

Laparoscopic Management of Hepatic Hydatid Cyst: A Single Institute Based Experience

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ABSTRACT

Background: Various modalities of treatment for hydatid cyst of liver include drug therapy, conventional open surgery and laparoscopic surgery. Laparoscopic approach is preferred in view of its minimal invasiveness, short hospital stay, early recovery, and lesser wound-related complications.

Aims and objectives: To study the safety and feasibility of laparoscopic surgery in hydatid disease of liver in selected patients.

Materials and methods: The study entitled, "laparoscopic management of hepatic hydatid cyst—A single institute-based experience" was conducted in the Department of General and Minimal Invasive Surgery SKIMS Medical College Bemina, Srinagar, Kashmir, India from November 2019 to August 2021 with a further follow-up for a period of 1 year from September 2021 to August 2022 and the total number of patient studied was 35. Cysts located in segment 3, 4, 5, 6, and 8, with no evidence of calcifications or infection or major biliary communication were included in the study. Cyst located in segment 1, 2, and 7, cyst located near vascular hilum, deep seated cyst, recurrent cysts, and ruptured hydatid cyst were excluded from the study.

Results: The study included 35 patients which included 17 males and 18 females. Twenty eight (80%) patients had a single univesicular cyst located in right lobe of liver, while as three patients had a cyst in right lobe as well as left lobe. Four patient had two cysts in the right lobe. Deroofing of the cyst with evacuation of contents was done in 23 (65.71%) patients while as partial pericystectomy was done in 12 (34.28%) patients. External tube drainage was done in 19 (54.28%) patients while as omentopexy was done in 16 (45.71%) patients. The average operative time was 89.80 minutes (60–120 minutes). Postoperative biliary leak was seen in three patients, which ceased spontaneously within 7–10 days in two patients. One patient needed ERCP with sphincterotomy. Time for return to work was 8.10 days (6–12 days). One of the patients had recurrence after 18 months.

Conclusion: Laparoscopic hydatid surgery is safe and feasible in selected patients. The main advantage being the lower postoperative morbidity, shorter hospital stay, early return to routine work and low recurrence rate.

Keywords: Advanced laparoscopic surgery, Diagnostic laparoscopy, Direct trocar entry.

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INTRODUCTION

Hydatidosis is a zoonotic disease having a worldwide distribution. The disease in humans is caused by larval stage of *Echinococcus granulosus* or *Echinococcus multilocularis*. The life cycle of the disease includes dog as the definitive host and the grass grazing animals as the intermediate hosts. Man is the accidental host and gets infected by utilizing vegetables, fruits and drinking water polluted by eggs passed along with the feces by these dogs. Humans may also get infected by handling of pet dogs. Surgery is the treatment of choice and is presently the most effective treatment for hydatid disease.^{1,2} Despite so much of progress and advancement, there is still no consensus as for as the extent of surgical procedure is concerned. Minimally invasive procedures such as laparoscopy and percutaneous aspiration is being attempted in selected patients.

The objective of treatment of hydatid disease should be complete eradication of the parasite and reducing any recurrence in future.^{2–4} The appropriate modality of the treatment of hydatid disease is determined by several factors such as overall health of the patient, location, size, and number of the cysts and whether the cyst is complicated or not. Presently, there are three main modalities of treatment for hydatid cyst of liver which include chemotherapy, conventional surgery, and minimally invasive procedures.⁵

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Minimally invasive procedures include PAIR (percutaneous aspiration, injection, and respiration) technique, modified catheterization technique and Laparoscopic approach. Advantages of laparoscopy include that it is minimally invasive and thorough examination of the entire peritoneal and cyst cavity is possible. The other advantages of laparoscopy include shorter hospital stay, less wound-related complications, and early recovery.⁶ However it is less feasible in complicated cysts such as ruptured cysts, cysts with major biliary communication, deep-seated cysts, cysts located in difficult locations, and cysts located close to vascular hilum. Aim of conducting this study was to determine the safety and feasibility of laparoscopic surgery in hydatid disease of liver.



