

## Original Research Article

# A study of clinical presentation, diagnostic difficulties and various treatment modalities of liver abscess

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### ABSTRACT

**Background:** Liver abscess is an uncommon entity and over past 100 years dramatic changes in demographics, etiology, diagnosis and treatment occurred. The purpose of this study was to determine the clinico-etiological demographic profile of liver abscess by using radiological studies and to evaluate the outcome associated with different treatment strategies.

**Methods:** A prospective study was conducted over a cohort of 50 patients presenting with liver abscess. Patients diagnosed with malaria, enteric fever, pyrexia of unknown origin, acute viral hepatitis, chronic liver diseases, or hepatomegaly due to any cause, were excluded from study.

**Results:** The amebic liver abscess was found in 32 patients and pyogenic abscess in 18 patients. The age group ranges from 16 to 78 years with mean age of 38 years and the peak incidence is found in the 31-40 years age group for both types. The M: F ratio is 7:2 in pyogenic liver abscess and 13:3 in amebic. In the present study, the most common symptoms in both types of liver abscess were pain abdomen, loss of weight, anorexia, chills and rigor, vomiting and cough. The most common signs seen in both type liver abscess were tenderness, hepatomegaly and jaundice. In both types liver abscess, right lobe was affected more commonly, and single abscess was more common. Hb <10 gm % is present in more than 50 % cases in both liver abscesses. The right dome of diaphragm elevation present in 75%-89% in both types of liver abscess. In pyogenic liver abscess group, patient had associated intra-abdominal infections. In amebic liver abscess group associated illness was not seen. Antibiotics alone used for small multiple abscesses and antibiotics with needle aspiration done for large abscess, are the main line of treatment in this series. Mortality was nil in present series.

**Conclusions:** Liver abscesses are more common in males, alcoholics and immune-compromised patients. Percutaneous drainage with antibiotics treat majority of cases. The mortality from liver abscess has decreased but incidence appears to be increasing.

**Keywords:** Amebic abscess, Pyogenic liver abscess, Ultrasonography

### INTRODUCTION

Liver abscesses are infectious space-occupying lesions of liver. The two most common abscess being, pyogenic (PLA) of bacterial origin and amebic(ALA) of parasitic origin. While the mortality from liver abscess has decreased significantly since the early 20<sup>th</sup> century, the incidence appears to be increasing.<sup>1</sup> Liver abscess has

been described since the time of Hippocrates (4000 BC), who speculated that prognosis was related to the type of fluid recovered from the abscess.<sup>2</sup> In 1938, Ochsner et al provided the first serious review of pyogenic abscesses in the pre-antibiotic era.

In the present study appendicitis was established as the most common cause. Ochsner's review heralded surgical

drainage as the definitive therapy, however despite his aggressive approach the mortality remained at 60-80%.<sup>3</sup> Ochsner noted that amoebic liver abscess was about three times more common than pyogenic.

However currently pyogenic abscesses are more common in most series of western literature, in contrast to amebic which accounts for the largest number of liver abscesses observed worldwide.<sup>4</sup> In that era pyogenic liver abscess was largely a disease of 20 and 30 years male with pylephlebitis secondary to appendicitis, diverticulitis or other intra-abdominal infectious processes, but in recent series age group has shifted towards elderly males in 60s, with either an actively treated advanced hepatobiliary malignancy or benign biliary pathology as the underlying most common cause.<sup>1,2</sup> In 1938 Ochsner and Debakey reported an incidence of 8/100000 hospital admissions but recent series suggested small but significant increase in incidence as high as 22/100000 hospital admissions.<sup>3</sup>

PLA was considered a morbid disease with significant mortality. Imaging techniques allowed more precise localization and percutaneous drainage, whether for single or multiple combined with antibiotics has become standard of care.<sup>4,5</sup>

Successful resolution of liver abscess is achievable in the majority of cases, although underlying malignancy is associated with poor outcome. Open operation is reserved primarily for cases of failure of nonoperative treatment, presence of fungal growth on culture, or communication of abscess with an obstructed biliary tree that cannot be managed nonoperatively.<sup>6,7</sup> In many Asian countries, hepatolithiasis with associated biliary strictures accounts for most of cases of PLA.<sup>8,9</sup> Where as in Western countries obstruction secondary to underlying malignancy such as cholangiocarcinoma with associated ascending cholangitis is the leading cause of PLA.<sup>6,7</sup> Currently mortality from PLA in European series ranges from 5.6% to 10%, whereas mortality worldwide ranges from 3-30%.<sup>4</sup>

