

## Original Research Article

# Clinical study of liver abscess

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**Received:** 05 July 2021

**Revised:** 01 August 2021

**Accepted:** 02 August 2021

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### ABSTRACT

**Background:** Liver abscesses, both amoebic and pyogenic, is an important cause of morbidity and mortality in tropical countries. However, liver abscess have been managed by conservative, percutaneous needle aspiration, surgical drainage and endoscopic drainage. The aim of our study was to study the etiological, predisposing factors, signs and symptoms and various modalities of treatment of liver abscess.

**Methods:** In this study 30 cases of liver abscess, required data was collected and was compared statistically. All cases were studied upto discharge regarding presenting signs and symptoms and treatment modalities.

**Results:** Liver abscesses were more common in males. History of alcoholism was present in 60% of cases. The common clinical features were rt hypochondriac tenderness 100%, tender hepatomegaly 90%, fever 97%, anorexia 77%, weight loss 40%, jaundice 13%. Elevated leukocytes was seen in 72%, elevated serum bilirubin in 17%, serum alkaline phosphatase in 50 % and serum transaminase in 17% of cases. Right lobe of liver was involved in 87%, left lobe in 13%, both lobes in 0%. 23% of cases were treated conservatively, 50% by aspiration, 27% by surgical open method drainage, complications were secondary infection in 8%, rupture into peritoneal cavity 13% and pleural effusion 17%. Mortality was nil.

**Conclusions:** The modern day ultrasound and other non-invasive imaging techniques had greatly revolutionized the diagnosis and management of the liver abscess. Conservative management with IV antibiotics and USG guided percutaneous aspiration of liver abscess are most frequent treatment modalities used now, with fewer complications.

**Keywords:** Amoebic, Liver abscess, Alcoholism, Hypochondriac tenderness

### INTRODUCTION

Liver abscesses are most commonly due to pyogenic, amebic or mixed infections. Less commonly these may be fungal in origin. With introduction to antibiotics, the incidence of pyogenic abscess of the liver has decreased to a greater extent. Liver abscess is the most common extraintestinal manifestation of amoebiasis. Hepatic amoebiasis is reported in 3-10% of afflicted patients. The incidence is high in tropical countries due to lack of proper sanitation and personal hygiene.<sup>1</sup> A liver abscess is a suppurative cavity in the liver resulting from the invasion and multiplication of microorganisms, entering

directly from an injury through the blood vessels or by the way of the biliary ductal system.

Liver abscess is found more commonly in men between 20 and 40 years of age but can occur at any age. Approximately 60% are solitary and mainly located in the right lobe of the liver as a result of the streaming of portal blood flow secondary to the fact that the right lobe is predominantly supplied by the superior mesenteric vein and because most of the hepatic volume is in the right lobe. Pyogenic and amoebic liver abscess share many clinical features. Patients usually present with a constant dull pain in the right upper quadrant of the abdomen which may be referred to the scapular region or the right

shoulder. These patients usually have fever of between 38°C and 40°C. Clinically the first diagnostic requirement is the demonstration of an abscess followed by demonstration of its nature. Until recently the diagnosis of liver abscess was dependent upon variable clinical criteria, characteristics of pus aspirated from abscess cavity or on a clinical response to appropriate chemotherapy. With the advent of imaging techniques such as ultrasound, CT scan, serological tests the diagnosis of liver abscess can be made early, rapidly and accurately. The management of hepatic abscess has been greatly influenced by advances in diagnostic imaging and interventional radiology.<sup>2,3</sup>

Percutaneous drainage of liver abscess has been an important advancement in the treatment of pyogenic liver abscesses. The primary mode of treatment of amoebic liver abscess is medical, however, as many as 15% of amoebic abscesses may be refractory to medical therapy.<sup>4</sup> Also, secondary bacterial infection may complicate 20% of amoebic liver abscesses.<sup>5</sup> In such patients and in patients with pyogenic liver abscesses, surgical drainage has been the traditional mode of treatment.<sup>6</sup>

### ***Aims and objectives***

The aims and objectives of this study were to study the clinical presentations, investigations, diagnosis and management of liver abscess; to study the different modalities of treatment adapted for different type of abscess (solitary, multiple, amoebic, pyogenic and others like traumatic, mycotic and abscess due to degeneration of metastasis) and to study the outcome of conservative therapy and surgical treatment and its complications.