Fig. 1: The CT image showing unilocular cyst in right lobe



Fig. 2: The CT image showing cyst in right lobe and left lobe

MATERIALS AND METHODS

The study entitled, "laparoscopic management of hepatic hydatid cyst—A single institute-based experience" was conducted in the Department of General and Minimal invasive surgery SKIMS, Medical College Bemina, Srinagar, Kashmir, India from November 2019 to August 2021 with a further follow up for a period of 1 year from September 2021 to August 2022. Ethical clearance from the Institutional Ethical Committee was sought before initiating the study. It was a prospective observational study and included 35 patients admitted with a USG and CT documented hepatic hydatid disease. The patients with cyst located in segment 1, 2, and 7 of liver, cyst located near vascular hilum, deep-seated cyst, recurrent cysts, ruptured cyst, infected cysts, calcified cysts, cysts with major biliary communication, and patients who has the history of multiple upper abdominal surgeries were excluded from the study. All the patients were put on preoperative albendazole therapy for a period of 4 weeks, in the dose of 10 mg/kg body weight which was continued postoperatively for a period of 3 months.

Preoperative Assessment

Detailed history and thorough physical examination were carried out in all the patients. In addition to it, various baseline investigations, ultrasonography, computed tomography (Figs 1 and 2) and serological examination was done in all the patients. An informed consent was taken from all the patients before the procedure.

Surgical Technique

All the procedures were performed under general anesthesia. After placing the patients in reverse Trendelenburg's position, Veress needle was introduced via supra-umbilical incision to create the Pneumoperitoneum. Carbon-dioxide gas was used to insufflate the abdominal cavity and intra-abdominal pressure of 12 mm Hg was set. After the Pneumoperitoneum was created, same supra-umbilical incision was used for introducing a 10 mm trocar for the telescope. Once the telescope was introduced, diagnostic peritoneoscopy was done and whole of the peritoneal cavity was examined. After this, a 10 mm port (working port) was introduced in the right hypochondrium into the peritoneal cavity to the right of the falciparum ligament 5 cm below the subcostal margin under direct vision. This was followed by insertion of a 5 mm trocar, a 5 cm

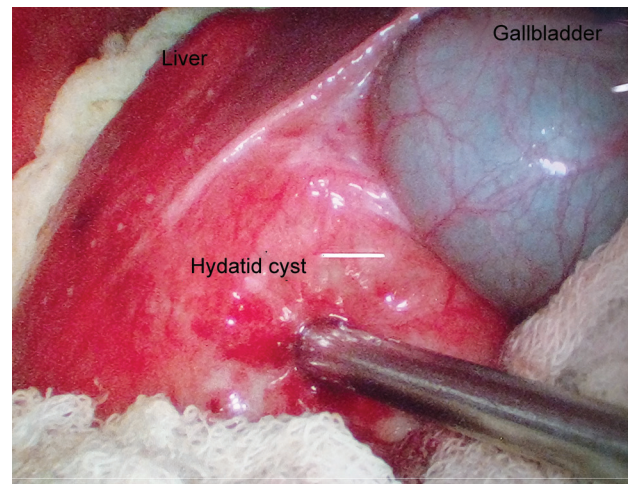


Fig. 3: Intraoperative picture during laparoscopy with a suction tip inside the cavity

below the right costal margin in the mid clavicular line. In patients with a cyst in right lobe, another 5 mm right subcostal trocar was placed in the anterior axillary line. While as in patients with a cyst in left lobe, one 5 mm trocar was placed in the left subcostal, a right subcostal area in the midclavicular line on both the sides, while as the port in the anterior axillary line was not needed.

