

## STUDY OF CLINICAL PATTERNS, MANAGEMENT AND OUTCOME OF LIVER ABSCESS IN A TERTIARY CARE HOSPITAL

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Received : 26/01/2023  
Received in revised form : 22/02/2023  
Accepted : 02/03/2023

### Keywords:

Abdominal pain, Alcohol intake, Diabetes, Percutaneous aspiration, Amoebic, Pyogenic Liver Abscess.

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DOI: 10.47009/jamp.2023.5.6.104

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm  
2023; 5 (6); 510-515



### Abstract

**Background:** Liver abscess is a significant health issue in developing countries like India due to tropical climate and unrestrained alcohol consumption. The study aimed to describe the aetiology, clinical presentation, management, and outcome of liver abscess patients in a tertiary care hospital. **Materials and Methods:** This prospective cohort study was conducted from January 2018 to December 2018 at the Department of General Surgery, Coimbatore Medical College and Hospital. Patients presenting to the surgery ward with clinical features of liver abscess, both diagnosed and undiagnosed, with detailed laboratory and radiological evidence. For each patient, a detailed history, clinical examination, and laboratory profiles of the patient were recorded. **Result:** Out of 50 patients, most (28%) belonged to the 31-40 age group, and most (90%) of the patients were male. The most common clinical manifestation reported was abdominal pain (96%). 84% had a history of alcohol intake, and 38% had a history of diabetes. There is no significant difference in age, number of abscesses, site of abscess, and diabetes with type of abscess, but a significant difference in alcohol intake. The outcome of the patients post-treatment was that 68.75% had resolution of abdominal pain by 3rd-day post-procedure, and about 91.67% of the patients were free of the symptom by the 7th day. There was only one mortality for the entire duration of the study, and the dead were from the amoebic liver abscess group. **Conclusion:** The study found that males were most affected, with young adults being the most affected. Percutaneous aspiration was the preferred treatment, showing better outcomes and no mortality.

## INTRODUCTION

Liver abscess is a major health issue in a developing country like India. Due to its tropical climate and unrestrained consumption of alcohol, which is a risk factor for the development of liver abscess, the prevalence of the disease has been constant over the years.<sup>[1]</sup> The liver usually manages to handle exposure to low levels of bacteria due to the presence of the reticuloendothelial system.<sup>[2]</sup> Liver abscess development occurs when an inoculum of bacteria, regardless of the route of exposure, exceeds the liver's ability to clear it. It could be due to infections of the biliary tree, portal vein, hepatic artery, or direct invasion of a nearby infection like appendicitis, peritonitis, etc. A liver abscess is a collection of purulent material in the parenchyma of the liver.<sup>[3,4]</sup> Globally, two common sources of infection, i.e., bacterial (Pyogenic) and Entamoeba histolytica (amoebic), have been identified and described

elaborately. Anatomically, a Liver abscess usually involves the right lobe. Symptoms associated may range from fever, nausea, vomiting, anorexia, and jaundice. Pain in the right hypochondrium is a late feature.<sup>[5,6]</sup> Diagnostic modalities have improved drastically over the years with ultrasonography, CT scans, etc., which has, in turn, improved the treatment of patients with either antimicrobial drugs or drainage of the abscess, depending on the severity of the disease.<sup>[7,8]</sup> For drainage, though usually ultrasound-guided percutaneous aspiration or catheter drainage is preferred, certain conditions indicate the need for open surgical drainage, which unfortunately has a higher morbidity and mortality.<sup>[9,10]</sup>

The study aimed to describe the aetiology, clinical presentation, management, and outcome of liver abscess patients in a tertiary care hospital.

## MATERIALS AND METHODS

This prospective cohort study was conducted on 50 patients with liver abscesses from January to December 2018 at the Department of General Surgery, Coimbatore Medical College and Hospital. The study received Institutional Ethical Committee approval before the initiation of the study. All participants' informed consent was obtained before their inclusion in the study.

### Inclusion Criteria

Patients above 18 years of age and patients admitted with liver abscesses in the surgical ward were included.

