# **Original Research Article**

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# Liver abscess presentation and management: a retrospective study

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## **ABSTRACT**

**Background:** Liver abscess is defined as collection of purulent material in liver parenchyma which can be due to bacterial, parasitic, fungal, or mixed infection. It is a common condition across the globe. The aim was to study the clinical profile, microbiological aetiology, and investigation profile and treatment outcomes in patients with liver abscess.

**Methods:** A retrospective study was conducted from January 2010 to December 2014 on 200 consecutive liver abscess patients at Bowring and Lady Curzon hospital, BMC and RI, Bangalore, Karnataka, India. Medical records were analysed for clinical features, examination findings, laboratory investigations, radiological tests, microbiological analysis and treatment modalities. Descriptive statistics were used.

**Results:** The mean age of patients was 42.25 years. Majority were male alcoholics. The abscesses were commonly in right lobe (80%) and solitary (72%). Abscesses were predominantly amoebic in 72%. Percutaneous needle aspiration was done in 34%, pigtail drainage in 48% and surgical intervention for rupture in 4% patients. Mortality was 2.5% with all death reported in surgical group.

**Conclusions:** Amoebic liver abscess is more common than pyogenic liver abscess. Commonly occurs in young alcoholic males. Most common presenting feature is pain abdomen followed by fever. Most common sign include tender hepatomegaly. Ultrasound abdomen is useful not only in diagnosis and intervention but also in the follow up of the condition and to assess resolution.

**Keywords:** Amoebic liver abscess, Liver abscess, Lobes of liver, Pyogenic liver abscess, Percutaneous aspiration, Percutaneous catheter drainage

# **INTRODUCTION**

Liver abscess is defined as collection of purulent material in liver parenchyma which can be due to bacterial, parasitic, fungal, or mixed infection. It is a common condition across the globe. In developing countries liver abscesses are common; most result from parasitic infections, such as amoebic and (less commonly) other protozoal and helminthic organisms. In developed countries parasitic liver abscesses are rarer. In the Western world, bacterial abscesses are more common, representing a complication of an infection elsewhere. About 10 % of the world's population is infected with entamoeba, the majority with non-invasive Entamoeba

dispar. Amoebiasis results from infection with *E. histolytica* and is the third most common cause of death from parasitic disease. Invasive colitis and liver abscesses are sevenfold more common among men than among women; this difference has been attributed to a disparity in complement-mediated killing.<sup>3</sup> Patients with amoebic liver abscesses have a history of travel to (or origination from) an endemic area. Patients without a history of travel to an endemic area often have associated immunosuppression, such as HIV infection, malnutrition, chronic infection, or chronic steroid use. Co morbid conditions associated with pyogenic abscess are cirrhosis, diabetes, chronic renal failure, and a history of malignant disease. The mortality for all patients with amoebic liver

abscess is approximately 5% but when the abscess ruptures, mortality ranges from 6% to as high as 50%.<sup>4</sup>

Minimal surgical interventions like percutaneous aspiration and percutaneous drainage are better than conservative treatment for the management of liver abscesses of size >5 cm, in terms of duration to attain clinical relief and duration for which parenteral antibiotics are needed.<sup>5</sup> This study tries to retrospectively evaluate the clinical profile, the microbiological aetiology and management outcomes in patients diagnosed with liver abscess.

#### **METHODS**

It was a retrospective study conducted in the department of General Surgery of Bowring and Lady Curzon hospital, a tertiary care centre attached to Bangalore Medical College and Research Institute, Karnataka, India. The data was collected in a predesigned proforma by systemic analysis of medical records of 200 patients admitted with liver abscess from January 2010 to December 2014.

Inclusion criteria included all patients with pyogenic, amoebic and post traumatic liver abscess of either sex aged 18 years and above. Patients with age less than 18 years, abscess in close proximity to large vascular structures in liver, malignant disease of hepatobiliary system and those pregnant were excluded.