Surgical procedure was initiated by inspection of whole abdominal cavity to confirm the findings. The cyst in the liver was identified and falciform ligament divided for better exposure. Two or three gauze packs soaked in cetrimide solutions were used to isolate the cyst from rest of the abdominal contents. An aspiration needle was introduced into the cyst and around 50% of the fluid was aspirated from the cyst cavity (Fig. 3). The color of the aspirated fluid was observed to rule out any bilious nature of the fluid. Once the bilious nature of the aspirated fluid was ruled out, an equal amount of cetrimide 0.5% was injected into cyst as a scolical agent and kept inside the cavity for 10–15 minutes, followed by the suction of the cavity. Once all the fluid was sucked out from the cyst, deroofting of the cyst cavity was done and all the contents of the cyst taken out carefully without causing any spillage. Laminated membrane (Fig. 4) and other contents of the cavity were placed in the sterile bag and

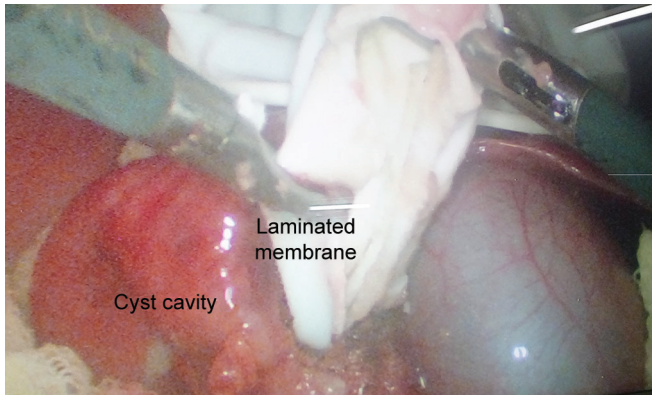


Fig. 4: Laminated membrane being delivered from the cyst during laparoscopy

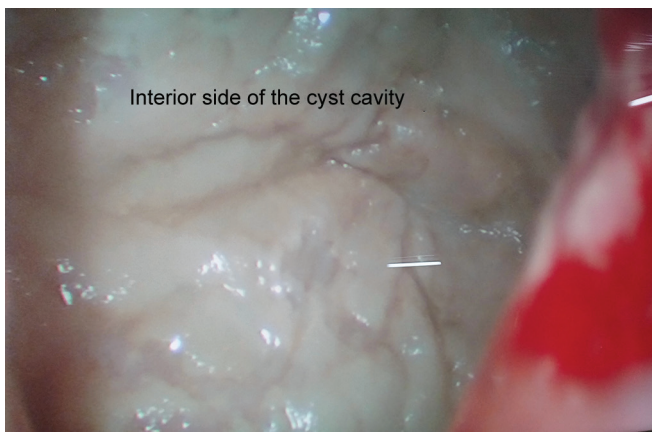


Fig. 5: Inner side of the cyst cavity as seen with a laparoscope placed inside the cavity after evacuation of the contents

then delivered out. This was followed by introduction of camera into cyst cavity to rule out presence of any cysto-biliary communication and any daughter cysts (Fig. 5). In patients with no cystobiliary communication, scolicalid agent was again instilled into the cavity to sterilize it. If any cystobiliary communication was found, it was sutured using Vicryl 2-0. In patients with exophytic cyst, excision of the redundant cyst wall was done (partial pericystectomy) using harmonic as an energy source. External tube drainage of residual cavity was done in 23 patients while as omentopexy was done in 12 patients. In all patients, a tube drain was placed in the sub-hepatic area followed by the closure of port sites.

Postoperative Care

Intravenous fluids were given to all the patients during first 12 hours followed by liquid orals. All the patients were put on intravenous third generation cephalosporins and intramuscular injection of diclofenac for a period of 3 days followed by oral antibiotics for a period of 5 days. Patients were advised to take oral analgesics as and when needed. Patients were monitored for any Jaundice and the color and quantity of fluid in the drain during the postoperative period. All the patients were put on albendazole therapy from the second postoperative day. The tube drain was removed once the drain was less than 50 mL per 24 hours and non-bilious in color, which was usually by 3rd or 4th postoperative. However, in two patients who continued with bilious drainage, the drains were

Table 1: Clinical presentation of patients

Chief complaints	No. of patients (n = 35)	Percentage
Abdominal pain	16	45%
Abdominal mass	04	11.42%
Abdominal mass + pain	04	11.42%
Asymptomatic	11	31%

