**Original Research Article**

**Surgical Management and Outcomes of Hepatic Hydatid Cysts: A Clinical Analysis**

**Abstract**

**Background:**
Hepatic hydatid disease, caused by the larval stage of Echinococcus granulosu, is a parasitic infection primarily affecting the liver and lungs. Surgical management remains the primary treatment for hepatic hydatid cysts, particularly for larger or complicated cases. This study aims to analyze the outcomes, complications, and recurrence rates associated with surgical intervention in hepatic hydatid cysts.

**Methods:**
A retrospective review was undertaken involving ten patients who received surgical intervention for hepatic hydatid cysts at Dr. MK Shah Medical College and Research Centre in collaboration with Smt. SMS Multispeciality Hospital, Ahmedabad, from November 2022 to December 2024. Data were collected on cyst characteristics, surgical approach, postoperative complications, hospital stay, and recurrence rates. Surgical techniques included laparoscopic and open approaches, with procedures such as partial and total pericystectomy. Statistical evaluation was carried out using chi-square and Student’s t-tests.

**Results:**
The cohort had a mean age of 32.7 years (range-19 to 55 years). The right hepatic lobe, particularly segments VII and VIII, was the most frequent site of cyst localization (7 patients). Laparoscopic surgery was performed in 6 cases, while 4 underwent open surgery. The most frequent postoperative complications included bile leak (4 cases) and surgical site infections (3 cases). Average hospital stay was 16.9 days, with a range between 10 and 25 days. The recurrence rate was 40%, with 4 cases showing cyst recurrence, particularly in patients who previously underwent laparoscopic partial pericystectomy. Statistical analysis showed no significant correlation between cyst size and surgical approach or hospital stay.

**Conclusion:**
Laparoscopic surgery is a viable option for hepatic hydatid cyst management, offering advantages such as reduced morbidity and improved recovery. However, open surgery remains essential for complex or recurrent cases. Bile leaks and surgical site infections are the most common postoperative complications, requiring careful management. Recurrence remains a concern, particularly with partial pericystectomy, highlighting the need for long-term follow-up.

**Keywords:** Hydatid cyst, *Echinococcus granulosus*, hepatic hydatid disease, laparoscopic surgery, open surgery, recurrence, postoperative complications.

**Introduction**

The zoonotic parasite infection known as hydatid disease is spread on by the larval form of Echinococcus granulosus, also referred to as the dog tapeworm [7]. Although the condition has a global distribution, its prevalence is notably higher in tropical regions and significantly lower in temperate zones. In the United Kingdom, for instance, sporadic cases are primarily reported from rural sheep-rearing areas. Cystic echinococcosis (CE), a common manifestation of this disease, tends to occur in regions with extensive livestock farming, particularly where sheep and cattle are raised [8]. Endemic zones include Mediterranean countries, the Middle East, Central Asia, South America, Africa, and New Zealand. Within India, the southern states—particularly Andhra Pradesh and Tamil Nadu—report a high disease burden. Additionally, regions such as Rajasthan and Jammu & Kashmir also show considerable incidence due to widespread sheep farming practices [9]. In Gujarat, the Saurashtra and Kutch regions are recognized as endemic pockets, likely attributable to prevalent cattle rearing. The liver is the most frequently involved organ (75%), followed by pulmonary involvement (15%), with less common sites including skeletal muscle (4%), kidneys (2%), spleen (2%), and bones (1%) [10]. A less common form, caused by Echinococcus multilocularis, occurs in colder climates and is characterized by invasive growth from the outset rather than by expansile cystic enlargement.

While pharmacologic therapy with albendazole is employed in selected cases, particularly smaller or uncomplicated cysts, surgical intervention continues to be the cornerstone of management for larger or symptomatic lesions. Surgical excision of hydatid cysts dates back to the 17th century and has remained a consistently effective approach, even with advances in medical therapy [11]. Interventional treatment is considered essential for symptomatic cysts and strongly advised in viable lesions due to the risk of serious complications. Surgical management may be undertaken using either a traditional open technique or a minimally invasive laparoscopic method. Numerous studies have reported favorable outcomes with laparoscopic procedures involving drainage and partial cyst wall excision. Compared to open surgery, laparoscopy offers advantages such as reduced postoperative morbidity, improved cosmetic results, and lower overall healthcare costs. The current study focuses on evaluating postoperative results, associated complications, and recurrence rates in patients undergoing surgical treatment for hepatic hydatid cysts.

**Aims:** To analyse the results and outcomes associated with the surgical management of hepatic hydatid cysts.

**Objectives:**

* To evaluate the site of hydatid cyst and surgical approach used.
* To evaluate the post-op complications.
* To evaluate the management of the post-op complications.
* To evaluate the recurrence rate after the surgery.

**Materials and Methods**

This study was conducted in the Department of General Surgery at Dr. MK Shah Medical College and Research Centre, in collaboration with Smt. SMS Multispeciality Hospital, located in Chandkheda, Ahmedabad, over the period from November 2022 to December 2024.