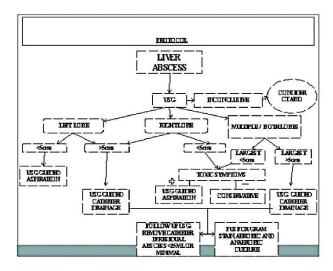


Figure 1: Protocol followed in management of liver abscess at our centre.

The medical records were reviewed with respect to history of presenting complaint and duration, risk factors for liver abscess (cirrhosis, diabetes, chronic renal failure, alcohol consumption), systemic examination findings, blood investigations (complete blood count, renal function test, liver function test), serological tests (for hepatitis B virus, hepatitis C virus, HIV) and imaging studies (ultrasonography abdomen and Chest x-ray) and the treatment protocol followed.

According to the hospital antibiotic policy patients were empirically started on intravenous ciprofloxacin 500mg q12hrly and intravenous metronidazole 500mg q8hrly until pus culture and sensitivity reports were available. Protocol followed for management of liver abscess has been shown in Figure 1. All data were collected in MS-excel sheet and analysed using descriptive statistics.



Figure 2: Ultrasound guided percutaneous needle aspiration.



Figure 3: Ultrasound guided percutaneous catheter drainage.

#### RESULTS

Medical records of a total of 200 patients with liver abscess were studied and analysed. The mean age of patients was 42.25 years (range 22 - 64). Male to female ratio was 7.33:1. Most common presenting complaint was pain abdomen in 96% (n = 192), with mean duration of 5.6 days followed by fever in 82% (n = 164). Most common finding on per abdomen examination was tender hepatomegaly in 92% (n = 184). HIV I was reactive in 5 patients and HBsAG in 8 patients and none were reactive for HCV. In our study 89% (n = 178) patients were alcoholic and 18% (n = 36) patients were diabetic.

The laboratory profile of patients has been summarized in Table 2. The most common abnormality noted was raised alkaline phosphate. Total bilirubin was raised only in 35% (n = 70) of the patients.

**Table 1: Clinical presentation of patients.** 

Features		Percentage (n = 200)
Symptoms	Pain abdomen	96% (192)
	Fever	82% (164)
	Anorexia	62% (124)
	Vomiting	56% (112)
	Cough	39% (78)
	Diarrhoea	10% (20)
Risk Factors	Alcoholic	89% (178)
	Diabetes	18% (36)
Signs	Pallor	48% (96)
	Icterus	20% (40)
	Hepatomegaly	92% (184)
	Right	
	Hypochondirum	90% (180)
	Tenderness	
	Ascites	5% (10)
	Pleural Effusion	35% (70)
	Peritonitis	4% (8)

**Table 2: Laboratory profile of patients.** 

Investigation	Cut off value	% Out of range (n = 200)
Haemoglobin (g/dl)	< 11g/dl	36% (72)
TLC	>11000 cells/mm <sup>3</sup>	78% (156)
Total bilirubin	>1.2 mg/dl	35% (70)
SGOT	>50IU/L	45% (90)
SGPT	>50IU/L	40% (80)
Alkaline phosphatase	>300IU/L	86% (172)
Albumin	<3.5g/dl	38% (76)
Urea	>40mg/dl	20% (40)
Creatinine	>1.2mg/dl	18% (36)

On ultrasonographic examination of abdomen of these cases right lobe was most commonly involved in 80% (n = 160). A solitary liver abscess was found in 72% (n = 144) cases. However four patients had liver abscess in both lobes. About ten patients had features of inflammation of caecum. Most common segment involved was segment VII followed by segment VI. Ultrasonography features have been summarized in Table 3.

Patients were managed according to the protocol mentioned. Out of 200 patients 4% of patients (n = 8) presented with features of peritonitis secondary to ruptured liver abscess where open surgical drainage was done. 13% of patients (n = 26) were put on conservative treatment with intravenous ciprofloxacin and intravenous metronidazole. 11% patients (n = 22) responded well to conservative treatment while 2% of patients (n = 4) failed to respond to treatment and abscesses were aspirated in a single sitting. 34% (n = 68) of the patients had ultrasound

guided percutaneous needle aspiration of their abscesses with 16 G spinal needle who were sick/toxic with small cavity abscess <5 cm, left lobe abscesses <5cm and 48% (n = 92) underwent ultrasound guided malecot catheter drainage. Catheter was removed when the drain output was nil.