Table 2: Characteristics of liver cysts

Type of cyst	No. of patients	Percentage (%)
Univesicular	24	68.57%
Multivesicular	11	31.42%
Number of cysts		
One cyst	32	91.42%
Two cysts	3	8.57%
Three cysts	0	0%
Site of cysts		
Right lobe	28	80%
Left lobe	4	11.42%
Both lobes	3	8.57%

removed between 7 and 10 days. While as in one patient bilious drain where the drainage continued beyond 2 weeks had to be subjected for ERCP with sphincterotomy, followed by the removal of drain by 3 weeks.

Statistical Analysis

Statistical Package for Social Sciences (SPSS) version 20 was used for tabulating, coding, and analyzing the data. The data were first entered into a MS Excel sheet and were later converted into SPSS data for analysis. The results were expressed as percentages or mean (SD).

RESULTS AND OBSERVATIONS

During this period of study, 37 patients with hydatid cyst of liver were planned for laparoscopic management in our hospital. In view of difficult approach, we had to convert two patients to open surgery and were not included in the study. The age of our study patients varied from 16 to 60 years with a mean age of 40.27 years. The number of male patients was 17 males while as number of females was 18. In this study, abdominal pain was seen in 45% and abdominal mass in 11.42% patients (Table 1). Out of 35 patients, a single unilocular cyst in the right lobe was seen in 28 (80%) patients. A cyst in both the right lobe and left lobe was seen in three patients. On the other hand, four of our study patients had two cysts in the right lobe (Table 2).

Deroofing of the cyst with extraction of contents was done in 23 (65.71%) patients, while as partial pericystectomy was done in 12 (34.28%) patients. Cysto-biliary communication was seen in 2 (5.71%) patients which was closed using Vicryl suture 2-0. The residual cavity was managed with external tube drainage in 19 (54.28%) patients while as omentopexy was done in 16 (45.71%) patients (Table 3). The mean operative time in this study was 89.80 minutes (65–120 minutes) (Table 3). Biliary fistula was the most frequent complication in the postoperative period and was seen in three patients, which ceased spontaneously after 7–10 days in two

Table 3: Intraoperative and postoperative study parameters

Parameter	Number of cases	Percentage
Type of surgery		
Deroofing with evacuation of contents	23	65.71%
Partial pericystectomy	12	34.28%
Management of residual cyst cavity		
External tube drainage	19	54.28%
Omentopexy	16	45.71%
Cysto-biliary communication	02	5.71%
Postoperative biliary leak	03	8.57%
Surgical site infections	Nil	00
Anaphylaxis	Nil	00
Recurrence	01	2.85%
Mean operative time	89.80 ± 6.08	–
Mean hospital stay	3.40 ± 1.63	–
Return to work (days)	8.10 ± 1.83	–
Mean ± SD		

patients. One patient needed ERCP with sphincterotomy to control the biliary fistula. In this study, the average hospital duration was 3.40 days (2–6 days), while as the average time taken to resume routine activities was 8.10 days (6–12 days). One of the patients had recurrence after 18 months and is being treated conservatively.

DISCUSSION

Surgery is the treatment of choice for hydatid disease of liver.^{2,3} In the initial stages, laparoscopic approach was not used for the management of hydatid disease in view of the higher risk of intraperitoneal spillage as compared to open approach. However, recent studies have shown that with laparoscopy, actual risk of dissemination and short-term recurrence are much less as compared to open surgery. As far as laparoscopy in hydatid surgery is concerned, it has got various advantages including lesser morbidity, lesser stay in hospital, faster return to work, and better cosmesis.^{6–8}