## **METHODS**

A prospective study of 30 cases of liver abscess was taken from the department of surgery, Sridevi institute of medical sciences and research hospital during June 2019 to December 2020.

### ***The diagnosis of hepatic abscess was based on the following criteria***

#### ***Patient's history***

Pain right hypochondrium with or without fever, malaise, chills, anorexia, weight loss, nausea.

#### ***Evidence***

Enlarged and tender hepatomegaly, radiological evidence of raised dome of diaphragm on the rt side, ultra sound evidence of abscess in the cavity, CT in cases where ultra sound was found inconclusive.

30 patients with hepatic abscess admitted to surgical and medical wards were studied with the following inclusion and exclusion criteria.

### ***Inclusion criteria***

Patients with history and diagnostic features suggestive of liver abscess and its complications of age group 15 to 60 years of both male and female and should have a liver abscess were included in the study.

### ***Exclusion criteria***

Patients with liver diseases like alcoholic hepatitis, viral hepatitis other than liver diseases, patients whose liver abscess are not detected on examination or radiologically, patients who are not willing for specific investigations like USG, CT and aspiration of the abscess were excluded from the study.

### ***Statistical analysis***

The data of the present study were fed into the computer and after its proper validation, checking for error, coding and decoding were compiled and analysed with the help of SPSS 11.5 software for windows. Appropriate univariate and bivariate analysis and ANOVA (analysis of variance) for more than two means were carried out using t test, calculated and tested. All means are expressed as mean±standard deviation. The critical values for the significance of the results were considered at 0.05 levels.

Detailed history of all patients and thorough clinical examination was done, findings were entered into proforma during their stay and follow up was done.

The following investigations were carried out. Hematological examination: Hb%, total count, differential count, ESR, liver function tests, routine urine analysis, X-ray chest, plain X-ray abdomen, USG abdomen, CT scan (when required), blood cultures (when required), analysis of fluid of abscess cavity were done.

After establishing clinical diagnosis, various treatment modalities for liver abscess used according to multiple factors such as site and size of abscess, pyogenic or amoebic, single or multiple. Specific criteria were made for modality of treatment to be used.

### ***Indications for conservative management***

The indications for conservative management were abscess size less than/or equal to 5 cm, right lobe abscess and abscess responding to antibiotics within 72 hours.

### ***Antibiotics given to patients of amoebic liver abscess***

Injection metronidazole 1000 mg TDS IV (double dose) for seven to fourteen days and followed by oral antibiotics.

Tablet ciprofloxacin 500 mg BD and metronidazole 400 mg TDS.

**Antibiotics given to patients of pyogenic liver abscess**

Injection ceftriaxone 1 gm, BD IV for seven days.

Injection metronidazole 500 mg TDS IV for seven to fourteen days and followed orally and tablet metronidazole 400 mg TDS.

**After discharge**

Oral metronidazole was continued for 2-3 weeks depending on the regression after discharge of the patients.

**Indication for aspiration of abscess**

The indications for aspiration of abscess were lack of improvement with subsidence of symptoms and signs in 72 hours; abscess size of more than 5 cm; large left lobe abscess and multiple liver abscess.

**Criteria for doing laparoscopic drainage of liver abscess patients**

The following criteria are required for doing laparoscopic drainage of liver abscess patients. They are abscess that were not amenable to percutaneous drainage secondary to location; coexistence of intra-abdominal disease that required operative management; concomitant biliary/intra-abdominal disease; failure of percutaneous aspiration; failure of percutaneous drainage.

**Open surgical drainage**

In 8 patients open surgical drainage was done due to rupture of liver abscess in peritoneal cavity, where typical transperitoneal approach was used. Abdomen opened with vertical midline incision.

All pus was aspirated, warm saline wash was given. Hemostasis was confirmed, abdominal drain no 32 kept and secured. Closed in layers. Review USG was done for each patient on post-op day 3. Tube was drained.