Other causes of PLA include hematogenous spread from sources such as bacterial endocarditis, IV drug use and infectious processes producing bacteremia. Radiofrequency ablation and transarterial chemoembolization (TACE) of liver tumors can also lead to liver necrosis which become secondarily infected leading to PLA.<sup>4</sup> Traumatic liver injury result in necrosis that predispose to development of PLA. Prior biliary reconstructive procedures may lead to biliary stricture and subsequent biliary tract infection that predispose to PLA. When no identifiable cause found PLA is said to be of cryptogenic origin and incidence is around 25% in some series.<sup>5,10</sup> Clinical presentation variable and early presentation are nonspecific. Classically a triad of right upper quadrant pain, fever or chills and malaise. Fever is most common presenting sign. Laboratory investigations are nonspecific with leucocytosis, increased alkaline

phosphatase, anemia, hypoalbuminemia, increased transaminases. Increased bilirubin suggests underlying biliary obstruction as an etiologic factor in the disease process. USG is usually the initial study of choice with reported sensitivity of 83% to 95% for diagnosis of PLA.<sup>11,12</sup> A mature abscess with pus has distinct wall and become hypoechoic.<sup>13</sup> CT scan is highly sensitive in detecting small PLA. Bacteria are more likely to be isolated from abscess cavity than from blood.<sup>14</sup> 33%-55% abscess cultures being polymicrobial.<sup>9,12</sup> *E. coli*, *streptococcus*, *enterococcus* and *klebsiella* are mostly isolated bacterial flora.<sup>15</sup> *Klebsiella pneumoniae* is especially prevalent in Asia.<sup>9</sup> PLA due to hematogenous spread not associated with gastrointestinal source is often monomicrobial. Infections that have enteric or biliary sources tend to be polymicrobial and those having hematogenous source are often monomicrobial.<sup>9,12</sup> Therefore principles of treatment are to drain the abscess cavity by percutaneous aspiration or catheter drainage, identify pathogen, and treat any underlying disease process. Multiple PLAs that are very small and widespread in distribution that are impossible for percutaneous drainage, so antimicrobial therapy is only treatment.

*Entamoeba histolytica* is causative agent of amebic liver abscess (ALA) and is endemic in underdeveloped countries. In an endemic area a patient presenting with lower chest or upper abdominal pain along with tender hepatomegaly should raise the suspicion of amebic Liver Abscess. There is 7 to 12 times higher incidence in males than females due to heavy alcohol consumption in males, hormonal effects in premenopausal women, and protective effect of iron deficiency in menstruating women. Individuals in 4<sup>th</sup> and 5<sup>th</sup> decade most commonly affected. Amebic abscess is usually solitary and mostly located in right lobe. The content of abscess is thick viscous exudates ranging from creamy white to dirty brown and pink, often described as anchovy paste. Most patients are asymptomatic but high-grade fever and right upper quadrant pain are main presenting symptoms.

Liver most common site of extraintestinal amebiasis. Serologic titre below 1:256 were predictive of pyogenic abscess.<sup>16</sup> USG and CT scan used for diagnosis. The mainstay of treatment of uncomplicated amebic liver abscesses are amebicidal drugs, metronidazole is amebicide of choice. Indications for percutaneous drainage include clinical deterioration despite adequate treatment, bacterial superinfection, impending rupture and abscess having high risk of rupture. Patients with abscesses communicating with biliary tree presented more frequently with jaundice and longer duration of illness.<sup>17</sup>

The value of therapeutic aspiration in addition to metronidazole to hasten clinical or radiologic resolution of uncomplicated ALAs cannot be supported or refuted by the current evidence.<sup>18</sup> Rupture into thorax or abdomen most common complication. Tender

hepatomegaly twice as common in ALA compared with PLA. PCR based study can differentiate between various Entamoeba species. Surgical procedures are used for patients who fail these management approaches or experience complications of abscess, such as peritoneal rupture or empyema. Males are predominantly affected by both types liver abscess. Abdominal pain is more frequent with the single abscess than with multiple abscesses, and jaundice is more frequent with multiple abscesses. Blood levels of alkaline phosphatase, bilirubin, creatinine and white blood cell counts are significantly higher in patients with multiple abscesses than those with a single abscess, and the hemoglobin level is higher with single abscesses. The single abscess is usually larger than 5 cm, and the multiple abscesses are usually smaller than 5 cm. The single abscess is always located on the right side and the multiple abscesses located on the right or both sides.

