

Original article:

Study of role of laparoscopic cystectomy and pericystectomy in liver hydatid disease

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Abstract:

Background: Liver hydatid disease, caused by the parasite *Echinococcus granulosus*, poses a significant global health challenge. This study aims to evaluate the role of laparoscopic cystectomy and pericystectomy in managing liver hydatid disease, considering demographic, clinical, and surgical factors.

Methods: A prospective interventional study was conducted from August 2020 to November 2022, involving 23 cases meeting inclusion criteria. Clinical data, radiological findings, operative parameters, complications, and outcomes were analyzed. Statistical analyses were performed to assess associations and trends.

Results: The majority of cases were aged 21-30 years (47.9%), predominantly male (69.6%), and presented with symptoms like abdominal lump (60.9%) and pain (47.8%). WHO classification revealed CE3A as the most common (56.5%). Mean cyst diameter was 6.52 cm. Operative time varied significantly with WHO classification. Intraoperative complications occurred in 4.3% of cases. Conversion to open surgery was necessary in 4.3% due to bleeding and adhesions. Postoperative complications included atelectasis (8.7%), fever (13%), port-site infection (4.3%), and bile leak (4.3%). Recurrence was absent. The mean postoperative hospital stay was 6.74 days, with a learning curve observed.

Conclusion: Laparoscopic cystectomy and pericystectomy exhibit promising outcomes in liver hydatid disease management, with low recurrence rates and shorter hospital stays. Expertise and tailored patient selection are vital for optimizing outcomes. Further research is needed to enhance understanding and refine surgical protocols.

Keywords: Liver hydatid disease, laparoscopic cystectomy, pericystectomy, complications, recurrence, surgical outcomes.

Introduction:

Liver hydatid disease, caused by the parasitic tapeworm *Echinococcus granulosus*, remains a significant public health concern in many regions worldwide. ¹Traditional surgical approaches for managing liver hydatid cysts involved open surgical techniques, which often presented higher morbidity rates, prolonged hospital stays, and increased postoperative pain. In recent decades, the advent of minimally invasive surgery, particularly

laparoscopic techniques, has revolutionized the field of hepatobiliary surgery. ²Laparoscopic cystectomy and pericystectomy have emerged as promising alternatives to open surgery for the management of liver hydatid disease. Laparoscopy offers several potential advantages, including reduced postoperative pain, faster recovery, shorter hospital stays, improved cosmetic outcomes, and decreased risk of wound-related complications.^{3,4,5}

The shift towards laparoscopic approaches has sparked a growing body of research aimed at evaluating the role of laparoscopic cystectomy and pericystectomy in the treatment of liver hydatid disease.⁶ Comparative studies have sought to assess the safety, efficacy, and long-term outcomes of these minimally invasive techniques in comparison to traditional open procedures. Understanding the evolving role of laparoscopic interventions in liver hydatid disease is crucial for optimizing patient care and refining surgical protocols. With this view, we planned to study role of laparoscopic cystectomy and pericystectomy in liver hydatid disease

Material and methods:

This prospective interventional study was conducted at a hospital-based setting from August 2020 to November 2022, aiming to assess the role of laparoscopic cystectomy and pericystectomy in the management of liver hydatid disease.

Inclusion Criteria: A total of 23 cases were included in the study if they met the following criteria:

- Patients presented with liver hydatid disease confirmed by ultrasound (USG).
- Hydatid cyst size between 5-10 cm.
- Gharbi type I, type II, or type III cysts.
- Unruptured liver hydatid cyst.
- Non-calcified hydatid cyst.

Exclusion Criteria: Patients were excluded from the study if they had:

- Deeply situated intraparenchymal cyst.
- Inaccessible posterior cyst.
- Cyst size larger than 10 cm.
- Gharbi type IV or type V cysts.
- Cyst impinging on major hepatic veins, inferior vena cava, or liver hilum.
- Ruptured hydatid cyst.
- Disseminated hydatid disease.
- Calcified hydatid cyst.
- Immunocompromised status.
- Unfit for general anesthesia.

Data Collection:

1. Preoperative assessment included age, sex, and history of previous abdominal surgery.
2. Routine laboratory investigations: Complete blood count, liver function tests, renal function tests, and random blood sugar.
3. Ultrasonography (USG) of the abdomen and pelvis for hydatid cyst classification (Gharbi and WHO classifications).
4. Chest X-rays to rule out lung hydatid cyst.

