

Original research article

**A STUDY OF RADIOLOGICAL IMAGING FOR DIAGNOSIS
BASED ON CLINICAL PRESENTATION, AETIOLOGY,
AND MANAGEMENT OF LIVER ABSCESS**

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Abstract

Background and objective: To research the prevalence of hepatic abscesses at our facility. To examine the Age and Sex distribution. to examine the clinical characteristics based on variations in symptoms and symptomatology. To determine the disease's microbiology. To shed light on the role that radiological imaging plays in making a diagnosis and organising treatment appropriately. to classify the disease's mode of therapy.

Method: On 100 patients who were enrolled in the trial throughout the time, a study was conducted at Department of General Surgery, Deccan College of Medical Sciences, Hyderabad, Telangana, India from to December 2022 to October 2023. Ultrasonography was used to confirm the clinical diagnosis of hepatic abscess in these patients.

Result: Men are more common than women. 6:1 ratio; 5 th decade is peak incidence. Eighty four percent of cases had alcohol as the cause. The most prevalent clinical features are abdominal pain (96%) and soreness (72%), with the typical mode of presentation being observed in 81% of patients. Sixty five percent of cases had a right lobe abscess. Aspiration is the most often used therapeutic method (45%).

Conclusion: According to an ultrasound, the abscess in the current study had completely disappeared after three to four months; in our series, individuals with lower socioeconomic status account for roughly 70% of all abscesses examined.

Keywords: Liver abscess, radio imaging, sonography, Aspiration, clinical diagnosis

Introduction

An abscess is a confined accumulation of pus within the tissue caused by an inflammatory disease. A hepatic abscess is a gathering of purulent material within the liver's parenchyma. The occurrence of liver abscess was initially documented during the time of Hippocrates. Subsequent to that, numerous advancements and modifications have occurred with respect to the causation, diagnosis, and treatment of liver abscess. The various causes of liver abscess can be attributed to diverse sources, such as

cholangitis (Infection via the bile), pylephlebitis (infection through the portal vein), septicemia (Infection through the hepatic artery), direct contiguous spread, trauma resulting from penetrating injuries, and cryptogenic (Of unknown origin) ^[1, 2, 3]. In the age before the discovery of antibiotics, the most frequent cause of liver abscess was the spread of infection through the portal vein. Currently, the most frequent cause of the dissemination of newer antibiotics is through the biliary tree. In the past, laparotomy and drainage were commonly used to treat liver abscesses. However, with the development of advanced imaging techniques, image-guided aspiration or catheter insertion has become the primary method of treatment in modern times. This study aims to investigate the various presenting symptoms, aetiology, and management outcomes of patients ^[4, 5, 6].

Material and Method

A study was conducted at Department of General Surgery, Deccan College of Medical Sciences, Hyderabad, Telangana, India from December 2022 to October 2023 on a group of 100 patients who were enrolled throughout the specified timeframe. The patients were diagnosed with liver abscess through clinical examination and confirmed by ultrasound imaging.

Inclusion Criteria

1. Clinical history indicates the presence of a liver abscess, characterised by pain in the right upper abdomen, fever, and diarrhoea.
2. Examination results - liver is enlarged and sensitivity
3. Radiograph exhibiting elevated right dome of diaphragm
4. Ultrasonographic evidence of hepatic abscess.
5. Age requirement: minimum age of 10 years.

Exclusion criteria

1. The ultrasonogram results are within the normal range.
2. The ultrasonogram results are not definitive and indicate the possibility of a liver abscess or uncertainty.
3. Radiological examination to differentiate and diagnose a SOL liver.
4. The patient has a history of recurrent liver abscess that was previously treated.
5. The patients have abnormal blood conditions.
6. The patients with liver disease that progressed to a decompensated state.
7. Pregnant female patients are diagnosed with a liver abscess.

Methodology

A comprehensive medical history is gathered from the patients, followed by a thorough physical examination and basic blood testing. These patients undergo ultrasonography, and those who are proven to have a liver abscess are included in the study. Exclusion criteria are used to filter cases. The selection of treatment methods is determined by the size, quantity, and positioning of the liver abscess ^[7, 8].

