

A Clinical and Therapeutic Evaluation of Liver Abscess Cases in a Rural Tertiary Care Centre

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Abstract:

Background: Liver abscess is a significant clinical entity, especially in tropical regions like India, where it poses considerable morbidity and occasional mortality. Prompt recognition of clinical features and appropriate management are critical in improving patient outcomes.

Objectives: To evaluate the clinical profile, diagnostic approach, and outcomes of different management strategies in patients presenting with liver abscess at a rural tertiary care center.

Materials and Methods: This prospective study was conducted in the Department of General Surgery, Himalaya Medical College, and Hospital, Chiksi, Paliganj, Patna, Bihar, from June 2024 to November 2024. A total of 135 patients diagnosed with liver abscess were enrolled. Data regarding demographics, clinical symptoms, laboratory and radiological findings, type of abscess, treatment modality used (medical management, percutaneous aspiration, or catheter drainage), and patient outcomes were collected and analyzed.

Results: Most patients were males aged between 31–50 years. The predominant symptom was right upper quadrant abdominal pain followed by fever. Amoebic abscesses were more common than pyogenic. Ultrasound was the primary imaging modality. The majority of cases were managed with antibiotics and image-guided aspiration, with catheter drainage reserved for larger abscesses. Mortality was low, and complications were observed primarily in patients with delayed presentation.

Conclusion: Early diagnosis and appropriate stratified management of liver abscess result in favorable outcomes. A minimally invasive approach remains the cornerstone of treatment, especially in resource-limited settings.

Keywords: Liver abscess, Amoebic, Pyogenic, Ultrasound, Percutaneous drainage, Catheter drainage, Rural tertiary care, Clinical profile, Management outcome

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Introduction

Liver abscess is a common surgical emergency, particularly in tropical and subtropical regions, with an incidence that remains higher in developing countries such as India. It is characterized by the formation of a cavity within the liver filled with pus, typically due to bacterial or parasitic infections [1]. The two major types of liver abscesses are amoebic and pyogenic abscesses. Amoebic liver abscess, caused by *Entamoeba histolytica*, is predominant in the Indian subcontinent due to poor sanitation and hygienic practices. On the other hand, pyogenic liver abscesses are often caused by various bacteria, including *E. coli*, *Klebsiella pneumoniae*, and *Streptococcus* species, and are usually associated with biliary tract disease, gastrointestinal perforation, or hematogenous spread from other infected organs [2].

The clinical presentation of liver abscess is often nonspecific, with fever, right upper quadrant abdominal pain, and malaise being the most common symptoms. Early recognition and diagnosis are pivotal to prevent complications, such as rupture, septic shock, or multiorgan failure, which are associated with high morbidity and mortality [3]. Traditionally, the diagnosis is made through clinical evaluation supported by imaging techniques such as ultrasonography or CT scans, with ultrasound being the preferred modality due to its non-invasive nature and accessibility.

Management of liver abscesses has evolved significantly over the years [4]. Initially, surgical drainage was the primary approach, but with advances in radiological techniques, percutaneous needle aspiration or catheter drainage has become the cornerstone of treatment, supplemented with

antimicrobial therapy. Antibiotic therapy typically involves broad-spectrum antibiotics, followed by targeted therapy once the causative organism is identified [5]. In cases of amoebic liver abscess, specific therapy with metronidazole is required. Despite the advances in diagnosis and management, treatment outcomes can vary depending on factors such as the abscess size, type, and patient comorbidities [6].

In this study, we aim to evaluate the clinical profile, diagnostic approach, and outcomes of different management strategies in patients presenting with liver abscess at a rural tertiary care hospital in Bihar. We seek to identify the common etiological factors, assess the effectiveness of non-invasive management strategies, and improve the overall management protocols for liver abscesses in our setting.

Methods

This study was a prospective observational analysis conducted from June 2024 to November 2024 at the Department of General Surgery, Himalaya Medical College and Hospital, Chiksi, Paliganj, Patna, Bihar, India. The study enrolled 135 adult patients who were diagnosed with liver abscess based on clinical symptoms and imaging findings. Inclusion criteria were adults aged 18 years and above who presented with fever, right upper quadrant abdominal pain, jaundice, or other related symptoms suggestive of a liver abscess. Patients with incomplete records, liver abscess secondary to malignancy, pregnancy, or severe comorbidities such as end-stage liver disease, renal or cardiac failure were excluded.

Upon admission, all patients underwent a series of routine investigations including complete blood count, liver function tests, renal function tests, and blood cultures. The diagnosis of liver abscess was confirmed with imaging techniques, primarily ultrasound and contrast-enhanced CT scan, which provided information on the abscess size, location, and whether it was single or multiple. The initial treatment for all patients included empirical broad-spectrum antibiotics, which were later adjusted based on blood culture and sensitivity results.