**RESULTS**

**Age incidence**

Hepatic abscess was more common in the age group of 21 to 60 years, which constituted 100% of total number of cases in the present study. Youngest patient encountered was 22 years and oldest was 57 years.

**Sex incidence**

Out of 30 cases, 21 were males and 9 were females. The ratio of male to female was 7:3.

**Socioeconomic status**

All the patients were from the lower socioeconomic status.

**History of alcoholism**

History of alcoholism was present in 60% of patients.

**History of dysentery**

In the present study, 5 cases gave past history of dysentery and 1 case presented with symptoms of dysentery during the study.

**Duration and onset**

The duration of symptoms varied from 2 days to 1 month. Taking 15 days as arbitrary figure for chronicity, 22 patients presented with acute onset of symptoms and remaining 8 cases were insidious cases.

**Symptoms**

With regard to the symptoms in these 30 case studied, it was observed that pain in the right hypochondrium and pain in the upper abdomen dominated the clinical picture in 100% of cases. The pain was dull aching in type in most of the cases.

**Table 1: Symptoms.**

Symptoms	No. of cases	Percentage
<b>Pain</b>	30	100
<b>Fever</b>	29	97
<b>Loose motion/dysentery</b>	6	20
<b>Cough with expectoration</b>	8	27
<b>Cough without expectoration</b>	2	7
<b>Lassitude</b>	26	87
<b>Anorexia</b>	23	77
<b>Loss of weight</b>	12	40
<b>Nausea/ vomiting</b>	7	23
<b>Jaundice</b>	6	20

Fever was present in 29 cases the commonest pattern of fever noted in our series was low grade and continuous in 23 cases and in few it was of the intermittent type, 5 patients had high grade fever.

The next commonest symptoms were anorexia present in 23 cases. Other associated symptoms were loss of weight, vomiting, cough and jaundice.

**Signs**

Palpable enlarged liver was encountered in 33% of cases. Inter coastal tenderness was present in 22% cases.

Tenderness all over the abdomen in 5% cases, who came with rupture of liver abscess into the general peritoneal cavity. Basal lung and effusion were present in 6% cases. Patients who presented in septicemic shock were 2% cases. Anaemia was the commonest sign in 9% cases. Icterus present in 5% of cases.

**Table 2: Signs.**

Signs	No. of cases	Percentage
Hepatomegaly	27	33
Intercostal tenderness	22	26
Tenderness all over the abdomen	4	5
Basal lung signs	5	6
Shock and sepsis	2	2
Anaemia	19	23
Icterus	4	5

**Laboratory investigations**

Haemoglobin (Hb) less than 10 mg/dl were found in 63% cases, the lowest Hb noted in this series was 6 mg/dl.

**Leukocyte count**

Leukocyte count of more than 10000 cells/Cumm was found in 72% cases. The highest noted in the study was 48200 cells/Cumm. Polymorphs were predominant.

**ESR In present series**

ESR was raised above 20 mm/1st hour in 90% of cases. Highest recorded was 130 mm/1st hour.

**Liver function tests**

**Serum bilirubin**

Serum bilirubin was raised in more than 20% cases in this series. Clinically jaundice was detected in all these 6 cases. Serum bilirubin of 10.8 mg/dl was highest in this series.

**Table 3: Serum bilirubin level.**

Serum bilirubin	No. of cases	Percentage
Less than 1	17	57
1-2	7	23
2.1-4	1	3
4.1-6	2	7
6.1-8	2	7
8.1-10	0	0
10.1-12	1	3

SGOT and SGPT levels were raised in 60% cases. Serum alkaline phosphatase levels were raised in 18 cases (60%).

**Radiological examination**

In 80% cases there were raised hemidiaphragm on the affected side.

**Table 4: Radiological findings.**

Radiological examination findings	No. of cases	Percentage
Pleural effusion	5	16
Erect X-ray abdomen		
Showing signs of peritonitis	3	10
Elevated dome of diaphragm	24	80

Plain X-ray abdomen in erect posture was done in patients who presented acutely with pain abdomen and signs of peritonitis and changes were noticed in 10% cases.

Chest X-ray showed pleural effusion, obliteration of costophrenic angle and obliteration of cardiophrenic angle in 16% cases.