**Table 3: Ultrasound findings.** 

Findings		% (n = 200)
Lobe involved	Right	80% (160)
	Left	18% (36)
	Both	2% (4)
Number of abscess	Solitary	72% (144)
	Multiple	28% (56)
Typhilitis		5% (10)
Segment involved	VII	38% (76)
	VI	26% (52)
	VIII	22% (44)
	Others	15% (44)

Table 4: Appearance and microbiological profile.

	% (n = 200)
Anchovy sauce appearance	72% (144)
Positive culture of pus	18% (34)
Organism isolated	
E. coli	9% (18)
Klebsiella	6% (12)
Staphylococcus	2% (4)
Pseudomonas	1% (2)

After noting the appearance of the pus, it was sent for culture and sensitivity for gram staining and ZN staining for AFB. The microbiological profile of the pus has been summarised in Table 4. The pus with anchovy sauce appearance and negative culture after 48 hours of aerobic incubation was presumed to be of amoebic origin.

#### **DISCUSSION**

Liver abscess is common in tropical regions like the Indian subcontinent. The common etiological agents for liver abscess are *E. histolytica* (amoebic), bacterial (pyogenic), mycobacterium tuberculosis and various fungi. Out of them, amoebic liver abscess is largely a disease of developing countries like India. The liver is the organ subject to the development of most abscesses in abdomen.

Organisms recovered from liver abscesses vary with the source. In liver infections arising from the biliary tree, enteric gram-negative aerobic bacilli and enterococci are common isolates. In contrast, in liver abscesses arising from pelvic and other intraperitoneal sources, a mixed flora including both aerobic and anaerobic species is common; *B. fragilis* is the species most frequently isolated. With hematogenous spread of infection usually

only a single organism is encountered; this species may be *S. aureus* or a streptococcal species such as one in the Streptococcus milleri group.<sup>3</sup>

Young patients with an amoebic liver abscess are more likely than older patients to present in the acute phase with prominent symptoms of <10 days' duration. Most patients are febrile and have right-upper quadrant pain, which may be dull or pleuritic in nature and may radiate to the shoulder. Point tenderness over the liver and right-sided pleural effusion are common. Jaundice is rare. Although the initial site of infection is the colon, fewer than one-third of patients with an amoebic abscess have active diarrhoea.<sup>3</sup>

In our study amoebic liver abscess was reported in 72 % of cases. Most of the cases had solitary abscess in right lobe of liver (80%). Mukhopadhyay et al in a prospective study reported liver abscesses involving right lobe in 85.53% of cases.<sup>6</sup> The predilection of liver abscess for right lobe is because of streaming effect in portal circulation. It receives most of blood draining from right colon, the primary site of intestinal amoebiasis.<sup>1</sup> In our study 80% cases reported right side abscess segment VII being most common followed by segment VI, 18% in left lobe and 2% in both lobe.

Mean age of patients was 42.25 years. Male to female ratio was 7.33:1. The age predisposition and gender differences may be as a result of high alcohol intake by young male which predisposes to amoebic liver abscess. In a prospective study by Makkar et al the liver iron was found to be significantly higher in patients with amoebic liver abscess, both alcoholic and non-alcoholic. The higher liver iron in alcoholic amoebic liver abscess cases was presumably due to regular alcohol use. Also, because of the regular menstrual blood loss, females in the reproductive age group are known to have lower iron stores. This low iron, which is unsuitable for the growth of *E. histolytica*, might act as a protective factor against the invasion of *E. histolytica* in such females.<sup>7</sup>