### Exclusion Criteria

Patients were excluded if the abscess was ruptured at initial presentation or if there was a concomitant pathology that required urgent surgical intervention like perforation, appendicitis, or carcinoma of the liver.

Patients presenting to the surgery ward with clinical features of liver abscess, both diagnosed and undiagnosed, with detailed laboratory and radiological evidence, its aetiology, history, treatment modalities (conservative, percutaneous aspiration, catheter drainage or open surgical drainage) as per standard guidelines and outcome of the disease were analysed in this study.

For each patient, a detailed history, clinical examination, and laboratory profiles of the patient were recorded. All patients underwent complete blood count, renal function test, liver function test and coagulation profile. Reference ranges were defined as per the hospital protocol. Every abscess was sent for culture, and every patient underwent a Check X-ray and Ultrasonography – abdomen and pelvis.

**Statistical Analysis:** Data were entered into MS Excel and analysed using SPSS 20. Data were expressed as frequency and percentage for categorical values. The relationship between the categorical variables was tested using the Chi-square test. A  $p < 0.05$  was considered statistically significant.

## RESULTS

Out of 50 patients, most (28%) belonged to the 31-40 age group. The mean age of the patients was 46.7 years. The youngest patient was 23 years old, and the

oldest was 75. Most (90%) of the patients were male, only 10% were female, and the male-to-female ratio was 9:1.

The most common Clinical manifestation reported was Abdominal pain (96%), followed by Fever (84%) and Right Hypochondriac Tenderness (82%). Only four patients had complaints of Weight loss.

84% had a history of alcohol intake, and 38% had a history of diabetes. A history of tuberculosis was present in 16% of patients. According to their causative organisms, the liver abscess was classified as Amoebic or pyogenic liver abscess. Out of 50 patients, 31 (60%) presented with Amoebic Liver Abscess and 19 (40%) presented with Pyogenic Liver Abscess [Table 1].

Out of 50 patients, USG Guided Percutaneous Aspiration or pigtail catheter was done in 72% (36), followed by 16% (8) in Conservative, while 6% (3) underwent open surgical drainage. The most common organism isolated was *E. coli* (45.45%), followed by *Klebsiella* (27.27%) in pyogenic liver abscesses. The other organism isolated includes *Proteus* (18.18%) and *Staphylococcus* (9.09%).

34 (68%) had elevated TLC, and 12 (24%) had anaemia. A total of 10 (20%) of the patients had elevated alkaline phosphatase with elevated SGOT in 4 (8%) and SGPT in 8 (16%) of the patients, respectively [Table 2].

In amoebic liver abscess, the age group with a maximum number of patients were 31-40 and 41-50 age groups, with each having a total of 9 patients. In pyogenic liver abscess, the age group with the maximum number of patients were 51-60, with a total of 5 patients. The association was not found to be statistically significant ( $p=0.405$ ).

Of 42 patients with single abscesses, 61.90% had amoebic liver abscesses, and 38.10% had pyogenic liver abscesses. Of those with multiple abscesses, 62.50% had amoebic liver abscesses, and 37.50% had pyogenic liver abscesses. The association was not found to be statistically significant ( $p=1$ ). Out of 39 patients with right lobe involvement, 64.10% had an amoebic liver abscess, and 35.90% had a pyogenic liver abscess. Out of those with left lobe involvement, 62.50% had an amoebic liver abscess, and 37.50% had a pyogenic liver abscess. Out of those with both lobe involvement, 33.33% had an amoebic liver abscess, and 66.67% had a pyogenic liver abscess. The association was not found to be statistically significant ( $p=0.821$ ).