**Ultra sound examination**

Ultra sound examination was done in all cases. It showed evidence of abscess in liver in all 30 cases.

**Site of lesion**

Right lobe of the liver was more often involved than the left lobe in the 30 cases studied, right lobe involvement was seen in 26 cases (87%) and left lobe involvement in 4 cases (13%) and both right and left lobes were involved in 0 cases.

**Table 5: Site of lesion.**

Locations	No. of cases	Percentage
Right lobe	26	87
Left lobe	4	13
Both lobe	0	0

**Solitary or multiple abscesses**

Study on the number of abscess were done.

**Table 6: Number of abscess.**

Number	No. of cases	Percentage
Solitary	20	67
Multiple	10	37

**Treatment (Table 7)**

Initially in all cases medical treatment was given and 23% cases responded to this line of management.

Surgical treatment aspiration following medical treatment was employed for 15 cases (50%). In 3% cases aspiration was repeated.

**Table 7: Treatment modalities.**

Treatment modalities	No. of cases	Percentage
Conservative	7	23
Aspiration	15	50
Surgical drainage	8	27

Surgery was considered in patients: who presented acutely with signs of rupture; in whom aspirate was thick; who did not respond to conservative line of treatment and who presented with large abscess.

#### ***Pleuro pulmonary variety***

In the current series, 5 patients (17%) with pleural effusion secondary to liver abscess were encountered. These patients were treated by pleural aspiration, antibiotic and anti-amoebic therapy. Liver abscess was aspirated per cutaneously. After initial treatment, patients of amoebic abscess were put on intra luminal and extra luminal anti-amoebic drugs. In our series diloxanide furoate, metronidazole, chloroquine were used. Complete course of anti-amoebic drugs was instituted for these patients.

#### ***Complications***

The types of complication encountered in our series were secondary infection in 2 cases (3%). These patients were suitably treated with appropriate antibiotics 4 cases (13%) presented with peritonitis, these patients were treated by open surgical methods 5 patients (17%) presented with pleural effusion. These patients were treated by aspiration and all these patients were given anti-amoebic drugs. Mortality in our series was nil.

**Table 8: Complications.**

Complications	No. of cases	Percentage
Infection (secondary infections of amoebic liver abscess)	2	3
Rupture into peritoneal cavity	4	13
Pleural effusion	5	17
Death	0	0

#### ***Condition at time of discharge***

In our series 90% patients were cured of their symptoms. 3 patients (10%) were re-admitted for their symptoms for whom repeated aspiration was done.

## **DISCUSSION**

Amoebic liver abscess is one of the most frequent complications of amoebiasis. The incidence was high in the tropical countries and was attributed to lack of proper sanitation and personal hygiene due to low socio economic conditions. Despite advances in the treatment, amoebic liver abscess is the commonest and most serious complications of amoebiasis. This is one of the illnesses to which there are a variety of effective drugs and surgical help is available when diagnosed. Hence early diagnosis and treatment can prevent the complications and sequel.

#### ***Age incidence***

In the present study, 80% were of age group between 21 and 30. Barbour et al study showed similar results of 84% in age group between 21 to 30.<sup>7</sup> Singh et al study showed 81% in same age group.<sup>8</sup>

#### ***Sex incidence***

It had been established beyond doubt by several workers that male sex dominated over female in the incidence of hepatic abscess.

Out of 30 cases, there were 21 male patients (70%) and 9 female patients (30%). The male to female ratio was 7:3. The results of the present study were comparable with the studies done by Debakey et al were 93.4% were male and 6.6% were female.<sup>9</sup> Raghavan et al study showed 89% male and 11% female.<sup>10</sup>

#### ***Economic status***

All patients in the study were from lower socio-economic strata. It was well known that amoebiasis was common in slum dwellers due to poor sanitation, poverty, ignorance and their poor nutritional status.

