

ORIGINAL RESEARCH

The Fate of Management of Hydatid Disease considering the Demographic & Clinical Profile – A Descriptive Study

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ABSTRACT

Background:Hydatid disease, a zoonotic infection caused by *Echinococcus* species, primarily affects the liver and lungs. The study aimed to analyze the demographic characteristics, clinical presentation, and treatment outcomes of patients diagnosed with hydatid disease.**Material and Methods:**This descriptive observational study was conducted at the Department of Surgery, LN Medical College, and JK Hospital, Bhopal, over 30 months. Twenty-two patients diagnosed with hydatid disease were included. Data were collected on demographics, clinical presentation, organ involvement, imaging findings, treatment modalities, and outcomes. **Results:**The mean age of the 22 patients was 37.5 ± 11.2 years, with males comprising 63.6%. Common comorbidities included diabetes mellitus (27.2%) and hypertension (18.2%). The liver was the most commonly involved organ (68.2%), followed by the lungs (27.3%) and spleen (4.5%). Most cysts were unilocular (CE1, 45.5%), with an average size of 8.6 ± 3.1 cm. Surgery was performed in 77.3% of cases, with a mean operative time of 85.4 ± 28.7 minutes. Postoperative complications were minimal (14.3%), with no recurrences observed. **Conclusion:**Hydatid disease predominantly affects the liver and lungs, requiring a multidisciplinary approach for diagnosis and treatment. Surgical intervention remains the cornerstone of management, complemented by antiparasitic therapy. Early diagnosis and tailored management strategies result in favorable outcomes.

Keywords: Hydatid disease, *Echinococcus*, Liver cysts, Lung cysts, Surgical management, Zoonotic infection, Clinical outcomes, Antiparasitic therapy.

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INTRODUCTION

Hydatid disease, also known as echinococcosis, is a parasitic zoonosis caused by the larval stage of *Echinococcus* species, predominantly *E. granulosus* and *E. multilocularis*^[1]. It remains a significant public health concern, particularly in regions where livestock rearing is prevalent, and close interaction between humans and intermediate hosts facilitates its transmission^[2,3]. The disease is endemic in various parts of the world, including the Mediterranean region, the Middle East, South America, and parts of Africa and Asia^[2,3]. However, sporadic cases are also reported in non-endemic areas due to increased travel and migration^[4,5].

Humans become accidental hosts through the ingestion of *Echinococcus* eggs, typically from contaminated water, soil, or food^[5]. Once inside the host, the eggs hatch into oncospheres that migrate through the bloodstream to various organs, most

commonly the liver and lungs, forming characteristic hydatid cysts^[5]. Clinical manifestations depend on the cyst's location, size, and complications, ranging from asymptomatic cases to severe morbidity due to rupture, secondary infection, or anaphylaxis^[5].

The diagnosis of hydatid disease often relies on a combination of imaging techniques, including ultrasound, computed tomography (CT), and serological tests^[5,6]. Treatment modalities include surgical removal of cysts, percutaneous aspiration, and antiparasitic therapy, particularly with albendazole or mebendazole^[7,8]. The choice of treatment is guided by the cyst's size, location, and stage, as well as the patient's clinical status and resources available^[7,8]. This descriptive study aims to analyze cases of hydatid disease, detailing their demographic characteristics, presenting clinical features, and outcomes of various treatment modalities admitted at the study institute.

MATERIAL AND METHODS

Study Design: This study was a descriptive, observational study conducted to analyze the demographic profile, clinical features, and treatment outcomes of patients diagnosed with Hydatid disease.

Study Settings: The study was conducted in the Department of Surgery, LN Medical College and associated JK Hospital, Bhopal.

Ethical Clearance: The study protocol, data collection forms, and informed consent documents were meticulously reviewed by the Institute's Ethical Committee to ensure adherence to ethical standards. The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki, ensuring respect for human dignity, patient rights, and safety throughout the research process.

Study Duration: The total duration of the present study was 30 months: April 2022 to October 2024.

Primary Outcome: The primary outcome was the treatment outcome of Hydatid disease, including clinical improvement, recurrence, or complications.