## METHODS

A prospective hospital-based study was conducted over a period of 12 months from August 2016 to July 2017 in Department of Surgery, Sardar Patel Medical College, Bikaner. Sample size consisting of 50 patients reporting to the surgery department, who present with liver abscess within study duration and eligible as per inclusion criteria were included in the study.

### Inclusion Criteria

- Patients with who present with liver abscess and those who give consent for study.

### Exclusion Criteria

- Patients diagnosed with malaria, enteric fever, pyrexia of unknown origin, acute cholecystitis, acute viral hepatitis (A, B, or E), chronic liver diseases, or hepatomegaly due to any cause.

A written and informed consent was taken from the patient after explaining details of treatment modalities.

General physical examination will be done for pain lump abdomen and jaundice etc. A detailed systemic examination was performed for tender hepatomegaly, ascites and pleural effusion as well as for other systemic symptoms. Patient samples were examined for tests, including blood complete picture, erythrocyte sedimentation rate (ESR), blood cultures, liver functions test, serum albumin, prothrombin time, chest X-rays for pleural effusion, ultrasound of the abdomen and computed tomography (CT) scan of the abdomen to look for the number and size of abscesses. Liver abscesses were aspirated to examine the type of abscess and amoebic liver abscess was confirmed and diagnosed by using the indirect hemagglutination test. To collect required information from eligible patients a pre-structured performa was used. For data analysis microsoft excel and MOOSE guidelines were used, and data was analyzed with the help of frequencies, proportions, measures of central tendency.

## RESULTS

The amoebic abscesses were found in 32 patients and pyogenic abscesses in 18 patients. The age ranges from 16 years to 70 years for amoebic liver abscess. The mean age around 38 years and the peak incidence is found in the 31-40 years, which is around 12 (38%) cases of total amoebic liver abscess patients. For the pyogenic liver abscess age ranges between 18 years to 80 years and peak incidence in 31 to 40 years, reaching around 7 (37%) cases of total patients. Only 4 female patients admitted out of 18 cases so the M: F ratio is 7:2 in pyogenic liver abscess. In amoebic liver abscess only 6 females admitted out of 32 cases so the M: F ratio is about 13:3.

In the present study, the most common symptom in pyogenic liver abscess is pain abdomen which was around 18 (100%) cases. After that loss of weight was mostly present in around 11 (61%) cases and then anorexia, chills and rigor, vomiting, cough, diarrhoea were present in decreasing order. In amoebic liver abscess group, pain abdomen presents in 27 (84%) patients.

**Table 1: Symptoms in hepatic abscesses.**

Abscess Type	Pyogenic		Amoebic	
	Total cases	Percentage	Total cases	Percentage
Pain abdomen	18	100.00	27	84.37
Fever	10	55.55	17	53.12
Chills	7	38.89	10	31.25
Nausea/vomiting	3	16.66	7	21.88
Malaise	7	38.89	7	21.88
Anorexia	9	50.00	20	62.50
Cough	6	33.33	13	40.62
Loss of weight	11	61.11	16	50.00
Diarrhoea	3	16.67	3	9.38

The most common sign present in amoebic liver abscess is tenderness which is present in 25 (78%) patients. Hepatomegaly is present in about 11 (33%) cases of patients. In pyogenic liver abscess the most common sign is tenderness which is present in about 12 (68%) patients and hepatomegaly is present in around 9 (53%) patients. Jaundice is present in 6 (33%) patients in pyogenic liver abscess and in 4 (25%) cases of patients in amoebic liver abscess. Both in amoebic liver abscess as well as

pyogenic liver abscess, right lobe is affected more commonly, and single abscess is more common. Hb <10 gm % is present in more than 50 % cases in both ALA and PLA so, anemia is commonly associated with both type of liver abscesses.

The right dome elevation present in 29 (88%) cases of amoebic liver abscess and 13 (75%) cases of pyogenic liver abscess.