#### ***Dysentery***

In the present study, 5 cases (17%) gave past history of dysentery and 1 case (3%) presented with symptoms of dysentery during the study period. Raghavan et al recorded only 9.8% of the 193 cases, with dysenteric symptoms.<sup>10</sup> Barbour et al in their study of 33 cases could record a history of accompanying dysentery in 55% of cases.<sup>7</sup> Nanda et al noted past history of dysentery in 25% of their patients.<sup>11</sup>

#### ***Onset and duration of illness***

If the duration of the illness was less than 15 days it was considered as acute and if more, was considered chronic. Among 30 patients, 22 patients (73%) had acute onset and 8 patients (27%) had insidious onset of illness.

### Symptoms and signs

Pain was a complaint in 30 cases in the study (100%). It was present in the upper abdomen. The nature of the pain was dull aching in majority of the patients and it was of a sharp stabbing nature in a few. The incidence of pain in various studies was compared with the observations of the present study in the following (Table 9).

**Table 9: Incidence of pain.**

Authors	Percentage
Debakey et al <sup>9</sup>	88.6
Mehta et al <sup>12</sup>	87.4
Present study	100

### Fever

Fever was present in 29 cases (97%) in the present study. In majority of cases fever was of low grade and continuous. The incidence of fever in the literature and in the present series was compared (Table 10).

**Table 10: Incidence of fever.**

Authors	Percentage of patients with fever
Debakey et al <sup>9</sup>	87
Mehta et al <sup>12</sup>	90
Present study	97

### Signs

*Enlarged and tender liver:* A palpable and enlarged liver was encountered in 27 cases (90%). It was one of the most essential parameters and a constant sign in hepatic abscess. Tenderness was present in 22 cases (73%) in the present series. In an abscess situated in the posterosuperior aspect or in a concealed abscess, liver may not be palpable. This was seen in 3 cases.

Different workers have reported hepatomegaly from 60-100% in the cases studied. Debakey et al noted in 77.2% cases.<sup>9</sup> Mehta et al noted in 98% cases.<sup>12</sup> Katzenstein et al suggested that hepatomegaly was more common in chronic cases.<sup>13</sup>

*Intercostal tenderness:* It was one of the diagnostic signs of liver abscess, but absence of it does not rule out the diagnosis. It was noted in 22 cases (73%) in present series.

Mehta et al reported in 19% of their cases whereas Barbour et al found in 71.2% of their cases.<sup>7,12</sup>

*Jaundice:* Jaundice at one time considered uncommon was no longer to be considered unusual in hepatic abscess. In the present study it was found in 6 cases (20%), it was mild in 2 cases and moderate in 4 cases. In

all the cases jaundice disappeared by one to two weeks after initiation of therapy. Similar results were reported by Manson-Bohr.<sup>14</sup> In the present study, jaundice was present in 1 patients with left lobe abscess, 5 patients with right lobe abscess and no cases with both lobe abscess.

*Lung signs:* Manifestations of low pleuropulmonary involvement on right side were not uncommon. This depended upon the extent of hepatic involvement. In the present series 8 cases (27%) had dull note in right infrascapular region with diminished breath sounds and with crepitations and 5 cases (17%) had pleural effusion, 5 cases needed aspiration. Raghavan et al reported pleural effusion in 19 cases (15.5%) and consolidation of right lung base in 45 of 126 cases studied.<sup>10</sup> Chuttani et al studied 135 cases and manifestations of right basal pleura pulmonary involvement were found in 27 patients (20%).<sup>15</sup>

### Laboratory findings

*Haemoglobin:* Anaemia was one of the common findings, accompanying liver abscess. Hemoglobin percentage less than 10 gm was found in 19 cases (63%) in this series. Anaemia was very common in chronic cases and was due to chronic infection.

*Leucocyte count:* WBC counts more than 10,000 cells/cmm were found in 21 cases (70%). This was one of the parameter in assessing the improvement after initiation of drug therapy. Similar raised WBC count of 82% found in the study done by Katzenstein et.<sup>13</sup>

*ESR:* A raised ESR was almost a constant finding. In the present study ESR was raised above 20 mm/hr in 27cases (90%). This was one of the essential parameter or criteria in assessing the response to drug therapy.

*Liver function tests:* The value of liver function tests in liver abscess had been a subject of dispute. These tests may not be absolutely diagnostic but were helpful in assessing the outcome of the disease. However some recent papers had emphasized the value of liver function tests in the diagnosis of liver abscess.