5. Contrast-enhanced computed tomography (CECT) of abdomen and pelvis to determine cyst's proximity to vital structures.

Albendazole Treatment: All patients received albendazole at a dose of 10-15 mg/kg of body weight once a day for 14 days prior to surgery.

Preoperative Workup: Routine investigations for anesthesia fitness were performed, and fully informed consent was obtained from each patient, including a discussion about the potential risk of conversion to an open procedure. Prophylactic antibiotics were administered before surgery.

Anesthesia: All patients underwent laparoscopic surgery under general anesthesia.

Laparoscopy Unit: The laparoscopic unit was equipped with essential tools including a video camera, high-intensity light source, high-flow CO2 insufflator, electrocautery, harmonic scalpel, Palanivelu Hydatid System (PHS), and 12 mm, 10 mm, and 5 mm ports. Veres needle was used for initial insufflation.

Results :

In the present study, majority i.e., 47.9% of the cases were in the age group of 21 – 30 years followed by 21.8% in the age group of 31 – 40 years. The mean age of the cases was 33.78 years and median age was 30 years with a standard deviation of 9.96 years.

In the present study, 69.6% (16) of the cases were males and 30.4% (7) of the cases were females.

In the present study, lump in the abdomen was the most common symptom seen in 60.9% of the cases followed by pain in abdomen, jaundice, fever, and early satiety in 47.8%, 13%, 8.7% and 4.3% of the cases respectively.

In the present study, 56.5% of the cases belonged to class CE3A, 21.7% in class CE2 and 13% and 8.7% of the cases in class CE3B and CE1 of WHO classification respectively.

In the present study, size of cyst ranges from 5cm to 9.5 cm . Largest cyst was of size 9.5 cm in diameter. The mean diameter of the cyst was 6.52 centimetres with a standard deviation of 1.24 centimetres.

In the present study, the mean operative time was more i.e., 199.2 minutes in cases belonging to WHO CE2 class followed by 185.0, 172.15 and 167.67 minutes in CE1, CE3A and CE3B respectively. The difference was found to be statistically significant.

Table 1: Distribution of cases by Intra-OP Complications

Intra-OP complications	N = 23	Percentage
Hollow viscous Injury	0	0%
Contamination with Scolices	0	0%
Anaphylaxis	0	0%
Excessive Blood loss	1	4.3%
None	22	95.7%

In the present study, intra-OP complications were seen 1 patient i.e. 4.3% of the cases.

Table 2: Rate and cause of Conversion TO OPEN PROCEDURE

Sr. No	Cause of Conversion	No. of Patients	% of Conversion
1	Bleeding	1	4.31%
2	Hollow viscous injury	0	0%
3	Adhesions	1	4.31%
4	Instrumentation Failure	0	0%

The conversion to open surgery was seen 1 patient i.e. 4.3% of the cases. The cause for conversion was excessive bleeding , dense adhesions between cyst and biliary radicles .

Table 3: Post-op complications

Post-OP complications	No of patients	Percentage
ATELECTASIS	2	8.7 %
FEVER	3	13.0%
PORT SITE INFECTION	1	4.3%
BILE LEAK	1	4.3%
None	20	86.9%

In present study ,2 patients(8.7%) had atelectasis , 3 pt had fever , 1 pt had port site infection,1 pt had Bile leak in postoperative period .

Patient who had bile leak also had fever and port site infection .Another 2 patients had Atelectasis and fever . So total 3 patients (13.04%)had post operative complications among 23 patients. No post operative complication observed in 20 patients (86.9%).

Table 4: Distribution of cases by Length of Post operative hospital stay

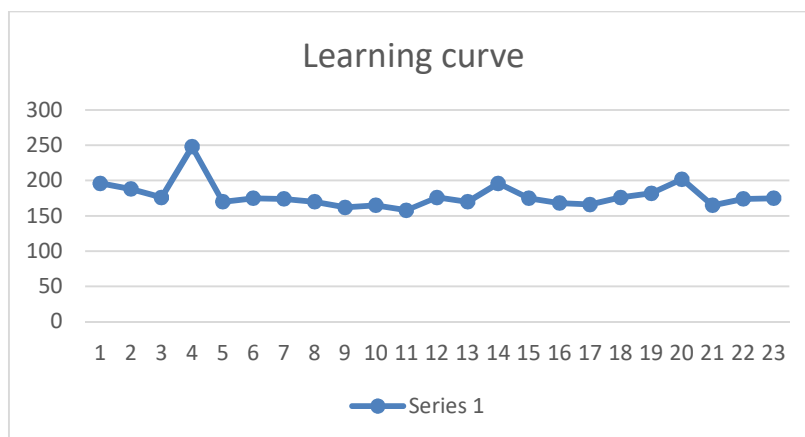
Length of stay (in days)	N = 23
Mean days	6.74
Median	6.00
Standard deviation	1.91

In the present study, the mean duration of post operative hospital stay was 6.74 days with a standard deviation of 1.91 days. 1 patient had longer stay for 14 days due to bile leak in post operative period which was managed conservatively. This was the same patient which was converted to open procedure due to intra operative excessive blood loss ,dense adhesions between cyst and biliary radicales , common bile duct ,difficulty in approaching the cyst laparoscopically.

