

ORIGINAL RESEARCH

## The study of Liver abscess, management strategies, and outcome in Shyam shah medical college Rewa MP

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### Abstract

**Background:** Liver abscess, a disease troubling mankind from ancient times, has earliest documentation in the Sanskrit document. Where right upper abdominal pain, have potentially lethal consequences, if prompt diagnosis and treatment are not accomplished. However, two major types are known, amoebic and pyogenic, in medical literature. Pyogenic liver abscess constitutes major bulk of hepatic abscess in western countries. The diagnosis is confirmed by ultrasonography, reddish brown (anchovy-paste like material) aspirate from abscess. The diagnosis, treatment and prognosis, of liver abscess have evolved remarkably over past few years. Imaging has improved diagnostic competence and has altered therapeutic strategy. The study aims at early clinical and diagnosis on imaging of liver abscess, to set up some guide lines in view of conservative or either intervention.

**Methods:** The present study was hospital based longitudinal study, carried out in shyam shah medical college Rewa MP from November 2021 to November 2022.. A total of 55 patients were enrolled in the study. All patients with suspicion of having liver abscess were confirmed on Imaging and included as present study population. Authors studied mainly presentation, role of conservative treatment, Aspiration, pigtail catheter, Outcome, and post procedural complications.

**Results:** All patients presented with Pain right or left upper abdominal pain in abdomen, any chest complaints, majority of present study group patients had fever with or without rigors, deranged liver function. Imaging is the most diagnostic method, and also helped in therapy and follow up. Conclusions: Males are affected more than females, Imaging is the best modality for diagnosis, therapy and follow up. Aspiration or pigtail drainage is the standard method of drainage. Pigtail drainage is the better method of treatment than aspiration.

**Keywords:** Aspiration, CT, Imaging, Liver abscess, Pigtail drainage, USG

### Introduction

Liver abscess, has a very long historic and Medical background mentioned in very old literature (3000 BC). 1 A right hypochondriac, or epigastric or left upper quadrant abdominal pain, may have high mortality and morbidity because of some complications, if early diagnosis and management is not done in a given patient.1 In world literature mainly two major descriptions for aetiology is known, amoebic and pyogenic, Western Literature for liver abscess suggest Pyogenic liver abscess constitutes major chunk of hepatic abscess.1-3 Although no distinct clinical criteria exist for distinguishing the two types, the diagnosis of amoebic and pyogenic abscess can be made by following points younger age, resident or recent travel to areas of endemic Amoebiasis, diarrhoea and marked abdominal pain raise clinical suspicion of amoebic liver abscess. The incidence of amoebic liver abscess varies throughout the world and large number of cases in developing countries (constituting major bulk of total cases) remain unreported.3,4 Pyogenic liver abscesses, result from ascending biliary tract infection, haematogenous spread via portal venous system, generalized septicaemia with involvement of liver by way of hepatic arterial circulation, direct spread from intra-peritoneal infection and other causes. Escherichia coli, Klebsiella, and streptococcus, are most commonly found organism followed by staphylococcus and pseudomonas.1,5 The diagnosis is confirmed by ultrasonography, reddish brown (anchovy-paste like material) aspirate, negative gram stain, resolution with Metronidazole treatment. The diagnosis of pyogenic liver abscess is made by symptoms of picket fence configuration of temperature chart, nausea, vomiting and anorexia. Pain is late symptom and is common with large solitary abscesses.5 Investigations reveal Leucocytosis, anaemia and positive blood culture for bacteria. The diagnosis, treatment and prognosis of liver abscess have evolved remarkably over past few years.6 Imaging has improved diagnostic competence and has altered therapeutic strategy by allowing the possibility of percutaneous drainage. Rapid diagnosis, effective antimicrobial therapy, treatment of underlying disease, and orderly approach to therapeutic interventions directed towards the abscess remain the mainstay of care for the patient with hepatic abscesses.7 The concept of minimally invasive drainage,

continues to be of paramount importance in treatment of hepatic abscesses.<sup>7,8</sup> With these views in mind, a study has been carried out in 55 patients, to evaluate the current features of liver abscess in regard to the presentation, its association with addictions, co morbid conditions and the different modalities of treatment. The study aims at early clinical and imaging wise diagnosis of liver abscess, in view of management with either conservative or intervention (aspiration, pig tail catheterization) to be done in a case of liver abscess in a given population

### Methods

The present study is hospital based longitudinal study, carried out in shyam shah medical college rewa mp, from November 2021 to November 2022. A total of 55 patients were enrolled in the study (N=55)

### Inclusion criteria

- Patients suspected of having liver abscess on the basis of history and clinical assessment which were then Confirmed by USG and laboratory work up.
- Patients more than 18 years.

