EXPERIENCE OF MANAGEMENT OF LIVER HYDATID DISEASE IN A TERTIARY CARE HOSPITAL– COMPARISON OF SURGICAL TECHNIQUES

Aparajita Mookherjee¹, Bharathi Kantamani², Moonish V. S³, Preethi Chandran⁴

¹Professor, Department of General Surgery, Vydehi Institute of Medical Sciences & RC.

²Post Graduate, Department of General Surgery, Vydehi Institute of Medical Sciences & RC.

³Post Graduate, Department of General Surgery, Vydehi Institute of Medical Sciences & RC.

⁴Post Graduate, Department of General Surgery, Vydehi Institute of Medical Sciences & RC.

ABSTRACT

BACKGROUND

Hydatid disease is an endemic condition in several parts of the world. Owing to ease of travel, surgeons in non-endemic areas are also encountering the disease. Hence, should be aware of the optimum treatment protocols. Surgery is the gold standard of management. In recent years laparoscopic surgery has become the preferred mode of surgery with much less complications and the additional advantage of early recovery. This study evaluates the efficacy and outcomes of minimally invasive laparoscopic surgery over open method in a tertiary care hospital.

METHODS

Between January 2014 and June 2015, total of 60 patients of liver hydatid disease were selected for surgery in this tertiary care hospital, 30 patients each underwent open and laparoscopic surgery, with the exclusion criteria being up to less than 3cms in size, extra hepatic hydatid cysts and patients unfit for general anaesthesia. The clinical presentations, laboratory findings, Operative findings and post-operative complications were compared.

RESULTS

A female preponderance was noted (56.66%) with maximum number of patients in the 4th decade (40%), common presenting symptoms were pain and mass per abdomen. Majority of patients presented with single hydatid cyst (70%) with involvement of right lobe in 56.66%. All patients underwent pericystectomy (Open or laparoscopic) with mean duration of 14 days hospital stay following open surgery and 6days following laparoscopic surgery. All patients with preoperative cysto-biliary communication underwent open surgery. Spillage was the common intra operative complication in 13.3% of laparoscopic patients. Postoperative biliary leak was seen only in the open surgery patients with cystobiliary communication (13.3%). Followup period ranged from 6 months to 1 year with no recurrence observed during this period in either group.

CONCLUSION

Early recovery, shorter hospital stay, minimum morbidity and faster return to work are the definite advantages of laparoscopic surgery and hence it should be ideally considered as a safe and efficacious treatment modality in cases of uncomplicated hydatid disease.

KEYWORDS

Hepatic Hydatidosis, Laparotomy, Laparoscopy.

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INTRODUCTION

Human Hydatid disease or Cystic Echinococcosis (CE) has been known since the times of Hippocrates.⁽¹⁾ It is a parasitic disease of worldwide distribution and incidence in the sheep rearing areas, including the Indian subcontinent. Physicians and surgeons often encounter this disease because of increased travel and migration.⁽²⁾ It is carried by the parasite Echinococcus granulosus, a Cestode that lives in the small intestine of dogs and other canines (Definitive host).

Eggs are eliminated in the faeces and when ingested liberate the larvae in the duodenum of the intermediate hosts.

Intermediate hosts can be Sheep or Goat (Pastoral hydatidosis) or Rein deer/Moose (Sylvan hydatidosis). Humans are accidental intermediate hosts.⁽³⁾

The most common site of occurrence of hydatid cysts in humans is the liver (50-93%).⁽⁴⁾ Liver hydatid disease is mostly asymptomatic in the early stages. If left untreated, the cysts grow in size and eventually cause complications like-cysto biliary fistula or communication, rupture into the peritoneal cavity and seeding of daughter cysts, leading to disability and morbidity. Only in exceptional cases does spontaneous healing occur due to parasitic death and calcification.⁽⁵⁾

Surgery remains the gold standard therapy for Liver Hydatidosis, despite significant advances in medical management and interventional radiology.⁽⁶⁾ With time, the treatment of abdominal hydatid disease is undergoing revolutionary changes and the era of open surgery with its associated large incision, post-operative complications and prolonged hospital stay is now being challenged by minimally invasive laparoscopic surgery.⁽⁷⁾

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Corresponding Author:

Dr. Aparajita Mookherjee,

Flat no-B 206,

Definer Serene Drive,

Pettanahalli, Hoskote,

Bangalore-562114.

E-mail: aparajita.mb@gmail.com

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Many controversies regarding patient selection criteria, surgical technique and follow up protocol, about the role of laparoscopic surgery have not been resolved completely due to scarce worldwide experience.⁽⁸⁾

Hence, this study presents a comparison of the outcomes of open versus laparoscopic procedure in the context of a single institutional experience.