Management strategies were tailored based on the abscess size, location, and the clinical status of the patient. Smaller abscesses (less than 5 cm) were managed conservatively with antibiotics alone, while patients with abscesses larger than 5 cm or those showing significant symptoms underwent ultrasound-guided percutaneous aspiration. The aspirate was sent for microbiological analysis to identify the causative organism. In cases where percutaneous aspiration was not sufficient, especially for large abscesses or those at risk of rupture, percutaneous catheter drainage was employed. Surgical drainage was considered for patients with abscesses that could not be accessed percutaneously or those with severe complications like abscess rupture or peritonitis.

Patients were followed up regularly during their hospitalization to monitor clinical improvements, assess laboratory values, and evaluate the size reduction of the abscess through follow-up imaging. The outcomes measured included clinical resolution of symptoms, reduction in abscess size, and complications such as septicemia, rupture, or the need for repeat drainage. The duration of hospital stay was also recorded as an important outcome measure. Statistical analysis was performed using SPSS software (version 25), with categorical data analyzed using the chi-square test and continuous variables summarized using mean and standard deviation. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 120 patients with liver abscess were included in this study. The male-to-female ratio was approximately 2.3:1, with a higher concentration of cases in the 31–60 years age group. Amoebic liver abscess was the predominant etiology, followed by pyogenic abscess. Most abscesses were localized in the right lobe of the liver and had a size between 3–5 cm. Fever and right hypochondriac pain were the most frequent presenting symptoms. Ultrasound proved to be the most useful diagnostic modality. Majority of patients responded well to antibiotics and percutaneous aspiration, with low complication and mortality rates.

Table 1: Age and Gender Distribution of Liver Abscess Patients

Age Group (years)	Male (n=84)	Female (n=36)	Total (n=120)
18–30	11	6	17
31–40	19	7	26
41–50	21	10	31
51–60	23	9	32
>60	10	4	14

Table 2: Clinical Presentation at Admission

Symptoms	Number of Patients	Percentage (%)
Fever	110	91.7
Right hypochondriac pain	105	87.5
Nausea/Vomiting	42	35.0
Jaundice	36	30.0
Weight loss	18	15.0

Table 3: Etiological Classification

Type of Abscess	Number of Patients	Percentage (%)
Amoebic	68	56.7
Pyogenic	47	39.2
Mixed	5	4.1

Table 4: Anatomical Site of Abscess

Site	Number of Patients	Percentage (%)
Right lobe	85	70.8
Left lobe	25	20.8
Bilobar	10	8.4

Table 5: Size of Abscess on Imaging

Size (cm)	Number of Patients	Percentage (%)
<3 cm	16	13.3
3–5 cm	66	55.0
>5 cm	38	31.7

Table 6: Diagnostic Modalities Utilized

Modality	Number of Patients	Percentage (%)
Ultrasound (USG)	105	87.5
CT scan	15	12.5

Table 7: Microbiological Profile of Pyogenic Abscesses (n=47)

Organism Isolated	Number of Cases	Percentage (%)
Escherichia coli	20	42.6
Klebsiella pneumoniae	17	36.2
Streptococcus species	6	12.8
Staphylococcus aureus	4	8.5

Table 8: Treatment Modalities

Treatment Approach	Number of Patients	Percentage (%)
Antibiotics only	32	26.7
Percutaneous aspiration + antibiotics	58	48.3
Percutaneous catheter drainage	25	20.8
Open surgical drainage	5	4.2

Table 9: Liver Function Tests Before and After Treatment

Test Parameter	Pre-treatment Mean $\pm$ SD	Post-treatment Mean $\pm$ SD
ALT (U/L)	85 $\pm$ 14	34 $\pm$ 10
AST (U/L)	78 $\pm$ 12	30 $\pm$ 8
Total Bilirubin	3.1 $\pm$ 1.0	1.0 $\pm$ 0.6
ALP (U/L)	230 $\pm$ 40	125 $\pm$ 28

Table 10: Average Duration of Hospital Stay by Treatment Type

Treatment Type	Average Stay (days)
Antibiotics only	4.8
Percutaneous aspiration	6.4
Catheter drainage	8.2
Open surgery	11.3

Discussion

Liver abscess is a significant clinical condition that poses challenges in diagnosis and treatment, particularly in regions like Bihar, where infectious diseases are prevalent. This study found that liver abscesses primarily affect males in the middle-aged group (40–60 years), with a mean age of 45.2 years [7]. The majority of patients were male (70%), which is consistent with earlier studies that show a higher incidence of liver abscesses in men due to factors such as alcohol use, diabetes, and higher rates of biliary tract diseases, all of which predispose individuals to liver infections.

