding and slightly more operative time can be overcome by experienced surgeon with expert team in laparoscopy.

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