**Table 2: USG Findings in hepatic abscess.**

USG finding	Abscess			Pleural Effusion	Ascites
	Right Lobe	Left Lobe	Both Lobes		
Pyogenic	13	2	3	12	3
Amoebic	26	3	3	22	10

**Table 3: Number of Abscesses in hepatic lobes.**

Abscess	Single		Multiple	
	Total cases	Percentage	Total Cases	Percentage
Pyogenic	14	77.78	4	22.22
Amoebic	22	68.75	10	31.25

In the pyogenic liver abscess group, one patient had ulcerative colitis, three patients had calculus cholecystitis, two patients had splenomegaly, one patient had pyelonephritis with portal lymphadenitis, one child had appendicitis and mesenteric adenitis, one patient had cholangitis with obstructive jaundice for which stent placement done and patient treated by aspiration.

In amoebic liver abscess group, associated illness is not present. In pyogenic liver abscess, complication occurs in one (5%) patient and presented with septicemia and shock; but all are well after antibiotics and aspiration. In amoebic liver abscess, complication occurs in five (16%) patients.

Three had rupture of abscess in right pleura which were treated by antibiotics and aspiration and no surgery required. Two patients had septicemic shock. The various treatment modalities are antibiotics alone, needle aspiration with antibiotics, surgical drainage with antibiotics and laparoscopic drainage of pus with antibiotics.

**Table 4: Treatment and mortality.**

Treatment modality Abscess ↓	Antibiotics alone		Needle aspiration+Antibiotics		Surgical drainage +Antibiotics		Laparoscopic drainage of pus + Antibiotics	
	Total patients treated	Mortality	Total patients treated	Mortality	Total patients treated	Mortality	Total patients treated	Mortality
Pyogenic Abscess	7	0	11	0	0	0	0	0
Amoebic Abscess	18	0	12	0	2	0	0	0

Antibiotics given to all of the patients were same and includes Ceftriaxone 1gm i.v. 8 hourly, Amikacin 500 mg i.v. 12 hourly and Metronidazole 500 mg i.v. 8 hourly. Other symptomatic drugs were also given to the patients. In this series, there was no mortality in the admitted patients in both ALA as well as PLA.

**DISCUSSION**

The hepatic abscesses are known from the time of Hippocrates. Their incidence is about 0.1 to 0.2 % of all

surgical admissions. Present series shows that most incidence of hepatic abscesses occur between 31 to 40 years of age. Patients age ranges from 18 to 80 years and M: F ratio is 13:3 for amoebic liver abscess and 7:2 for pyogenic liver abscess. These are comparable with other studies.<sup>2,5,16,19-24</sup>

Pain abdomen is the most common symptom in 18 (100%) cases of pyogenic liver abscess. Other symptoms are fever 12 (65%) cases, cough 6 (33%) cases, malaise 7 (39%) cases, diarrhoea 3 (16%) cases, chills and rigor 7

(39%) cases, anorexia 9 (50%) cases, weight loss 9 (51%) cases etc. This is in consistence with previous studies.<sup>5,8,12</sup> In present study, in amoebic liver abscess pain abdomen 27 (84%) cases, the most common presenting symptom other symptoms are fever 16 (50%) cases, chills and rigor (31%) cases, cough 13 (40%) cases, malaise 7 (22%) cases, nausea and vomiting 7 (22%.) cases. This is in consistence with studies in literature.<sup>10,16,20,21</sup>

The most commonly observed sign in pyogenic liver abscess is tenderness in the right hypochondrium seen in 14 (78%) patients other signs seen are hepatomegaly 6 (33%) cases, jaundice 6 (33%) cases, lump right hypochondrium 3 (15%) cases, pleural effusion (16%) cases and this is in consistence with studies of.<sup>3,5,8,12</sup> In amoebic liver abscess also most common sign is tenderness right hypochondrium 22 (68%) cases, other signs are hepatomegaly 17 (53%) cases, jaundice 8 (25%) cases, lump abdomen 4 (13%) cases and pleural effusion (15%) cases and this is in consistence with studies in literature.<sup>5,16,20,21</sup>

Most of the patients in pyogenic liver abscess group were anaemic 12 (67%) cases, with Hb<10 and their TLC raised (>12000) in 12 (67%) cases, decreased serum albumin 5 (28%) cases, increased liver transaminases 12 (65%) patients, this is in consistence with studies of.<sup>5,8,12</sup> Comparison is done between different studies and present series for amoebic abscess and the results are found to be comparable with Hb<10gm seen in 24 (72%) patients. Other lab investigations seen are TLC>12000 24 (75%) cases, decreased serum albumin 8 (25%) cases, Increased liver transaminases 8 (22%) cases, increased alkaline phosphatase 4 (12%) cases. this is in consistence with studies.<sup>16,20,21</sup>