**Table 1: Distribution of patient records according to the types and factors**

		Number (n=50)	Percentage
Age (in years)	20-30	6	12
	31-40	14	28
	41-50	11	22
	51-60	12	24
	>60	7	14
Gender	Male	45	90
	Female	5	10
Clinical Manifestations	Abdominal pain	48	96
	Fever	42	84
	Chills & Rigors	40	80

	Right Hypochondriac Tenderness	41	82
	Nausea & vomiting	26	52
	Jaundice	12	24
	Weight loss	4	8
Risk Factors	Alcohol	42	84
	Diabetes	19	38
	Tuberculosis	8	16
Type of Abscess	Amoebic Liver Abscess	31	62
	Pyogenic Liver Abscess	19	38

**Table 2: Distribution of Modalities of treatment, Organisms isolated, and laboratory profiles**

		Number (n=50)	Percentage
Modalities of treatment	Conservative	8	16
	USG Guided Percutaneous Aspiration or pigtail catheter	39	78
	Surgical drainage	3	6
Organisms isolated (n=11)	E. coli	5	45.45
	Klebsiella	3	27.27
	Proteus	2	18.18
	Staphylococcus	1	9.09
Investigation	Value	Number	Percentage
Hb. (g/dl)	<11 gm/dl	12	24
TLC	>11000	34	68
Bilirubin	>1.2	10	20
Urea	>40	8	16
Creatinine	>1.2	6	12
Alkaline phosphatase	>150IU/L	10	20
SGOT	>50IU/L	4	8
SGPT	>50IU/L	8	16
PTI/INR	<1.2	7	14
ESR	>20	18	36

**Table 3: Association of age, number of abscesses, site of abscess, alcohol intake, and diabetes with type of abscess**

		Amoebic Liver Abscess	Pyogenic Liver Abscess	P-value
Age (in years)	20 – 30	2 (33.33)	4 (66.67)	0.405
	31 – 40	9 (69.23)	4 (30.77)	
	41 – 50	9 (81.82)	2 (18.18)	
	51 – 60	8 (61.54)	5 (38.46)	
	>60	3 (42.86)	4 (57.14)	
Number of Abscess	Single	26 (61.90)	16 (38.10)	1
	Multiple	5 (62.50)	3 (37.50)	
Site of Abscess	Right Lobe	25 (64.10)	14 (35.90)	0.822
	Left Lobe	5 (62.50)	3 (37.50)	
	Both Lobe	1 (33.33)	2 (66.67)	
Alcohol intake	Yes	25 (78.13)	7 (21.87)	0.004
	No	6 (33.33)	12 (66.67)	
Diabetes	Yes	11 (57.89)	8 (42.11)	0.866
	No	20 (64.52)	11 (35.48)	

**Table 4: Association of type of abscess, symptoms post-treatment, and mortality**

		Day 3	Day 7
Type of abscess	Amoebic liver abscess (n=31)	20 (66.67%)	9 (18%)
	Pyogenic liver abscess (n=19)	14 (73.68%)	4 (21.05%)
Symptoms	Abdominal pain (n=48)	33 (68.75%)	11 (22.91%)
	Fever (n=42)	18 (42.85%)	22 (52.38%)
	Chills and rigours (n=40)	22 (55%)	18 (45%)
	Right hypochondrium tenderness (n=41)	6 (14.63%)	30 (73.17%)
	Nausea and vomiting (n=26)	22 (84.61%)	4 (15.38%)
	Jaundice (n=12)	Nil	3 (25%)
Mortality		Alive	Dead
	Amoebic liver abscess (n- 31)	30	1
	Pyogenic liver abscess (n- 19)	19	Nil
	Total	49	1

Out of 32 patients with a history of alcohol intake, 78.13% had an amoebic liver abscess, and 21.87% had a pyogenic liver abscess. Out of those with a history of diabetes, 33.33% had an amoebic liver abscess, and 66.67% had pyogenic liver abscess. The association was found to be statistically significant

(p=0.004). In pyogenic liver abscess, 11 patients had diabetes, and in amoebic liver abscess, eight patients had a history of diabetes. The association was statistically insignificant (p=0.866) [Table 3]. The outcome of the patients post-treatment was that 68.75% had resolution of abdominal pain by 3rd-day

post-procedure, and about 91.67% of the patients were free of the symptom by the 7th day. By the 3rd day, 42.85% of the patients had a fever, and by the 7th day, 95.23% didn't. Of the patients with right hypochondrial tenderness, 14.63% didn't have tenderness by the 3rd day and 87.8% by the 7th day. There was only one mortality for the entire duration of the study. The dead were from the amoebic liver abscess group [Table 4].