### Exclusion criteria

- Patients aging less than 18 years.
- Abscess associated with malignancy.
- Immunocompromised patients.
- Ascitis.
- Liver abscess which ruptured in peritoneal, pericardial, pleural cavity.
- Who do not want to enroll in the study.

### Sample design

55 patients, admitted with clinical, laboratory and imaging feature of liver abscess. Study factors: age, gender, occupation, address, socioeconomic status, addiction, comorbidity, complete haemogram, liver function test, USG feature. Culture of aspirated material from liver abscess blood culture treatment modalities, treatment outcome.

### Methodology

A complete physical examination including examination of abdomen and chest following proper history. Specific Investigations including Hb%, TLC, DLC, liver function test, prothrombin time, blood for HBSAg, HIV, fasting and post prandial blood sugar, ultrasound of abdomen, chest X ray, microscopic examination and culture of aspirated pus, blood culture. The patients were divided into two treatment groups. Group 1: with abscess cavity 5 cm (>150 cc) or smaller abscess which failed to respond to drug therapy alone, left lobe abscess, they in addition treated with USG guided-percutaneous needle aspiration or catheter drainage.

### Medical treatment

Amoebic liver abscess: all patients with diagnosis of amoebic liver abscess of size < 5cm were treated with Metronidazole divided dose. Pyogenic liver abscess: All patients with PLA of size<5cm (<150 cc) or if there were small multiple abscess which were either solidified and not amenable for tapping were treated initially with broad spectrum antibiotics till the culture and sensitivity report were available then treatment was guided as per sensitivity report.

### USG Guided aspiration

The patients with abscess size >5 cm or smaller abscess those who failed to improve clinically left lobe abscess were subjected to imaging guided aspiration. Informed consent was taken from the patients explaining the complications of the procedures for which open surgical intervention might be needed. The patients were examined daily for clinical improvement. Improvement in fever, and USG was done on 3,7,14 day, repeat TLC was done on day 3.

### Technique of pigtail catheter drainage (PCD) of liver abscess

The standard pigtail external drainage catheter, ranging from 8.5Fr to 10Fr having multiple side holes and with a trocar and cannula, drain kept in the abscess cavity. The draining catheter was properly secured in its place and connected to a collecting system. Chest X-ray was done after catheter drainage to rule out pleural effusion or pneumothorax. Catheter output charting was done daily, and a chart was maintained.

The first review ultrasound was done when drainage over last 24 hours had declined to < 10ml. If the abscess had resolved, the catheter was removed. If residual cavity was present, the catheter was flushed with saline and aspirated till no material was found. Further review ultrasound was done every third day and the catheter was removed if the catheter drainage had remained minimal

Otherwise, the catheter was left until catheter drainage had stopped. Ultrasound was repeated until the cavity had either decreased by 50% or more of its original size or remains static with clinical recovery. Outcome was assessed by: relief of symptoms, Resolution of liver abscess cavity ultrasonographically on third day after treatment started. Improvement of symptoms on third day of particular treatment and Decrease in total leukocyte count on third day after particular treatment started. Recurrence and readmission in hospital for recurrence of abscess.

### Results

Total of 55 patients with a diagnosis of liver abscess were included in the study. The demographic, clinical, laboratory, and imaging data for all patients was collected and recorded on a predesigned record form. The outcome was studied. The observations are as follows:

The mean age of presentation was 45.56 years. The youngest patient was of the age 22 years and the oldest was of 75years (Table 1)

**Table 1: Age distribution**

Age group	Frequency	Percentage
>20-30	8	14.5
>30-40	13	23.6
>40-50	11	20
>50-60	13	23.6
>61	10	18.2
Total	55	100

### Gender distribution

There were 43 males (78.18%) and 12 females (21.81%) enrolled in the present study with 34 patients in Amoebic liver Abscess 21 in Pyogenic liver Abscess. The overall male to female ratio of 3.6:1. The male: female ratio in Amoebic group is 2.4:1 and in pyogenic group it is 9.5:1 (Table 2)

**Table 2: Gender distribution.**

Type of abscess		Male	Female	Total
	Amoebic Liver Abscess	24	10	34
	Pyogenic Liver Abscess	19	2	21
<b>Total</b>		43	12	55