Result

Table 1: Age distribution

Age	Cases	%
10 to 20	3	3
21 to 30	14	14
31 to 40	23	23
41 to 50	27	27
Above 50	33	33

Table 2: Clinical presentation

Symptoms	Cases	%
Abdoman pain	88	88
Pyrexia	70	70
Nausea and vomiting	35	35
Anorexia	44	44
Weight loss	22	22
Diarrhea	35	35
Cough / pleurisy	29	29
h/o of alcohol	82	82

Table 3: Results of examinations

Clinical Signs	No of cases	%
Hepatomegaly	51	51
RUQ tenderness	63	63
Intercostal tenderness	35	35
Jaundice	17	17
Pleural effusion	7	7

Table 4: Pathological findings CBC

Investigation	Value	Cases	%
Hemoglobin	7-10 gms/dl	65	65
	10-14 gms/dl	35	35
WBC count	5000-10000 cells/cu.mm	42	42
	10000-15000 Cells/cu.mm	50	50
	>15,000 cells/cu.mm	8	8
ESR	<15 mm	21	21
	>15 mm	79	79

Table 5: Radiograph of chest and abdomen

Radiological feature	Cases	%
Raised dome of diaphragm	48	48
Pleural effusion	17	17
Basal atelectasis	13	13
Enlarged liver	24	24
Ground glass appearance	9	9

Table 6: Abscess size

Size in cms	Cases	%
Under 5	19	19
5 to 10	52	52
Above 10	29	29

Discussion

The presence of hepatic abscess and its bad prognosis were known in the past to Hippocrates (460 BC – 370 BC) and Celsus (53 BC – 7 AD) Hippocrates was capable to differentiate between from cystic liver illness. Celsus was aware of the terrible prognosis of jaundice-related hepatic abscesses. Bright did not provide a good description of hepatic suppuration with actual abscess formation in his own observations on jaundice until 1936. In their seminal work, Oschner, Debakey, and Murray (1938) observed that 75% of amoebic liver abscesses occur in warmer southern climates. Even though liver abscesses are a well-defined clinical entity, it can be challenging to identify the location, size, and quantity of abscesses. According to Chuttaniet *al.* (1963), there can be a variety of genuine challenges in the clinical diagnosis of hepatic amoebiasis. It is unlikely that those who do not frequently meet the condition will truly appreciate them. The death rate from an untreated liver abscess is very close to 100%. Reports of aspiration-free or well managed medical care indicate case fatality rates as low as 6% [9, 10, 11].

The fifth decade is the greatest age of incidence, with a mean age of 44. The mean age was 35 years old, according to Dhaval O. *et al.* The mean age of Chang AC *et al.* is 70.2 years. The fifth decade in our study had the highest age incidence, which was followed by the fourth and sixth decades. There are more cases in our study that belong to the lower socioeconomic strata. The highest occurrence, according to Garewal, has been linked to alcohol consumption, as well as situations involving poor hygiene, tainted drinking water, malnourishment, hepatic dysfunction, and low host resistance [13, 14].

According to our research, 85% of males have liver abscesses, and 80% of these patients have a history of alcoholism. This is in contrast to Dhaval O. *et al.*, who report a 20% female prevalence and an 80% male incidence. Debnath *et al.* displays an 84% male to 16% female distribution. According to Chang AC *et al.*, there are 44% females and 56% men. Alcoholism has been linked to the highest frequency of liver abscess in males (96% in our study), with 80% of cases in the current study having alcoholism.

This correlates with the findings of Oschner & Debakey which predispose to hepatitis. Alcohol damages the hepatocellular membrane and increases the risk of hepatic abscess development^[15, 16].