Study Universe: The study universe included all patients presenting to the Department of Surgery, LN Medical College, and associated JK Hospital, Bhopal, during the study period. The participants for the present study were recruited from this pool of patients.

Study Participants: The participants for the present study were patients diagnosed with Hydatid disease during the recruitment period. Eligible participants were selected based on specific inclusion and exclusion criteria to ensure the accuracy and relevance of the study.

Inclusion Criteria

1. Patients diagnosed with Hydatid disease through imaging and/or serological confirmation.
2. Patients who underwent treatment (surgical or medical) for Hydatid disease at the study institute.
3. Patients who provided written informed consent.

Exclusion Criteria

1. Patients with incomplete medical records or inadequate diagnostic data.
2. Patients who declined to participate in the study.

Sample Size: Given the observational nature of the study and the rarity of Hydatid disease in the study region, all eligible patients presenting during the recruitment period were included. A total of 22 participants meeting the inclusion criteria and providing written informed consent were enrolled in the study.

Sampling Methodology: Participants were selected using a non-probability convenience sampling method. All eligible patients diagnosed with Hydatid disease during the study period who met the inclusion criteria and provided informed consent were included, ensuring feasibility and timeliness.

Participant Recruitment: Participants were recruited by the Principal Investigator in collaboration with the surgical team. All patients diagnosed with Hydatid disease during the study period were initially screened. Their medical history, imaging reports, and serological tests were assessed to ensure eligibility based on the inclusion and exclusion criteria.

Obtaining Informed Consent: The Principal Investigator obtained written informed consent from all participants using a bilingual consent form in Hindi and English. The form included details about the study's purpose, methodology, potential risks, and benefits. Participants were given sufficient time to ask questions and discuss their concerns before signing the consent form. Only those who provided signed informed consent were included in the study.

Data Sources: Data on treatment outcomes were derived from patient medical records, follow-up reports, and direct observations during clinical visits. Demographic data (age, gender, occupation) and clinical features (cyst location, size, and complications) were obtained from patient histories, imaging reports, and laboratory test results.

Data Collection Procedure: The data collection for this study followed a systematic and stepwise process to ensure completeness, accuracy, and adherence to ethical guidelines:

1. **Obtaining Informed Consent:** All potential participants diagnosed with Hydatid disease were approached by the Principal Investigator or designated study team members. Written informed consent was obtained from those willing to participate before initiating data collection.
2. **Participant Screening:** A detailed review of the participants' medical records was conducted to confirm their diagnosis and eligibility based on inclusion and exclusion criteria. Participants who met the criteria were enrolled in the study and assigned unique identification codes to ensure confidentiality.
3. **Initial Data Collection:** Demographic data, including age, gender, occupation, and place of residence, were recorded through interviews with the participants. Clinical data, such as presenting symptoms, duration of symptoms, and comorbid conditions, were documented based on patient interviews and review of medical histories.
4. **Clinical Examination and Investigations:** Data on clinical findings, such as organ involvement and cyst characteristics (location, size, and

complications), were collected from imaging reports (ultrasound, CT scans) and serological tests performed as part of routine patient care. Additional findings from physical examinations conducted by treating physicians were recorded.

5. **Treatment Data:** Information on treatment modalities (surgical or medical) was gathered, including details of the type of surgery performed or the duration and dosage of antiparasitic therapy. Treatment-related complications, if any, were noted based on clinical records and follow-up visits.
6. **Follow-Up Data Collection:** Post-treatment outcomes were assessed through follow-up visits, during which clinical improvement, recurrence, or complications were evaluated. Data on recovery time and hospital stay duration were recorded to assess treatment efficacy.
7. **Data Recording and Management:** All collected data were documented in pre-designed data collection forms. Forms were checked daily for completeness and accuracy by the study team, and discrepancies were corrected promptly. Data were then entered into an electronic database, with regular backups to ensure security and prevent data loss.

Data Quality Assurance: The Principal Investigator regularly reviewed the collected data for accuracy and completeness. The study supervisor conducted periodic audits of the data collection process to identify and address discrepancies. Ethical Committee approval included a detailed review of the data collection methodology to ensure adherence to ethical and

scientific standards. Cross-verification of data with medical records was performed to minimize errors.