*Serum bilirubin:* Serum bilirubin was raised (>2 mg/dl) in 5 cases (17%) of the present study. Clinically jaundice was detected in 6 cases. The incidence of jaundice reported by several workers varies from 10-50%.

*Serum transaminases (SGOT, SGPT):* Serum transaminases were raised in 9 patients (30%) in this series. SGOT was increased in 5% of cases in Katzenstein et al series and in 33 cases (41.2%) of Nanda et al series.<sup>11,13</sup>

*Serum alkaline phosphatase:* A value of above 13 ka units was considered abnormal. It was raised in 09 cases (30%) in the present series. It was evaluated in 84% of

cases of Katzenstein et al.<sup>13</sup> According to them higher values are found in chronic amoebic liver abscess. Persistent high alkaline phosphatase levels suggest non-responsiveness of the abscess for drug therapy and it was an indication for needle aspiration of the liver.

**Radiological examination:** In radiological examination the following were noted, a raised dome of diaphragm 24 cases (80%), right sided pleural effusion 5 cases or (17%) and a consolidation in 2 cases or (7%).

**Aspiration and surgical exploration:** Liver aspiration was done in 15 cases, patients who did not respond to metronidazole and chloroquine therapy. The colour of aspirate from the liver in majority of the patients varied from chocolate brown as in amoebic abscess to yellowish green as in pyogenic abscess.

The most common organism isolated in this series was *Staphylococcus aureus*. 3 cases had to be taken for aspiration following failure of conservative therapy. Surgical drainage was done in 8 cases, following aspiration one case was found to be secondarily infected (cryptogenic). Portal of entry in pyogenic cases could be traced to biliary tree in one case and directly through the abdomen in 1 case secondary to trauma.

### **Morbidity**

Thirty patients studied, 4 patients required surgery for secondary rupture into the peritoneal cavity. The remaining 15 patients were successfully managed by conservative ultrasound guided aspiration.

Despite having convinced the patient regarding the importance of follow up, the response was poor in most of the cases.

The conclusion arrived at from this being is that needle aspiration/conservative management in the treatment of liver abscess has no correlation with the number or size of the initial liver abscess.

Limitation of our study was that the etiology of abscess was not uniform and formed a heterogeneous group with abscesses of both amoebic and pyogenic etiology existing in both groups.

### **CONCLUSION**

Liver abscess is associated with a relatively high mortality and morbidity, and several serious complications. A very prompt recognition is important in instituting effective management and achieving good outcomes. Because of the nonspecific symptoms and laboratory findings, the presence of predisposing factors can be helpful in increasing the level of diagnostic suspicion. The key to successful outcome in the management of liver abscess is early diagnosis and institution of appropriate therapy. Different modalities of

treatment of liver abscess are available, each having different indications, merits and demerits.

Early diagnosis of amoebic liver abscess in patients from endemic areas and treatment with metronidazole will result in successful therapy in 85% of cases. Surgical intervention or alternative medical therapy is indicated for those patients who do not respond after 72 hours of metronidazole therapy. Complications of liver abscess and mortality rate has been significantly reduced due to early diagnosis and less invasive procedure. If abscess cavity is larger and/or filling repeatedly, continues drainage of liver abscess with pig tail catheter along with antibiotics is required. Laparoscopic drainage of liver abscess is a newer modality with fewer complications and can be used as alternative to open surgical drainage or in recurrent abscess. Earlier open surgical drainage was the main stay of treatment. With advanced imaging modalities and antibiotics this approach has been shifted more towards conservative or minimally invasive procedures. The modern day ultrasound and other non-invasive imaging techniques had greatly revolutionized the diagnosis and management of the liver abscess. Conservative management with IV antibiotics and USG guided percutaneous aspiration of liver abscess are most frequent treatment modalities used now, with fewer complications.

### **ACKNOWLEDGEMENTS**

I acknowledge my sincere thanks to Professor Dr. Narendra Kumar. I also thank other staff members and my colleagues for their help and suggestions.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Chethan L. Clinical study of liver abscess. *Int Surg J* 2021;8:2558-65.