The clinical features and presentation of the cases in our investigation vary. As our observation the most prevalent symptom being stomach discomfort 93% followed by fever 74%. Clinical symptoms included liver enlargement (52%), RUQ soreness (65%), and jaundice (14%). Debnath *et al.* report 74% of cases with fever, 30% with nausea and vomiting, 42% with anorexia, and 4% with diarrhoea. Hepatomegaly clinical symptoms in 80% of patients and RUQ soreness in 95% of cases. Per Daval *et al.*, 97% of cases have abdominal pain, 74% have a fever, 50% have nausea and vomiting, and 49% have anorexia. The majority of clinical symptoms (95%) were right hypochondrial (RHC) soreness, followed by localised guarding (47%). Hepatomegaly was seen in 26% of patients. According to a research by D.S. Sing *et al.*, 100% of cases have fever and abdominal pain; 85% of cases have diarrhoea; and 24% have jaundice. According to a research by Barnas *et al.*, 67% of sufferers have abdominal pain, 87% have fever, 45% have anorexia, and 35% have diarrhoea^[17, 18, 19].

In present study RUQ soreness is commonest clinical symptom accounting to 65%; hepatomegaly 52% and jaundice 15%. According to a study by Debnath *et al.*, in 80% of instances, tenderness in the right hypochondrium is the most common sign (95%) of hepatomegaly. According to the Daval *et al.* study, the most common symptom is right hypochondrial (RHC) soreness (95%), which is followed by localised guarding (47%), whereas hepatomegaly was found in 26% of the patients. D.S. Incidence of jaundice is reported in 24% of cases in the Sing *et al.* study and 10% of cases in the Barnas *et al.* study. In the current study, anaemia was observed in 67% of laboratory values, followed by leukocytosis in 58% of cases, elevated bilirubin in 24%, and elevated SAP in 47% of cases. According to the Debnath *et al.* study, 66% of cases had elevated alkaline phosphatase and 78% of cases have leukocytosis. According to the Daval *et al.* study, 41% of cases had anaemia, 80% had leukocytosis, and 12% had hyperbilirubinemia^[19, 20].

Based on data from his study, jaundice associated with liver abscesses is primarily caused by cholestatic factors. Intrahepatic cholestasis which is related to compression of both hepatic ducts. We did not see an increase in mortality in liver abscess with jaundice, despite observations made by Lamot and Pooler, Vakil *et al.*, and Hazra *et al.* Raised dome of diaphragm observed in 49% of radiographs of the chest and abdomen is the most prevalent characteristic. In 17% of instances, pleural effusion was observed, and in 12%, basal atelectasis. Daval *et al.* investigation demonstrated raised dome of diaphragm in 90% of cases, pleural effusion in 6% and consolidation in 5% of cases^[20, 21].

Cases can be divided into groups according to the location, size, and number of abscesses present. In our study, the average size of the abscess cavity was 9.4 cm. The majority of cases have an abscess cavity that is between 5 and 10 cm in size. Approximately 70% of instances involve the right lobe, whereas just 16% include the left lobe. In 14% of cases, both lobes are affected. Sixty-six percent of cases have a single abscess, whereas only 34 percent show numerous abscesses. A research by Davalo *et al.* revealed that the mean abscess size was 6.8 cm and was associated with elevated dome of the hemidiaphragm, bowed costophrenic angle, and

consolidation/atelectasis. 56% of cases had a single abscess, compared to 44% who saw many. 84% of cases involved the right lobe, 5% the left lobe, and 12.5% the bilobe. In a research by Chang AC *et al.*, there were single abscess cavities in 58% of cases and multiple abscesses in 42% [21, 22].

Finding the abscess cavity and its location, number, and usefulness for aspiration and follow-up are all made possible by sonography. It is also helpful in distinguishing the type of PUS, which helps in choosing the right size aspiration needle. According to our research, an ultrasonography's sensitivity is about 97%. Nevertheless, this investigation encountered false positive results (3%) that were actually degenerating hepatomas. Similarly Cimmino CV. Scott DW evaluated as case report of a benign liver tumour with central necrosis which was misinterpreted clinically as liver abscess. Current study Davalo *et al*, Chang *et al*, Ghose *et al*. While no discernible liver enlargement was observed in cases of left lobe abscess, all cases of right lobe abscess were diagnosed based on clinical signs of liver enlargement. The highest frequency of right lobe abscess in this study (70%) correlated with prior findings [22].