Table 5 : Distribution of cases by recurrence

Recurrence	Number	Percentage
Yes	0	0%
No	23	100%
Total	23	100%

In the present study, recurrence was seen in 0% of the cases.



Graph: It was observed that there is slow and steep learning curve of this procedure (Laparoscopic cystectomy and pericystectomy) and operative time decreases as expertise of surgeon increases.

Discussion:

Liver hydatid disease remains a significant health concern, necessitating effective management strategies to optimize patient outcomes. The present hospital-based, prospective interventional study aimed to evaluate the role of laparoscopic cystectomy and pericystectomy in treating liver hydatid disease, considering various clinical, radiological, and operative parameters. The study sheds light on the demographic distribution, clinical presentation, surgical outcomes, and postoperative complications, providing valuable insights for clinical practice and future research endeavors.^{8,9}

The study cohort predominantly consisted of young adults, with nearly half (47.9%) falling within the age range of 21-30 years. This age distribution aligns with the epidemiological patterns of liver hydatid disease, which often affects individuals in their economically productive years. The predominance of males (69.6%) in the study cohort is consistent with previous reports, possibly attributed to occupational or behavioral factors exposing them to the parasitic infection.¹⁰ Lump in the abdomen emerged as the most common presenting symptom (60.9%), underscoring the importance of early detection and intervention. Pain in the abdomen (47.8%), jaundice (13%), fever (8.7%), and early satiety (4.3%) were also observed. These findings emphasize the diverse clinical manifestations of liver hydatid disease and highlight the need for a comprehensive diagnostic approach.¹¹

The study employed Gharbi and WHO classifications to characterize hydatid cysts. The majority of cases (56.5%) belonged to WHO class CE3A, indicating active cysts with daughter vesicles and solid components. This distribution aligns with the literature, reflecting the variable stages of cyst development and highlighting the challenge of determining the appropriate surgical approach based on cyst morphology.¹²

The mean cyst diameter of 6.52 cm highlights the variety of cyst sizes encountered in clinical practice. Additionally, the study demonstrated a statistically significant association between WHO classification and operative time. This finding suggests that cyst morphology and complexity influence the surgical duration, indicating the need for tailored surgical strategies based on cyst characteristics.

Intraoperative complications were rare (4.3%), with excessive blood loss being the most frequent complication. Conversion to open surgery occurred in a minority of cases (4.3%) due to bleeding and dense adhesions, reflecting the technical challenges of laparoscopic intervention in advanced cases. Postoperative complications, including atelectasis (8.7%), fever (13%), port-site infection (4.3%), and bile leak (4.3%), were

observed in a subset of patients. While the overall complication rate was relatively low (13.04%), these findings underscore the importance of vigilant postoperative care and patient monitoring.

Notably, the study reported no cases of recurrence, suggesting that laparoscopic cystectomy and pericystectomy may offer effective and durable outcomes in appropriately selected patients. The mean length of postoperative hospital stay was 6.74 days, aligning with the trend towards shorter hospital stays observed in minimally invasive procedures. The longer hospital stay for the patient with bile leak, who also underwent conversion to open surgery, underscores the impact of intraoperative factors on postoperative outcomes. The study also revealed a learning curve associated with the procedure, as evidenced by a decrease in operative time as surgeon expertise increased. This finding highlights the importance of surgical training and proficiency in achieving optimal outcomes with laparoscopic cystectomy and pericystectomy.

Conclusion:

The findings suggest that these minimally invasive techniques offer promising results in terms of operative feasibility, low recurrence rates, and shorter hospital stays. However, the study also emphasizes the need for meticulous patient selection, surgical expertise, and comprehensive postoperative care to mitigate potential complications and ensure optimal patient outcomes. Future research with larger sample sizes and longer follow-up periods may further elucidate the role of laparoscopic approaches in the management of liver hydatid disease and contribute to the refinement of surgical protocols.

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