Most common symptoms of liver abscess are pain abdomen and fever which were present in 96% and 82% of our patients, respectively. Ghosh et al have reported fever as most common feature in 99% cases and Sharma et al have reported pain abdomen in 78% cases. 1,8 Cough was reported in 39 % and pleural effusion in 35 % of cases. In a study by Ghosh et al cough was reported by 30% of cases and in Sharma et al it was reported by 3.5% of cases.<sup>1,8</sup> Mukhyopadhya et al report pleuropulmonary involvement in 24% of cases.<sup>6</sup> Pleuropulmonary involvement which is reported in 20 - 30% of patients, is the most frequent complication of amoebic liver abscess. Manifestations include sterile effusions, contiguous spread from the liver and rupture into the pleural space. Sterile effusions and contiguous spread usually resolve with medical therapy.<sup>3</sup> Amoebic peritonitis is considered to be the second most common complication of amoebic liver abscess. Mukhyopadhya et al reported an incidence

of 26.39% of peritonitis in their study.<sup>6</sup> However in our study incidence was found to be 4%. The size of the abscess appears to be the most important risk factor for rupture, and the overall incidence of rupture ranges from 3% to 17%.<sup>4</sup>

Icterus was reported in 20% of our patients. In earlier studies from India, it was reported in 45 - 50% of patients. But after advent of good antimicrobial therapy, it has become less common.1 Mild abnormalities of LFT results, including albumin, PT-INR, ALP, AST, and bilirubin levels, are typical. The most common LFT abnormality is an elevated PT-INR.4 Mechanism of hyperbilirubinemia in amoebic liver abscess has been studied previously in many studies. Various mechanisms were suggested like pressure on biliary ducts at the porta hepatis especially by large abscess. 10 Sharma et at observed that jaundice occurs because of intrahepatic obstruction or associated hepatitis and is usually seen in large or multiple abscesses; abscess situated at porta hepatis is more likely to produce jaundice because of extra-hepatic obstruction.8

Ultrasound and CT scanning of the abdomen are both very sensitive but nonspecific for the detection of amoebic abscesses. Ultrasonography, though observer dependent, is widely accepted as a first time technique for imaging focal hepatic lesions including liver abscesses. This is attributable to its low cost, greater availability and high accuracy. It is useful not only in diagnosis and intervention but also in the follow up of the condition and to assess resolution.

As per the latest management protocol of minimally invasive aspiration 34% of patients underwent USG guided percutaneous drainage and 49% underwent USG guided malecot catheter drainage, according to hospital antibiotic policy intravenous ciprofloxacin intravenous metronidazole injections were used which were changed according to pus culture and sensitivity report. Indication for laparotomy was peritonitis following rupture of liver abscess, 4% of patients underwent surgical intervention. Overall mortality was 2.5%. The overall mortality rate seen in amoebic liver abscess from various series ranges from 2-15%.7 The most recent series from Memorial Sloan Kettering Cancer Centre (MSKCC) has reported a 3% mortality. The presence of malignant disease, factors associated with malignant disease (e.g., jaundice, markedly elevated LFT results) and signs of sepsis appear to be consistent markers of poor prognosis.<sup>4</sup>

Our study has certain limitations, as this was a retrospective analysis we diagnosed amoebic liver abscess based on negative culture report of 48hrs of aerobic culture, anchovy sauce appearance of pus, clinical and radiological improvement with anti-amoebic drugs. More than 70% of patients with amoebic liver abscess do not have detectable amoebae in their stool, the most useful laboratory evaluation is the measurement of

circulating anti-amoebic antibodies, which are present in 90% to 95% of patients. A number of serologic tests have been devised over the years. An enzyme immunoassay has a reported sensitivity of 99% and specificity higher than 90% in patients with hepatic abscess. Unfortunately, the presence of antibodies may reflect prior infection, and interpretation can be difficult in endemic areas.<sup>4</sup>

## **CONCLUSION**

Amoebic liver abscess is more common than pyogenic liver abscess. Commonly occurs in young alcoholic males. Most common presenting feature is pain abdomen followed by fever. Most common sign include tender hepatomegaly. Patients presenting with pain in upper abdomen on right side and fever with tender hepatomegaly should raise a clinical suspicion of liver abscess. Ultrasound abdomen is useful not only in diagnosis and intervention but also in the follow up of the condition and to assess resolution.

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Ethical approval: The study was approved by the

institutional ethics committee

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