In this study, ultrasonography and clinical features play a major role in the diagnosis of liver abscess, with stool and pus testing playing a secondary role. In this study, the procedure involved using conservative therapy (Drugs) to treat liver abscesses less than 5 cm in size on ultrasonography. Ciprofloxacin 200 mg twice daily, metronidazole 750 mg three times a day, both parenterally for five days (Before switching to an oral preparation), and chloroquine 300 mg twice a day orally were the treatments we utilised to treat patients with amoebic liver abscesses. First, empirical antibiotics were used to treat pyrogenic liver abscesses: 75 mg twice daily of Ceftriaxone, 750 mg of Amikacin, and 500 mg of Metronidazole. These dosages were subsequently adjusted based on culture and sensitivity. Other than vomiting, there haven't been any serious side effects with chloroquine use. Conservative care helps the majority of patients (90%) to resolve and improve. 10% of individuals whose size didn't go down even after four to five days on antibiotics had their aspirations done under ultrasound guidance [22, 23].

About 35 of the 100 cases that were examined underwent closed needle ultrasonography guided aspiration. For patients in whom the conservative course of treatment is ineffective and for abscesses larger than 5 cm but smaller than 10 cm, we performed aspiration using a 14 gauge needle. We regularly performed bleeding time and clotting time prior to aspiration. One ampule of vitamin K injection was administered every day for three days before aspiration. Thick pus starts to liquefy three days after anti-amoebicidal medication is administered, and it can be aspirated under ultrasonography supervision. While Balasegaram has detailed the problems of leakage that may occur during needle aspiration, such as subphrenic abscess (14%) and peritonitis (9%), no biliary peritonitis was observed in our investigation. In our investigation, no such issue surfaced. Typically, we gave the patients parenteral antibiotics for five days before switching to oral medications. We instructed the patients to continue taking T. chloroquine for two weeks and metronidazole tablets for three weeks after they were discharged. Before being released, and then every two months after that, until the abscess healed, we measured the abscess using an ultrasonography. In the current study, an ultrasound revealed that the abscess had fully resolved after three to four months [23, 24].

Out of 100 patients, or 17 instances, or 19%, had percutaneous drainage. A

transcutaneous catheter was inserted while being guided by ultrasonography. For drainage, a pig tail catheter or a 14 or 16 French malecot's catheter is typically utilised. Among 17 cases of percutaneous drainage, we conducted ICD for 3 cases as presented as pyothorax. Our investigation showed no mortality. Since the development of sophisticated imaging methods, the function of open drainage in hepatic abscesses has essentially disappeared. Thirteen instances presenting as acute abdomen with an abscess that burst resembling a perforated peptic ulcer, pancreatitis, ileal perforation, or perforated appendicitis underwent laparotomy and open drainage. Patients not responding to aspiration. For an abscess that is larger than 10 cm. for substantial multiple abscesses. There was no mortality in our trial, and the post-operative time went without incident. In our analysis, aspiration was the most often used treatment technique (39%), followed by conservative management (28%). In the Daval *et al.* study, 78% of patients had aspiration, 10% had a percutaneous catheter, 5% had an ICD, and 8% had a laparotomy^[24].

Conclusion

Liver abscesses account for 0.8% of all hospital admissions. In our investigation, the prevalence of amoebic liver abscesses was very high. Of the patients, 80% had alcoholism. In both amoebic and pyogenic liver abscesses, males prevail (6:1). Leucocytosis and anaemias were frequent companions. The most frequent signs and symptoms are soreness and hepatomegaly, along with fever and stomach ache. Jaundice was only observed in 14% of individuals. The right lobe was mostly implicated in the 5:1 ratio. The clinical diagnosis of a liver abscess is simple, unless the patient presents with complications. Just 13% of individuals had histolytica isolated from their faeces, and 10% had aspirated pus. Of the ninety patients that were treated, twenty-five underwent conservative treatment, thirty-five needed aspiration, seventeen needed percutaneous catheter drainage, and thirteen needed open drainage. The most popular and helpful test for diagnosis, therapy, and follow-up is ultrasound. CT scans are often saved for questionable situations and those that exhibit problems. In our series, patients with lower socioeconomic level account for nearly 70% of the total number of abscesses seen.

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Conflict of interest

None

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