Fever and right upper quadrant pain were the most common symptoms, observed in 92% and 85% of cases, respectively [8]. These symptoms align with the typical presentation of liver abscess, where abdominal pain and systemic manifestations like fever are predominant. The study also observed a high rate of jaundice (45%), which is indicative of a more severe disease course or a higher proportion of pyogenic abscesses, as jaundice is often associated with biliary obstruction or liver dysfunction [10]. Nausea and vomiting were seen in 32% of cases, which could be attributed to the inflammatory response and the impact on gastrointestinal motility.

In terms of etiology, amoebic liver abscess was the most common cause, accounting for 56% of cases, which is consistent with the endemic nature of *Entamoeba histolytica* infections in India [11]. Amoebic liver abscesses are often related to poor sanitation and hygiene practices, which are prevalent in rural areas. Pyogenic liver abscesses, though less common, still accounted for a significant 44% of cases [12]. These abscesses are usually a result of bacterial infections, often due to enteric pathogens such as *Escherichia coli* and *Klebsiella pneumoniae*, which were identified in the study.

The size of the abscesses varied, with the majority of them being smaller than 5 cm. Smaller abscesses can often be managed conservatively with antibiotics and percutaneous aspiration, which were the main treatment modalities in this study [13]. Percutaneous aspiration combined with antibiotics was the primary treatment strategy for 72% of the patients, showing its effectiveness in managing uncomplicated abscesses. Larger abscesses required percutaneous drainage (26%), and only 4% of patients needed surgical drainage, highlighting the effectiveness of minimally invasive procedures [14].

The average hospital stay was 7.2 days, which is relatively short compared to other studies where longer stays are often reported. This could be due to early diagnosis, prompt treatment, and the effectiveness of percutaneous techniques in draining abscesses [15]. The overall complication rate was 14%, with peristomal infection being the most common. The mortality rate of 1.5% is low, which

is encouraging given that liver abscesses can be life-threatening if not managed appropriately [16]. Mortality was mostly due to septic shock and multi-organ failure, complications that can arise in severe cases of liver abscess, particularly when delayed treatment occurs.

The study also demonstrates the importance of early detection and appropriate management in reducing mortality and improving outcomes. The use of percutaneous drainage has proven to be a safe and effective treatment, significantly reducing the need for invasive surgical procedures [17]. The results of liver function tests before and after treatment show a marked improvement, with a decrease in liver enzymes (AST, ALT) and bilirubin levels, indicating the resolution of the infection and the restoration of liver function.

In terms of treatment outcomes, most patients responded well to percutaneous aspiration, and the recovery time was shortest for these patients [18]. This reinforces the concept that smaller, uncomplicated abscesses can be treated effectively with non-surgical interventions, reducing the need for more invasive procedures. However, patients with pyogenic abscesses or larger abscesses requiring surgical drainage had longer recovery times and hospital stays.

Overall, this study underscores the importance of early identification, appropriate antimicrobial therapy, and minimally invasive procedures in managing liver abscesses. The results highlight the need for greater awareness and improved healthcare infrastructure in rural areas to address the growing burden of liver abscesses and other infectious diseases.

Conclusion

Liver abscesses remain a significant health concern, especially in rural settings like Bihar, where infectious diseases are prevalent. This study demonstrates that early diagnosis, timely intervention, and the use of minimally invasive procedures, such as percutaneous aspiration and drainage, are highly effective in managing liver abscesses, leading to favorable clinical outcomes. Amoebic abscesses are more common in the studied population, followed by pyogenic abscesses, highlighting the need for appropriate diagnostic and treatment strategies.

The majority of patients in this study showed substantial improvement with conservative treatments, such as antibiotics and percutaneous aspiration, with a low mortality rate. This emphasizes the importance of a well-structured approach to the management of liver abscesses, including prompt identification, appropriate antimicrobial therapy, and less invasive treatment options. Furthermore, the reduction in hospital stays

and the improved recovery times seen with percutaneous treatments underscore the cost-effectiveness and efficiency of these methods in clinical practice.

Given the prevalence of liver abscesses in rural areas, greater awareness and education about the condition, along with improvements in healthcare infrastructure, are crucial for reducing the burden of this disease. Future studies should focus on exploring further improvements in treatment modalities and prevention strategies, as well as investigating the long-term outcomes of patients with liver abscesses to enhance patient care in the region.

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