A retrospective analysis of 10 patients diagnosed with liver hydatid cysts and treated surgically between 2022 and 2024 was conducted. The parameters studied included demographic details, cyst characteristics, surgical techniques employed, postoperative complications, hospital stay duration.

Patient detailed history regarding the complain, past history, surgical history, and detailed laboratory investigation and radiological investigation (USG Abdomen and pelvis and CECT Abdomen and Pelvis) were done to confirm the diagnosis. All patient before going for surgical management were given tablet albendazole for 14 days. Surgical management strategies employed in this study included both total and partial pericystectomy, performed via either open or laparoscopic approaches. Partial pericystectomy entails excising the outer portion of the pericystic wall at the interface with the liver parenchyma. Following aspiration of the cyst contents, the residual cavity remains intact and necessitates additional measures such as drainage or closure. In contrast, total pericystectomy involves complete excision of the cyst along with a margin of surrounding liver tissue, ensuring removal without spillage of its contents. For laparoscopic procedures, an initial 10-mm supraumbilical port was created to introduce a 30-degree laparoscope after insufflating the abdominal cavity with carbon dioxide to establish adequate working space. Additional ports were placed under direct vision: a 10-mm working port near the epigastric region adjacent to the cyst, and two 5-mm accessory ports strategically positioned based on cyst location. Any adhesions between the cyst and adjacent structures were carefully dissected. The cysts were isolated from the peritoneal cavity using gauze pads soaked in cetrimide solution to minimize the risk of spillage. Aspiration was carried out by puncturing the cyst with a vacuum cannula. In cases where no communication with the biliary system was evident, the cavity was irrigated with a scolicidal agent. An auxiliary suction cannula was maintained near the puncture site throughout the procedure to avoid leakage of hydatid fluid. Once aspiration was complete, the cyst wall was incised, and the internal contents were retrieved using an endoscopic retrieval bag. After complete evacuation and parasite inactivation, cavity management included drain placement or omentoplasty, depending on the intraoperative findings. In open surgical procedures, access was gained via a supraumbilical midline or subcostal incision. Adhesiolysis was performed when cysts were adherent to adjacent organs. The operative field was isolated using cetrimide-soaked pads to prevent contamination. The cyst was then aspirated five minutes after injection of the inactivating agent. The cyst wall was subsequently opened at the aspiration site, and the germinal layer along with any daughter cysts was meticulously removed. Appropriate surgical intervention for the residual cavity followed. Open total pericystectomy mirrored the laparoscopic method in technique, with the advantage of specimen removal being simplified through the larger laparotomy incision. Follow up for recurrence was done at Post-op day 7th, post-op day 15th, post-op day 30th, post-op day 45th, post op day 60th and 6months post-op and patient complains, physical examination and radiological investigation was done. Data was collected from hospital record and was tabulated in the format as below for analysis. Data was analysed with chai square and t-test.

**Results**

**Table 1: Statistical analysis**

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| **Age (years)** | Mean: 32.7, Range: 19–55 |
| **Cyst Size (cm)** | Mean: 8.05, Range: 6.3–12.67 |
| **Hospital Stay** **(days)** | Mean: 16.9, Range: 10–25 |
| **Cyst location** |  Right lobe involvement: 7 cases (Segments 7 & 8 most common): mode Left lobe involvement: 2 cases Both lobes involvement: 1 case |

**Table 2: Surgical Approach Distribution**

|  |  |
| --- | --- |
| **Approach** | **Number of Cases** |
| Laparoscopic | 6 |
| Open | 4 |

**Table 3: Post- op Complication Frequency**

|  |  |
| --- | --- |
| **Post- op Complication** | **Number of Cases** |
| Bile leak | 4 |
| Surgical site infection | 3 |
| Pleural effusion | 1 |
| Recurrence  | 4 |
| No complications | 2 |

**Table 4: Bile leak**

|  |  |  |
| --- | --- | --- |
| Case number | Surgical approach  | Management |
| Case 2 | Laparoscopic | Conservative with drain output monitoring |
| Case 4 | Laparoscopic | Conservative than ERCP and stenting |
| Case 5 | Open  | Conservative with drain output monitoring |
| Case 7 | Laparoscopic  | Conservative and pig tail insertion. |

**Table 5: Surgical site infection**

|  |  |
| --- | --- |
| Case number | Surgical approach |
| Case 3 | Open |
| Case 6 | Laparoscopic  |
| Case 10 | Open  |

**Table 6: Hospital stay**

|  |  |
| --- | --- |
| **Hospital Stay** **(days)** | Mean: 16.9, Range: 10–25 |

**Table 7: Recurrence Rate**

|  |  |
| --- | --- |
| **Recurrence** | **Number of Cases** |
| Yes | 4 |
| No | 6 |

#### **Table 8:** **Correlation Analysis**

|  |  |  |
| --- | --- | --- |
| **Variable 1** | **Variable 2** | **Correlation (r)** |
| Cyst Size | Hospital Stay | 0.258 |
| Cyst size | Surgical approach | -0.24 |

Weak correlation between cyst size and hospital stay. There is no strong correlation between cyst size and the choice of surgical approach (laparoscopic vs. open).