**Table 3: Clinical symptoms.**

Variable	Amoebic Liver	Abscess Pyogenic Liver Abscess	Total%	P value
Pain	34(100%)	21(100%)	55	100
Fever	32(94%)	20(95%)	5294.54	0.859
Vomiting	20(59%)	16(76%)	3665.50	
Chills and rigors	19(55%)	14(66%)	3360	
Jaundice	16(47.05%)	9(42.85%)	25450.761	
Diarrhoea	14(41.17%)	5(23.80%)	1934.50	
Cough	9(26.47%)	6(28.57%)	1527.30	

**Table 4: Clinical signs.**

Signs	Amoebic	Pyogenic	Total %	P value
Lump in abdomen	12(35.29%)	7(33.33%)	1934	
Hepatomegaly	23(67.64%)	18(85.71%)	4174	0.135
Inter costal tenderness	24(70.58%)	14(66.66%)	3869.1	0.76
Respiratory signs (decreased air entry)	16(47.05%)	6(28.57%)	22	40

Clinical manifestations: (Table 3) All 55 (100%) patients presented with pain in abdomen. Fever is the next common symptom, about 94% of study population had fever at the time of presentation. Chills and rigors: At the time of presentation- 60% of the study population had chills and rigors in Amoebic liver abscess and 55% had chills and rigors in Pyogenic liver Abscess, the percentage of patients with chills and rigors was more in Pyogenic group. History of vomiting was found in 69.9% (n=58) of the cases, in Amoebic liver abscess 59% and in pyogenic liver abscess 76% had vomiting. About 45% of study population had jaundice. Amoebic liver abscess 47%, the prevalence of jaundice was more as compared to Pyogenic group 42.85%. Cough was present in 27% of study subjects (Table 4). Addiction: In the present series, 60% of patients were Alcoholics. 55.88% were alcoholic in Amoebic liver Abscess and 66.66% in Pyogenic liver abscess, Comorbidity -The overall prevalence of Diabetes in study population was 32.72%. In Amoebic liver abscess 38.23% patients were Diabetic and in Pyogenic group, about 23.8% had Diabetes, Tuberculosis was found in 17.64% of the study

population, in Amoebic group 11.8% had tuberculosis and in pyogenic group it was 9.5%. On per abdomen examination lump was found to be present in 34% of the cases (n=19). However, lump was present in 35.29% of the Amoebic group, and 33.33% of Pyogenic group. Hepatomegaly was found to be present Ultrasonography is simple, inexpensive, and quick to perform; with a diagnostic accuracy of 90%. Abscesses, (Figure 1) located peripherally in contact with the liver capsule and varies from 2 to 21 cm in size (mean 7.75 cm). USG is very important in therapeutic intervention

in 74% of the cases (n=41). However, Hepatomegaly was present in 67.64 % of Amoebic group and 85.71% of Pyogenic Liver Abscess, more number of patients in Pyogenic group had palpable liver as compared to Amoebic group. About 69% of study population had inter costal tenderness. In Amoebic liver Abscess more number of patients 70.58% had tenderness as compared to Pyogenic group where it was 66.66%. Study population who had inter costal tenderness was 69%. In Amoebic liver Abscess more number of patients 70.58% had tenderness as compared to Pyogenic group where it was 66.66.

On examination of chest there was decreased air entry on Right side in about 40% of the subjects, in Amoebic liver abscess there were 47% of patient as compared to Pyogenic group where there were 28.57% with decreased air entry on Right side. In the present study, 38.18 % (n=21) of the cases had counts less than 11000 while 61.181% (n=34) had counts more than 11000.

In the present study, about 44% of patients had raised Bilirubin, overall 49% of study population had raised Alkaline Phosphatase levels, about 20% of the study population had raised Aspartate Transaminase with mean value of 75.59 U/L. Alanine Transaminase was raised in 21% of study subjects with mean value of 88.02 U/L (Table 6).

Ultrasonography is simple, inexpensive, and quick to perform; with a diagnostic accuracy of 90%. Abscesses, (Figure 1) located peripherally in contact with the liver capsule and varies from 2 to 21 cm in size (mean 7.75 cm). USG is very important in therapeutic intervention for guided aspiration and pigtail insertion. It is also of great use in follow up of patients who had liver abscess. Especially in the acute situation, a computed tomography (CT) scan does not add to the diagnostic accuracy of ultrasound except in the evaluation of imminent rupture of abscess. In an atypical or chronic case, CT may be of value; it shows better rim enhancement with contrast enhancement in pyogenic liver abscess and high density of the contents in necrotic liver tumours (Figure 2).