Right dome of diaphragm elevation seen in 9 (48%) patients of pyogenic liver abscess with pleural effusion and atelectasis seen in 8 (43%) cases and other findings in the chest X-ray are noted and compared with other series and are in consistence with studies.<sup>9,26</sup> Right dome of diaphragm elevation is seen in 8 (25%) of amoebic liver abscess and pleural effusion is seen in 10 (31%) of cases. The findings of this series are matched more or less with studies.<sup>9,20,21,25,26</sup> On ultrasonography, pyogenic liver abscess most commonly seen in right lobe liver in 13 (72%) cases. In left lobe seen in 2 (11%) and in both lobes seen in 3 (16%) cases. Multiple abscess seen in 4 (22%) cases. Result of present series is matching with previous studies.<sup>23,27</sup> Amoebic liver abscess most commonly seen in right lobe liver in 23 (74%) cases, in left lobe 3 (9%) and both lobes 3 (9%) cases. Pyogenic liver abscess solitary in 12 (69%) cases and multiple in 6 (32%) cases. These are matching more or less in comparison to other studies.<sup>23,27</sup>

The most common complication found in pyogenic Liver Abscess group was septicemia with shock in present series and this is comparable to the other studies.<sup>8,9</sup> In the amoebic Liver Abscess group, most common

complication was rupture of abscess in the pleura and peritoneal cavity in present series. This is comparable with.<sup>23,27</sup> In our series, the hepatic abscesses responded well to treatment by antibiotics and needle aspiration. Various other studies show that the aspiration of abscesses is more effective and has less morbidity and mortality than the surgical treatment So, the result of present series and different other studies are matched in treatment and mortality percent.<sup>3,5,6,8,22</sup>

## CONCLUSION

Hepatic abscesses are more common in poor socioeconomical conditions, poor hygiene, smokers, alcoholics and immunocompromised patients. The peak age incidence observed in the fourth decade of life in both groups but ranges from sixteen years to seventy-eight years of age. Liver abscess are more common in males. The duration of symptoms ranges from 5 days to 35 days. Symptoms in decreasing order are pain abdomen, fever, malaise, nausea, vomiting, cough and diarrhoea in both type of abscesses. The sign most commonly present is tenderness in the upper abdomen in the hepatic abscess.

Other signs include hepatomegaly, pleural effusion, jaundice and right hypochondrial lump. Most common cause of pyogenic liver abscess is cryptogenic in nature; second most common cause is biliary tract disease and systemic bacteremia. Pus culture mostly yields *Staphylococcus aureus* and *E. coli*. Stool are negative for *E. histolytica* in nearly all the cases. Elevation of right dome of diaphragm, pleural effusion pulmonary findings are diagnosed in chest x-ray. USG is the most sensitive and specific tool for diagnosis of hepatic abscesses and it is also used for guided aspiration. It is a harmless investigation so for prognosis it can be done serially to check the size and character of abscess.

Best treatment for hepatic abscesses is antibiotics and needle aspiration, which is easy to perform, and patient's recovery is fast. Needle aspiration is also helpful in differentiation between hepatic abscesses. Aspiration complications include secondary infection of peritoneal cavity and injury to vital organs like liver, gall bladder etc. Most common presenting symptom is pain abdomen in amoebic liver abscess and fever and pain abdomen in pyogenic.

Anemia, leukocytosis, elevated ESR, increased serum alkaline phosphatase with increase in SGOT, SGPT and serum bilirubin are present in both groups. Hypoproteinemia is also present in most cases. Plain chest x-ray shows elevation of right dome of diaphragm, pleural effusion and atelectasis. Common complications of pyogenic liver abscess are shock and septicemia and for amoebic liver abscess are rupture in peritoneal cavity. Early diagnosis and prompt treatment is necessary for better results.

Antibiotics alone and antibiotics with needle aspiration are the main line of treatment in case of large abscesses as seen in present series. Surgical drainage is not necessary for majority of cases. It is only done in treatment failure, deep left lobe abscess cavity, or when there is laparotomy necessary for the underlying cause and in case of ruptured liver abscess in peritoneal cavity. Small, multiple abscesses are treated by antibiotics only. Majority of abscesses were in the right lobe of liver and most of them are solitary in pyogenic as well as in amebic liver abscess. Mortality is nil in present series.

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