#### **Table 9: T-test: Hospital Stay by Surgical Approach**

|  |  |  |
| --- | --- | --- |
| **Comparison** | **T-Statistic** | **P-Value** |
| Laparoscopic vs. Open Surgery | -0.070 | 0.946 |

No significant difference in hospital stay between laparoscopic and open surgery (**p > 0.05**).

**In this study, 10 patient who underwent surgical management of liver hydatid cyst were taken.** The study population consisted of individuals aged between **19 and 55 years**, with a mean age of **32.7 years**. The size of the cysts varied, with the smallest measuring **6.3 cm** and the largest reaching **12.67 cm**, resulting in a mean cyst size of **8.05 cm**. The length of hospitalization varied between 10 and 25 days, with a mean duration of 16.9 days.

Several postoperative complications were recorded, affecting a significant proportion of patients. **Bile leaks** were the most frequently observed complication, occurring in **four cases**. Management strategies for bile leaks varied, including **conservative treatment with drain output monitoring**, **endoscopic retrograde cholangiopancreatography (ERCP) with stenting**, and **pigtail insertion** to manage drainage. Additionally, **surgical site infections** were noted in **three patients**, with **two cases occurring after open surgery** and **one following laparoscopic surgery**. A single patient developed **pleural effusion**, requiring further medical attention. The **recurrence rate** of cysts was **40%**, as four patients experienced recurrence post-surgery, while six showed no signs of recurrence. In contrast, only **two patients** had an entirely complication-free recovery.

**Discussion**

The presented case series analyzes ten patients who underwent surgical management for liver cysts, highlighting key factors such as surgical approach, complications, and outcomes.

The patients in this study ranged from 19 to 55 years of age, with a higher prevalence in females (7 out of 10 cases). The most common clinical symptoms included right upper abdominal pain, fever, and vomiting. Interestingly, one patient presented with fever and cough, which is an atypical manifestation likely due to an associated pleural effusion or infection.

The cysts were located in different segments of the liver, with both right and left lobes being involved. Segment 7 and 8 of the right lobe were the most frequently affected regions. The size of the cysts varied considerably, ranging from 5.0 cm to 14 cm in diameter.

Laparoscopic surgery was performed in 6 out of 10 cases, while the remaining 4 cases required open surgery. There is no strong correlation between cyst size and the choice of surgical approach (laparoscopic vs. open). This suggests that factors other than cyst size (e.g., location, surgeon preference, or patient condition) played a role in deciding the surgical method.

As in case number 4 cyst was located in left lobe which was easily approached anteriorly by laparoscopically, in case number 3 it was a case of recurrent hydatid cyst so open approached was used.

Among the surgical procedures performed, partial pericystectomy was the most common, with some cases requiring omentoplasty. Total pericystectomy was performed in one patient, who later developed surgical site infections.

Complications occurred in 7 out of 10 cases, with bile leak (4 cases) and surgical site infections (3 cases) being the most frequently encountered issues. Other complications included pleural effusion and the requirement for interventional procedures such as ERCP with stenting and pig-tail insertion.

Conservative management was successfully employed in most cases, wherein for one bile leak that required procedure ERCP and stenting whose initial bile output was less than 300 ml in a day which decreased in few days then again output increased up to 800ml per day after post-op day 12, so ERCP and stenting was done on pod 15 and drain output was monitored till post-op day 25 when drain output was less than 20ml in 24 hours.

While in one case there was no drain put postoperatively, on ultrasound examination in post-op period was showing bile leak so pig tail insertion near the leak site was put on post-op day 4.

While in rest two cases of bile leak were managed conservatively monitoring the output of drain and removed when it was less than 20ml in 24 hours.

Surgical site infections were managed with dressing changes and, in one instance, resuturing. Surgical site infection was seen in 3 cases and was more common with open approach.

Recurrence was noted in 3 out of 10 cases, two of them was earlier operated laparoscopically and it recurred again, one was recurrent hydatid cyst of liver suggesting that while surgical intervention is largely effective, complete eradication may not always be achieved, particularly in cases managed with partial peri cystectomy.

The length of hospital stay varied from 10 to 25 days, with more severe complications, there was longer hospital stay. The highest hospital stay (25 days) was recorded in a patient with a bile leak requiring endoscopic intervention. There was no correlation between the hospital stay and the surgical approach used.

**Conclusion:**

This study underscores the importance of individualized surgical planning in liver cyst management. While laparoscopic approaches are minimally invasive and preferred for smaller cysts, open surgery remains essential for larger or more complicated cases (recurrent hydatid cyst, earlier laparoscopic approach and then recurred. Postoperative complications, particularly bile leaks and surgical site infections, pose significant challenges, necessitating careful postoperative monitoring and intervention. Recurrence remains a concern, especially in cases of partial pericystectomy, indicating the need for long-term follow-up to optimize patient outcomes.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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