Funding: There was no external funding for this study. All expenses were borne by the study institute, and the Principal Investigator covered costs related to data collection. Participants were not paid any compensation for their involvement in the study.

Conflict of Interest: The authors declare no conflict of interest in the design, implementation, or interpretation of the findings of this study. The study was conducted independently, without any influence or bias from external agencies or parties.

Statistical Analysis

The data from paper-based data collection forms were initially entered into MS Excel to create an organized dataset. The dataset was subsequently imported into Stata 17.0 for statistical and graphical analysis. All statistical and graphical analysis for this study was undertaken using Stata software version 17.0. Descriptive statistics were used to analyze the demographic profile, clinical features, and treatment outcomes of the participants. Continuous variables such as age were summarized using means and standard deviations, while categorical variables like gender, occupation, and organ involvement were expressed as frequencies and percentages. Treatment outcomes, including clinical improvement, recurrence, and complications, were analyzed in relation to independent variables. Comparisons between treatment groups (surgical vs. medical) were conducted using appropriate statistical tests.



Fig 1: Chest Xray PA View showing Hydatid cyst in left lower lobe



Fig 2: CT Abdomen showing Hydatid Cyst in Liver's Left Lobe



Fig 3: Splenic Hydatid Cyst on CT Abdomen

RESULTS

A total of 22 patients were included in this study. The mean age of the patients was 37.5 ± 11.2 years, and the majority were males (14, 63.6%). Most common comorbidity among the participants was Diabetes Mellitus (n=6, 27.2%), Hypertension (n=4, 18.2%), Anaemia (n=4, 18.2%), and Hepatitis B (n=1, 4.5%) and none had Hepatitis C and HIV. Most of the participants completed high school education and belonged to lower middle class. All patients presented

with symptoms specific to the organ affected, including abdominal pain in hepatic cases and respiratory symptoms such as cough and chest discomfort in pulmonary cases. Jaundice was seen in 4 cases (18.2%).

In this study, 15 patients (68.2%) reported a history of close contact with domestic animals such as sheep and cattle, which are recognized as intermediate hosts of *Echinococcus granulosus*. Among these, 9 patients (40.9%) also reported regular interaction with dogs,

which act as definitive hosts for the parasite. The remaining 7 patients (31.8%) denied any significant exposure to animals or their environments, suggesting potential alternative routes of transmission such as contaminated food or water.

Hematological and biochemical parameters were within normal limits for all patients. Ultrasonography (USG) was performed as the initial screening investigation, followed by contrast-enhanced

computed tomography (CECT) for anatomical delineation. The liver was the most commonly affected organ, with involvement observed in 15 cases (68.2%). The lungs were affected in 6 cases (27.3%), including 3 cases in the right lung (13.6%) and 2 in the left lung (9.1%). One case (4.5%) involved the spleen. The mean diameter of the cysts was 8.6 ± 3.1 cm ranging from a minimum of 4.5 cm to 13.4 cm (Fig 1 & 2).

Table 1: Characteristics of Participants	
Characteristics	Values
Total patients	22
Mean age (years)	37.5 \pm 11.2
Males	14 (63.6%)
Females	8 (36.4%)
Diabetes Mellitus	6 (27.2%)
Hypertension	4 (18.2%)
Anaemia	4 (18.2%)
Hepatitis B	1 (4.5%)
Hepatitis C	0
HIV	0
Education Level	Completed high school (77.3%)
Socioeconomic Class	Lower middle class (63.6%)
Symptoms - Abdominal Pain	72.3%
Symptoms – Respiratory	27.3%
Jaundice	4 (18.2%)

Table 2: Disease Characteristics	
Parameters	Values
Organ Involvement	
Liver	15 (68.2%)
Lungs (Right)	3 (13.6%)
Lungs (Left)	2 (9.1%)
Spleen	1 (4.5%)
Type of Cysts	
CE1	10 (45.5%)
CE2	7 (31.8%)
CE3	4 (18.2%)
CE4	1 (4.5%)
Contact with Animal	
Close contact with domestic animals	15 (68.2%)
Interaction with dogs	9 (40.9%)
No significant animal exposure	7 (31.8%)
Mean cyst size (cm)	8.6 \pm 3.1 (4.5 - 13.4)
Management	
Surgery performed	17 (77.3%)
Medical management	5 (22.7%)
Failed Medical Management	3 (13.6%)
Postoperative complications	3 minor (14.3%)
Recurrence	None