## DISCUSSION

Liver abscess has been a major health issue, especially in a tropical country like India where, statistically, the prevalence of liver abscess has been quite high as compared to other developed countries. In the present study, a study population of 50 patients were made. The incidence in the male sex was much higher as compared to the female sex in the ratio of 9:1, which is comparable to the other studies conducted. Out of the 50 patients in our study, the most common symptom encountered was abdominal pain (96%), followed by fever, which affected 84% of liver abscess patients. Chills and rigours accompanied fever in 80% of the study population. Incidence of right hypochondriac tenderness was presented in 82% of the patients, and jaundice was present in 24% of the study population. Similar to a study by Sharma et al. reported jaundice in only 12.7% of cases.<sup>[11]</sup>

In their study, Yoo et al. compared patient data between the 1970s and 1980s and reported a fall in the incidence of jaundice from 25% to 7% during this period. Co-morbid conditions were evaluated, and 38% of the study population had diabetes mellitus. A total of 16% of the patients reported a history of tuberculosis, and 84% of the population had a history of alcoholism.<sup>[12]</sup>

In this study, the most affected age group belonged between 31-50 (28%) and 51-60 (24%). Amoebic liver abscess was more commonly encountered in young adults and pyogenic liver abscess in the older age groups. In the Indian scenario, the amoebic liver abscess is predominantly a disease of young alcoholics. Therefore, the prevalence of liver abscesses is higher in the younger age groups as the amoebic liver abscess is more commonly encountered in India.<sup>4</sup> In Western countries, studies have shown that pyogenic liver abscesses involving the older age groups are more common.<sup>[13-15]</sup>

Our study showed that most patients had elevated total leukocyte counts (68%) and alkaline phosphatase in 20% of the population. Of the 50 patients, Pyogenic liver abscess accounted for 38% (19) of patients, out of which 57.89% (11) of patients showed growth in culture. The most common organism was *E. coli* (45.45%), followed by *Klebsiella* (27.27%). Amoebic liver abscess accounted for 62% (31) of patients. The study conducted by Jayakar SR et al. showed that 61.81% of patients had amoebic liver abscesses, and 38.18%

of the study population had pyogenic liver abscesses.<sup>[16]</sup>

So, the result of the present study is similar to their result, which shows that amoebic liver abscess is more prevalent than pyogenic liver abscess in the Indian subcontinent. As a tropical subcontinent, the poor living conditions and hygiene in developing countries, more patients are affected through the faecal-oral route and present with amoebic liver abscesses. In temperate and developed countries, the pyogenic liver abscess is comparatively higher. For imaging studies, we did ultrasonography of the abdomen and pelvis to identify the part of the liver affected and the number of abscesses involved. When USG was inconclusive, a CT scan was done to come to a diagnosis.

The results were that in amoebic liver abscess, from among the total number of single liver abscesses, 61.90% (26) of the patients had a single liver abscess, and pyogenic liver abscess accounted for 38.10% (16) of the single liver abscesses. In multiple abscesses, the amoebic liver abscess accounted for 62.50% (5) of the total and pyogenic liver abscess was responsible for 37.50% (3) of the total multiple liver abscesses. In amoebic liver abscess, in 25 (80.64%) patients involved the right lobe. The left lobe was involved in 5 (16.12%) patients, and both lobes were involved in 1(3.2%) patient. In pyogenic liver abscess, the right lobe is involved in 14 (73.68%) patients and the left lobe was involved in 3 (15.80%) patients. Both lobes were involved in 2 (10.53%) pyogenic liver abscess-type patients.