MATERIALS AND METHODS

Between January 2014 and June 2015, 60 patients with liver hydatid disease underwent surgery in the hospital; 30 patients in group I underwent laparoscopic surgery and 30 patients in group II underwent open surgery. All patients with liver hydatid disease were included in the study, only excluding patients less than 18 yrs. age, unfit for general anaesthesia, having cysts less than 3cm in size and with associated extra hepatic hydatid disease (Lungs, kidney etc.). Diagnosis of liver hydatidosis was done by USG of abdomen and further confirmed by CECT scan of abdomen for confirmation of exact number, size, depth and complications of cysts. Patients with preoperative evidence of intrabiliary rupture were excluded from the laparoscopic group and included in the open surgery group.

Intrabiliary rupture was suspected preoperatively in the following cases.

1. Liver hydatid cyst with Gharbi type 2 during USG abdomen associated with hepatic cytolysis and cholestasis changes.
2. Liver hydatid cyst with Gharbi type 2 or type 4 during USG abdomen associated with presence of jaundice during hospital admission or in the medical history.
3. Liver hydatid cysts with Gharbi type 2 or type 4 during USG abdomen associated with CBD dilatation exceeding 10mm and elevated cholestatic levels.
4. Liver hydatid cysts with Gharbi type 2 or type 4 during USG abdomen and the presence of echogenic material within the CBD.

All patients received preoperatively medical management with tablet Albendazole (400mg twice a day) for at least 4 weeks. Following surgery postoperative medical management with tablet Albendazole was continued for 4 cycles of 28 days with a gap of 14 days between 2 cycles.

Surgical technique for Group 1

All patients were opened by Hasson's technique following a transumbilical incision. Three ports – umbilical camera 10mm port, epigastric Palanivelu hydatid system 12mm port and right midclavicular line 5mm working ports were placed for right lobe hydatid disease and 4 ports –supraumbilical 10mm port camera port, epigastric Palanivelu hydatid system 12mm port, right midclavicular line 5mm working port and left midclavicular line 5mm working port were placed for left lobe hydatid disease (Fig I and II).

Following CO₂ insufflation and creating a pneumoperitoneum (pressure of 12mm of Hg) position of cysts were confirmed and adhesiolysis done between cyst and surrounding structures. Cyst evacuation was done using Palanivelu hydatid trocar system (Fig III and IV) introduced directly transabdominally over the cyst. Once inside the abdomen the trocar was removed, cannula tip made to touch the cyst surface and maintains tight contact by applying suction through a side channel.

A 5mm suction nozzle was introduced into the cannula and fitted to another suction machine. Following puncture of cysts all spillage was sucked through the side cannula. Through the PHS system, the cyst cavity was continuously irrigated with 0.04% Chlorhexidine scolicidal agent to remove all debris, fragmented laminated membrane and daughter cysts. Telescope was reintroduced through the trocar into the cavity to confirm any remnants of daughter cysts, hydatid sand and to confirm for any cysto-biliary communication. The cavity was re-irrigated with chlorhexidine for a holding time of 10minutes and reaspirated, procedure repeated for a few times till the returning fluid was free of all debris.

In the absence of any cystobiliary communication (<5mm), the cyst wall was deroofed (partial pericystectomy), the cavity was packed and sutured with omentum and an intra-abdominal drain was kept in situ.

None of the patients had any evidence of biliary communication (All patients were included in group II following pre-operative evaluation) and 2 of the patients had to be converted to open surgery (Due to iatrogenic liver injury).

Fig. 1

Fig. 2

Fig. 3 **Fig. 4**

Surgical technique for Group II

Choice of incision was either right subcostal (Kocher's) or midline depending on the cyst location. After isolation of cyst, abdominal cavity was packed with 0.04% chlorhexidine soaked packs and then the cyst cavity was punctured, all contents aspirated and the same scolicalid agent injected into the cyst for a holding time of 5-10 minutes. These steps were repeated for 2-3 times till returning fluid was clear, followed by pericystectomy (partial/complete). In the 8 patients with overt cysto biliary communication (>5mm), the openings were closed with 2-0 Vicryl and then all cavities were packed with omentum and closure was done over a suction drain.

All patients were allowed orally on appearance of bowel sounds and drain removal done after 48-72 hours when the contents were 20-25 ml over 24 hrs.