In our study, 48.57% patients were males and 51.42% females and the mean age of the patients was 40.27 years which is in concordance with other studies.^{6–9} Abdominal pain was the commonest complaint as seen in 45% patients followed by abdominal mass in 11.42% patients. This is again in accordance to the results of Ul-Bari et al.¹⁰ and Fadel et al.¹¹ In our study, 80% of the patients had a cyst in right lobe, 11.42% patients had cyst in left lobe while as remaining patients had bi-lobar involvement, which is in agreement to the results of other studies.^{9–11} In our study, 92% patients had a single cyst, while as the remaining patients had more than one cyst involving both the right and left lobe. On the other hand, in a study conducted by Fadel et al.¹¹ 96% patients had a single cyst, while as remaining 4% had a multi-centric lesion. Postoperative biliary fistula was noted in 8.57% patients, which is in agreement to the results of other studies.^{9,12} In the present study, the mean operative time in laparoscopic group was 89.80 minutes. Many other studies had comparable results.^{9–11} On the other hand, in two separate studies conducted by Fadel et al.¹¹ and Yağmur et al.¹³ a respective mean operative time of 78.2 and 90 minutes (range, 60–190) was reported. Another study conducted recently

reported that operative time had a mean value of 66 minutes, with a range between 66 and 160 minutes.¹²

In this study, two (5.71%) patients had to be converted to open approach. In one case, it was because of difficult access and in another case, it was because of inability to suture a major cystobiliary communication. In a study conducted by Fadel et al.¹¹ conversion to the open approach was performed in only one (4%) case owing to surgical bleeding. While as in a study conducted by Yağmur et al.,¹³ conversion to the open approach was performed in 6.81% of cases because of restricted access.

In our study, cystobiliary communication was seen in two (5.71%) patients, which was closed using a Vicryl suture 2-0. Rooh-ul-Muqim et al.⁹ and Fadel et al.¹¹ have reported a cystobiliary communication in 8% patients. As per the available evidence the cystobiliary communication has been reported in 5–30% cases and use of scolical agents in such patients may damage the biliary tree and result into a sclerosing cholangitis. That is why injection of scolical agent into the unopened cyst is not recommended by most of the clinicians. In the current study, postoperative biliary leak was seen in three patients, which stopped spontaneously after 7–10 days in two patients. However, one patient needed ERCP and sphincterotomy. Rooh-ul-Muqim et al.⁹ documented postoperative biliary leak in four (10%) patients out of 40 patients. Yağmur et al.¹³ reported postoperative leak in seven (15.91%) patients out of 44 cases, of which five cases were conservatively managed, whereas the remaining two cases required ERCP. Other authors have reported a higher incidence of postoperative biliary fistula rate of 36.7%.¹² Several studies have also reported other complications such as port-site infection and port-site hernia in 7.69 and 3.84%, respectively.^{14,15} However, these complications were not encountered in the current study.

The mean stay in hospital in the present study was 3.40 days which was in agreement with results of several studies.^{5,14–17} In our study, patients resumed their routine work in 8.10 days. This was because of the minimal invasive approach of laparoscopic which is in accordance to the results of other studies.^{16,17} Over a follow up period of more than 18 months a low recurrence rate of 2.85% was seen due to preoperative and postoperative use of albendazole in all patients. On the other hand, several studies^{18,19} have reported no recurrence in patients treated with Albendazole. Similarly, Nooghabi et al.²⁰ have also reported no recurrence after laparoscopic management of these patients with a mean follow-up period of 17.86 months. Tai et al.²¹ reported only one (2.27%) case of recurrence, after they have followed cases for a median of 25 months.

Limitations

Since the large surgical packs are not used in laparoscopic hydatid surgery, there will always be a theoretical risk of increased dissemination of disease as compared to open surgery. All the necessary precautions need to be taken to decrease the dissemination of disease which includes using high pressure suction devices, repeated aspiration, and irrigation of cyst several times before evacuation of solid contents, very careful and smooth evacuation of membranes and daughter cysts and using endobags if available for evacuation of contents of cyst.

CONCLUSION

Based on the results of our study, we conclude that selective use of laparoscopic approach in hydatid disease is safe and

feasible modality of management as it is associated with lesser postoperative morbidity, lesser hospital stay, low mortality, quick return to routine activities, and less recurrence. All the necessary measures should be followed during extraction of laminated membrane and daughter cyst to avoid any dissemination of the disease including the use of endobags.

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