In a study by Mohit Bhatia et al., the right lobe was involved in 88% of the study population and 10% of the patients involving the left lobe. Both lobes were involved in 2% of the population.<sup>[17]</sup> Our study also gave similar results, with 78% of the patients with only the right lobe and 16% involving the left lobe only. In 6% of the patients, both lobes were involved. Ultrasound of the abdomen is the investigation of choice for liver abscess as it can localise the abscess and hepatic vasculature. Also, the specific segment involved can be demonstrated with the help of an ultrasound. In our study, segment VII of the right liver was most involved. As per the latest management strategy for liver abscesses and the hospital protocol, the liver abscesses were segregated according to their size and number and the lobe's involvement. Those smaller than 5 cm were treated conservatively first with antibiotics. Metronidazole 500mg intravenous thrice daily was administered for amoebic liver abscess, and a broad-spectrum antibiotic was given for pyogenic liver abscess till the culture reports were made available. Third-generation cephalosporin was the most used drug. Those patients who did not respond to antibiotics, those with a size larger than 5cm, or those with multiple liver abscesses were subjected to ultrasound-guided percutaneous aspiration or catheter drainage. Most of the patients responded to the management and showed alleviation of symptoms. Those who didn't respond or had

impending rupture were subjected to open surgical drainage.

In our study, 8 (16%) patients received conservative management only and showed resolution of symptoms. Among them, 6 (75%) were of amoebic liver abscesses, and 2 (25%) were of pyogenic liver abscesses. Due to the persistence of symptoms despite medications due to the larger size of the abscess or due to multiple abscesses, 39 (78%) patients were subjected to ultrasound-guided percutaneous aspiration or catheter drainage and responded to the treatment with resolution of symptoms. Among those 39 patients, 23 patients belonged to the amoebic category, and 16 patients belonged to the pyogenic liver abscess category. Only 3 (6%) of the study population underwent open surgical drainage due to failure of treatment via multiple (at least 3) percutaneous drainage under ultrasound guidance or catheter drainage. Of which, 2 (66.67%) belonged to the amoebic type, and 1 (33.33%) belonged to the pyogenic type. Our findings are nearly identical to the study done by Soumik Ghosh et al., in which 79% of the patients underwent percutaneous needle aspiration, among which 4% underwent open drainage due to rupture.<sup>4</sup> The outcome of the treatment was evaluated based on the improvement of the patient symptomatically and resolution of the disease as well as mortality of the patient. The symptomatic improvement was compared on the 3<sup>rd</sup> and 7<sup>th</sup> days post-treatment. Of those that presented with chills and rigours, all the patients had resolution of symptoms by the 7th day and those with nausea and vomiting. Only one patient of the amoebic liver abscess group, who was under open surgical drainage, died during this study. Hence, the total mortality of the study was 1, which showed increased mortality risk associated with open surgical drainage.

## CONCLUSION

Male gender was the most involved sex, with young adults being the most affected age group. Liver abscess was uncommon in females, and abdominal pain with fever and right hypochondriac tenderness were the most common presenting symptoms. Jaundice was not commonly seen in this study. Most patients had elevated total blood counts, and anaemia with elevated liver enzymes was occasionally encountered. Patients with a history of alcohol were one of the important risk factors. Other risk factors could not be assessed due to the small sample size. Amoebic liver abscess was more commonly encountered than pyogenic liver abscess, with the right lobe being the predominant lobe affected. Multiple liver abscesses were uncommon. Ultrasonography was the preferred method of imaging for liver abscesses. In pyogenic liver abscesses, *Escherichia coli* is the most common organism identified. Conservative management was attempted in a few smaller abscesses, and the

response was variable. Those not amenable to conservative management should undergo ultrasound-guided percutaneous aspiration or catheter drainage.

Most patients responded well to percutaneous aspiration and, hence, should be the treatment of choice for liver abscess. Finally, those patients not improving with percutaneous drainage were subjected to open surgical drainage, from among which one patient died. Hence, individualisation and personalisation of each patient with percutaneous aspiration under ultrasound guidance as the first line of management in that indicated aspiration should be the preferred line of management as it has shown better outcomes with less morbidity and no mortality in our study.

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