STATISTICAL ANALYSIS

RESULTS

Patients from both the groups were found comparable in terms of age, gender, clinical presentation, number of cysts and size of the cysts. Maximum patients were in the age group of 31-50 years numbering 36 (60%) in both the groups. Female preponderance was seen in 34 cases (56.6%). Pain was the common presenting symptom in 42 (70%) patients followed by mass per abdomen in 6 (10%) of cases; 42 (70%) patients had single cyst, followed by 2 cysts in 14 (23.3%) patients. right lobe was predominantly involved in 34 (56.6%) patients and the mean cyst diameter was 9cms in 42 (70%) cases. (Table I).

Comparison of intraoperative complications, post-operative morbidities and complications

In laparoscopic group (Group I), spillage was seen in 4 patients (13.3%) and 2 patients (6.7%) suffered iatrogenic liver injury. Both these cases had to be converted to open surgery for repair of the liver injury. Spillage could be managed laparoscopically.

In group II patients intraoperative bleeding and spillage was seen in 2 patients (6.7%) each. There was no liver injury and 8 patients (13.3%) were found to have evident cystobiliary communication (>5mm in size) as was diagnosed preoperatively and hence patients were included in the open surgery group.

Requirement of postoperative analgesia (Injection or tablet Diclofenac 50mg BD) was for a mean of 2.5 days in group I patients and 6 days in group II patients ($P<0.001^{**}$). In all group I patients, post-operative drain removal was done after 3-4 days, whereas following open surgery average time for drain removal was 4-6 days, except in 8 patients with cystobiliary communication (9-10 days).

There was a significant difference in the post-operative complications (Mainly biliary leak and surgical site infection) none of the laparoscopic group patients had any complications whereas in group II, 8 patients (13.35) had biliary leak (due to cysto biliary communication) and 10 patients (33.3%) had surgical site infections (Table II).

Hospital Stay and Recurrence

Early mobilization (1st and 2nd day) was seen in all the laparoscopic group patients, where as in group II most patients were mobilized after 2nd post-operative day. Hence, duration of hospital stay was shorter for group I patients (mean of 4 days) while following open surgery patients had a mean stay of 8 days in the 12 (10%) (Uncomplicated patients) while in the remaining 18 (60%) patients with complications the mean stay was 14days. The stay was significantly longer for group II ($P<0.001^{**}$).

All patients were followed up to a duration of 6 months – 12 months and no recurrence was observed in either group during this period.

Comparison of study variables in the 2 groups studied is shown in Table III.

Parameters	Laparoscopic Group		Open Group		P- value
	n = 30	(%)	n = 30	(%)	
1.Age (years)					0.387
<30	2	6.7	4	13.3	
31-50	20	66.67	16	53.3	
> 50	8	26.67	10	33.3	
Mean age (yrs.)	46.67±9.76		42.67 ± 14.67		
2.Sex					0.713
Male	12	40.0	14	46.7	
Female	18	60.0	16	53.3	
3.Number of cysts					1.000
1	22	73.3	20	66.7	
2	6	20.0	8	26.7	
>3	2	6.7	2	6.7	
4.Liver lobe					0.605
Right	20	66.7	14	46.7	
Left	4	13.3	6	20.0	
Both	6	20.0	10	33.3	

Table 1: Demographic data in the patient population and Hydatid Disease

Parameters	Laparoscopic Group		Open Group		P - value
	n= 30	(%)	n = 30	(%)	
1. Intraoperative complications					
Spillage	4	13.3	2	13.3	1.000
Bleeding	0	0	2	13.3	
Iatrogenic liver injury	2	6.7	0	0	
Cystobiliary communication	0	0	8	13.3	
2. Post-operative mobilization (days)					
1	18	60.0	0	0	0.246
2	12	40.0	6	20.0	
3	0	0	24	80.0	
3. Drain removal (days)					
1-2	0	0	0	0	0.011 *
3-4	30	100.00	0	0	
5-6	0	0	22	73.3	
7-10	0	0	8	26.67	
4. Post-operative complication					
biliary leak	0	0	8	13.3	0.042
surgical site infection	0	0	10	33.3	
5. Hospital stay (days)					
1-3	10	33.3	0	0	0.001**
3-6	20	66.67	0	0	
7-10	0	0	12	40.0	
11-14	0	0	10	33.3	
15-18	0	0	8	13.3	

Table II: Intraoperative complications, postoperative morbidity and complications

Baseline Variables	Laparoscopic Group	Open Group	P - value
1. Age (years)	46.67 ±9.76	42.67 ±14.67	0.387
2. Number of cysts	1.33 ±0.62	1.40 ±0.63	0.772
3. Size of cysts (cms)	8.07 ±3.10	11.27 ±3.17	0.009*
4. Post-operative analgesia requirement	2.27 ±0.46	5.40 ±0.83	<0.001**
5. Drain removal day	3.73 ±1.28	5.40 ±2.92	<0.011*
6. Postoperative hospital stay	4.47 ±1.06	12.00 ±3.21	<0.001**