About 30% of patients had Right sided pleural effusion, 18% had bilateral pleural effusion. In present study maximum number of the patients (84%) had right lobe involvement, right lobe involvement was maximum in Amoebic (88%) as compared to Pyogenic group (76%), both lobe involvement more common in pyogenic liver abscess (15%) as compared to Amoebic (12%), there was no left lobe involvement in Amoebic Abscess. In present study it was found that multiple liver Abscesses came out to be pyogenic liver abscess (52%) where there is a single Abscess cavity, it came out to be Amoebic liver abscess (74%). The P value is 0.05 is significant. single abscess cavity is in close association with Amoebic liver abscess (Table 5) (Figure 1). Out of 55 patients, those with abscess larger than 5 cm, guided drainage was done, 9 patients were treated conservatively on Medical line of management, 9 patients underwent Aspiration under USG guidance 31 patients underwent pigtail catheterization and in 6 patients with multiple abscess combine Pigtail catheter as well as Aspiration was done (Table 6). Out of 55 patients 9 patients underwent USG guided Aspiration 31 patients (Figure 3). Pigtail catheterization was done and in 6 patients combined approach was made (Figure 4). Pus culture of aspirated fluid 66.66% of pyogenic abscess showed growth, none of the amoebic abscess showed growth on culture medium, the P On Gram staining of the aspirated fluid, 14 patients were positive in pyogenic group and maximum were Gram negative bacilli, no organism was seen in amoebic liver abscess .

The result suggest that Amoebic liver Abscess are sterile and none of present patients had secondary bacterial infection. Out of 44 patients within which pus was aspirated, 14 patients showed growth of organism and all 14 patients belonged to Pyogenic liver abscess group Most commonly found organism on pus culture sensitivity was Staphylococcus (43%) followed by E. coli and Pseudomonas (22%).

About 90% of the patients had symptomatic relief on 7th day in Aspiration +Pigtail group followed by Pigtail group and 11% of aspiration and conservative were having no relief even on day 7 (Table 8). About 16.4% patients had recurrence, in Conservative management followed by Aspiration (44.44%), no recurrence was found in Pigtail Catheter drainage.

There is negligible recurrence if pigtail catheterization is done in a cavity more than 5 cm in diameter Out 55.9 patients were managed conservatively, blood culture was sent to know the causative organism and some of the cases of Pyogenic abscess showing no growth on pus culture, blood culture was sent out of 13, and 10 were positive, for staphylococcus (39%) followed by Klebsiella and E. coli and pseudomonas (22%) (Table 7). Decrease in volume of abscess cavity on USG is maximum in Pigtail aspiration and Pigtail groups with a significant P value it was followed by aspiration and then by conservative treatment. Relief of symptoms on day 3, no significant relief was found in either of the groups. Symptomatic relief was maximum in Aspiration group followed by Pigtail and then by conservative group.