The hydatid cysts identified in the study were classified based on imaging and intraoperative findings. The majority of cysts were simple unilocular cysts (CE1), accounting for 10 cases (45.5%). Multilocular cysts with daughter cysts (CE2) were present in 7 cases (31.8%). Transitional forms (CE3),

characterized by partial detachment of the germinal layer, were noted in 4 cases (18.2%). One case (4.5%) exhibited complex features with calcifications indicative of inactive cysts (CE4). The procedure was completed surgically in 17 (77.3%) patients, while 5 (22.7%) were initially managed medically with

antiparasitic therapy. Among those initially managed medically— 3 patients required surgery after 1-2 months of being on medicine. Among the surgically treated cases, no conversion to alternate procedures was required. Intraoperatively, cyst characteristics such as size and location were carefully evaluated, and no major complications such as cysto-biliary communication (CBC) or dense adhesions were noted. The mean operative time for surgical cases was 85.4 ± 28.7 minutes, and intraoperative blood loss was minimal, averaging 18.3 ± 7.2 mL. Postoperative complications included wound infections in 2 (10.0%) patients, which were managed with standard wound care, and transient elevation of liver enzymes in 1 (5.0%) patient, which resolved spontaneously. There were no incidences of bile leak or other significant morbidities. The median hospital stay for surgical patients was 7 (IQR – 5 to 10) days, and all medically treated patients were followed up in outpatient settings. Postoperatively, all patients received a minimum of 3 months of oral albendazole therapy. There were no recurrences of hydatid cysts or surgery-related complications observed during the study period.

DISCUSSION

Hydatid disease, caused by *Echinococcus granulosus*, predominantly affects the liver and lungs, with occasional involvement of other organs such as the spleen, peritoneum, or retroperitoneum. In our study, 22 cases of hydatid disease were analyzed, with the majority involving the liver (68.2%) and lungs (27.3%). This organ distribution aligns with findings from Kumar et al., where the liver was the most commonly affected site (75%) followed by the lungs (15%)^[9].

Clinical and Diagnostic Insights: Imaging and serological tests remain essential in diagnosing hydatid disease. Ultrasound and contrast-enhanced CT scans were effective in delineating cyst size, location, and complications^[6,10]. Similar diagnostic strategies have been highlighted in the literature. Harouachi et al. noted the utility of abdominal CT in identifying hydatid cysts, particularly in unusual locations such as the retroperitoneum^[11]. The Gharbi classification of cysts, used to assess hydatid cyst types, further supports the importance of imaging in guiding treatment decisions^[6,10].

Management Strategies

Surgical management is the mainstay for hydatid disease, especially for large or complicated cysts^[6,8]. In our study, 90.1% of patients underwent surgical intervention, including cystectomy for liver cysts and thoracotomy for lung involvement. This approach is consistent with Kumar et al.'s findings, where partial pericystectomy was performed laparoscopically in most cases, demonstrating its feasibility and safety^[9]. Splenic hydatid cysts, as noted in a case

report by Jallali et al., often require total splenectomy due to their rarity and risk of rupture^[12]. Similarly, our study included one case of splenic hydatid disease, which underscores the need for individualized treatment based on cyst location and complexity.

Complications and Outcomes: Postoperative complications in our study were minimal, with no mortality reported. This aligns with Kumar et al., who reported a low complication rate and no recurrence with meticulous surgical techniques^[12]. Harouachi et al. also emphasized the importance of preoperative albendazole therapy to reduce cyst viability and postoperative recurrence risk, a protocol followed in our study^[11].

CONCLUSION

This study reinforces that hydatid disease requires a multidisciplinary approach, with surgery being the cornerstone of management. Early diagnosis, tailored treatment based on cyst characteristics, and adherence to protocols for minimizing intraoperative spillage are crucial for optimal outcomes. Further research with larger sample sizes is recommended to validate these findings and improve management strategies.

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