* Statistically significant ** highly significant

DISCUSSION

There are various treatment modalities for liver hydatid disease including medical management, PAIR (Puncture, Aspiration, Injection, Reaspiration) or combination of both. But surgery was and remains the mainstay for complete healing.⁽⁶⁾ Choice is between open conventional surgery and newer laparoscopic surgery. Due to its prolonged learning curve and limited exposure to laparoscopic technique, wide acceptancy is still limited regarding concerns about improper evacuation of cysts, possibility of intra peritoneal dissemination and subsequent high recurrence rate. In fact, the real risk of spillage after laparoscopy is much lower than open surgery.⁽⁹⁾ and the short term recurrence rates varies between 0-9% after laparoscopic and between 0-30% following open surgery.⁽¹⁰⁾

Very few series are available which compare the results of open versus laparoscopic surgery, hence our series has been

a learning experience towards a comparative analysis. The largest published series of 59 patients by Florin Zaharie et al. (2013).⁽¹¹⁾ has also confirmed the efficacy of laparoscopy over open surgery in the management of hepatic hydatid disease. The other large series comprise of open surgical management of 391 patients by Heikal Bedioui et al. (2012).⁽¹²⁾ and 117 patients by Siddharth S. Rao et al. (2012).⁽¹³⁾ A single large laparoscopic series comprising of 66 patients was conducted by Palanivelu C et al. (2006).⁽¹⁴⁾

In the present study the largest number of patients (70%) had solitary cysts, mainly located in the right lobe of liver (56.66%) with involvement of 2 segments of the liver in 46.66% cases. Maximum number of cysts were between 6-12cms with a mean diameter of 9.9cms. These findings are comparable with the series of Heikal Bedioui, Siddharth S. Rao and Palanivelu C et al. in respective open and laparoscopic groups. None of the laparoscopic patients of this series had any

cysts in segments I, II, VII (which are considered blind areas in laparoscopic surgery as they are not easily accessible and visualized).

Intraoperative spillage (13.3%) and iatrogenic liver injury (6.7%) in group I patients of this series does not compare with the findings of Palanivelu C et al. (Who has no complications) except cystobiliary communication seen in 13.5% patients. Intraoperative complications in the open cases in this series are comparable with those of Siddharth S. Rao and Heikal Bedioui et al. We had 8 patients (13.3%) of post-operative biliary leak in group II (Due to cysto biliary communication), whereas Heikal Bedioui et al. reported 31.9% of patients with postoperative biliary leak. Post-operative morbidity rate was significantly negligible in laparoscopic group due to lower incidence of complications. (0 versus 13.3%, $p=0.042$) and shorter hospital stay (Average 3-4 days versus 10-12 days, $p=0.001^*$) with no disease or procedure related mortality in either group. Similar results have been reported by Palanivelu C et al and Florin Zaharie et al.^(14,11)

The encouraging results favouring laparoscopic surgery namely significantly lower postoperative morbidity, shorter hospital stay and rapid healing, should motivate enhanced use of laparoscopy as a prime approach towards liver hydatidosis. The only limitations are thorough preoperative evaluation of relation of cysts with biliary tree and avoiding patients with cyst in laparoscopic inaccessible segments (I, II, VII). Barring these limitations there are no other real contraindications for laparoscopic surgery and following wider exposure to the skills of laparoscopy and the surgeons faster learning curve, this minimally invasive approach will surely be the front runner of surgical management in the near future.

CONCLUSION

Liver hydatid disease is a complex and dynamic disease confronting both physicians and surgeons worldwide. Due to the various phases of the disease (Growing phase or involution phase of cysts) no "one size fits all" approach can be adopted and efficacious choice of therapy is of utmost importance. Surgery remains the mainstay of management, with the choices of open or laparoscopic surgery. Appropriate patient selection is mandatory before laparoscopic surgery in terms of location of cysts – segments 1 and 7, size of cysts >9-10cms and presence of biliary communications). If these morbidity predictors are judiciously monitored, then laparoscopic surgery provides a safe and efficacious approach to all types of liver hydatid cysts and has well known benefits in terms of early recovery, shorter hospital stay, minimum morbidity and faster return to work. Hence, it is worthy to consider

laparoscopy over conventional surgery as a viable alternative for the management of uncomplicated liver hydatid disease.

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