## Discussion

The present study includes 55 patients, and as many as two recent studies, show that the common age group is between 30-50 years.<sup>9,10</sup> The mean age of presentation was 45.56 years. The youngest patient was of the age 22 years and the oldest was of 75 years. Reports in the literature show that there is a male preponderance in a ratio ranging from 10:1 to 17:1.<sup>10,11</sup> A retrospective analysis in 1978 by Kapoor et al reported that the male:female ratio was 5.66:1, which had remained constant.<sup>11</sup> In present study, the overall male to female ratio of 4:1. The male:female ratio in Amoebic group is 3:1 and in pyogenic group it is 10:1. Study carried out in (2004) Karachi, showed that 48% of pyogenic hepatic abscesses, 67% of patients with amoebic liver abscess got fever.<sup>12</sup> Majority of present study population was suffering from fever (94.55%) at the time of presentation and 60% of the study subjects got associated chill and rigor. Incidence of pain in abdomen in recent report varied up to 88.6%.<sup>13</sup> But from India Kapoor et al showed 75% patients presented with abdominal pain.<sup>14</sup> Present study result simulates the result of this study 100% of the patient in Amoebic and 100% of pyogenic had abdominal pain (Right hypochondriac). A larger Indian study carried out in 2005 showed 31.94% patients got jaundice.<sup>15</sup> In present study 45% of population had jaundice. Amoebic liver abscess, 47% patients had jaundice, the prevalence of jaundice was more as compared to Pyogenic group 42.85%. When comorbidity was studied in present series. The overall prevalence of diabetes in study population was 32.72%. In Amoebic liver abscess 38.23% patients were Diabetic and in Pyogenic about 23.8% had diabetes, Mathur et al found that about 21% cases were diabetic.<sup>10,16</sup> Tuberculosis was found in 17.64% of the study population, in Amoebic group- 11.8% had tuberculosis and in pyogenic it was 9.5% had tuberculosis. Present study showed that most of the cases (61.81%) had leucocyte count ranging from 11800 to 34500 cells/mm<sup>3</sup> with mean value of 11,500. Earlier studies had reported the mean TLC to be 15000 cells/mm<sup>3</sup> with the range 7500 cells/mm<sup>3</sup> to 25000 cells/mm<sup>3</sup>.<sup>17</sup> 2006 reports found E. coli to be most frequent organisms found. Study by D' Angelica M et al they found E. coli followed by Klebsiella as most frequent organism.<sup>18-22</sup> In present study the most common organism found was Staphylococcus aureus. In present study blood culture was positive in 10 cases (47.61%) and Staphylococcus was found to be most frequent in 39% of PLA. Earlier studies Wood TF, Rose had reported right lobe abscesses in 55% cases of liver abscesses, multiple abscesses were 27.7% and isolated left lobe abscesses 16.6% and 28.4% of both lobe abscess.<sup>23-25</sup> In present study subjects (64%) had solitary liver abscess (74% of ALA and 84% of PLA) and 84% of present patients had their right lobe involved (88% of ALA and 76% of PLA). The study carried out by Rajak CL showed that 67% patients had amoebic subtype.<sup>26</sup> In present study 61.81% of patients were found to have amoebic liver abscess and 38.18% of patients were found to have pyogenic liver abscess. So present result corroborates with their result that amoebic liver abscess is more prevalent than pyogenic liver abscess. In present study 60% of the subjects attained  $\geq 50\%$  reduction in abscess cavity size following therapy. Percutaneous pigtail catheter drainage was successful in terms of  $\geq 50\%$  reduction in abscess cavity size in 70% patients as compared to percutaneous needle aspiration which was successful in 66.66% patients and in combination of both the treatment pigtail and aspiration it was 75%. Present study revealed that PCD was more successful in terms of recurrence of abscess, relief of symptoms and decrease in size of abscess cavity. 22.22% patients who underwent PCD required readmission in hospital as compared to PNA. About 41.4% patient of PCD had their symptoms relieved within three days, however in USG, PNA also shows 44.4%-almost equivalent result. Hospital stay of more than a week was 100% in PNA as compared to PCD which is 83% in present study corroborates with the result of the study performed by Agrawal et al where they reported that clinical relief attained in PCD group was in shorter duration than in PNA where it took a longer time. 27-29 The major advantages of PNA over PCD are: it is less invasive and less expensive; avoids problems related to catheter care; and multiple abscess cavities can be aspirated easier in the same setting.<sup>30,31</sup> However, in present study authors had a success rate of PNA, which was significantly lower than with catheter drainage (71% versus 100%).

## Conclusion

Present study includes 55 cases of liver abscess following are the conclusions of present study. The most common age group affected by Liver abscess was third and fifth decade of life. Males are more commonly affected than females. Ultrasonography is the standard modality for diagnosis as well as therapeutic drainage of abscess and also follow up. Authors found that the incidence of amoebic liver abscess was more as compared to pyogenic liver abscess. Pyogenic liver Abscess most common pathogen was Staphylococcus followed by Klebsiella. There is increasing association of diabetes with both types of abscess. Image guided drainage is the best modality of treatment for liver abscess. In case of larger abscess (>5cm) or 150cc, Ultrasound guided percutaneous pigtail catheter drainage is a superior therapeutic approach than percutaneous needle aspiration if there are multiple abscess cavity the larger abscess cavity should be drained by pigtail catheter and smaller ones should be aspirated. Patients treated with ultrasound guided percutaneous catheter drainage improved rapidly than those treated with needle aspiration. Abscess cavity resolves better in case of catheter drainage than needle aspiration. Pigtail is better than aspiration group as compared to recurrence and readmission, but the hospital stay of Pigtail is longer

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