

## Management of Patients of Liver Abscess in a Tertiary Care Hospital an Observational Study

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### Abstract

**Background:** Liver abscess is an uncommon condition that over past many years has seen changes in etiology diagnosis and treatment. With the advent of Laproscopy surgeons are now routinely performing drainage of liver abscess particularly pyogenic with safety and lesser time.

**Aim:** To study the clinical features, radiological findings and microbiological profile of liver abscess patients and to study the efficacy and outcomes of percutaneous drainage of patients with pyogenic liver abscess.

**Methods:** This study was conducted in Department of General Surgery of Alfalah School of Medical Sciences and Research Centre, Dhauj, Faridabad, Haryana, 45 patients with clinical and imaging (ultrasound and contrast enhanced CT) features suggestive of pyogenic liver abscess and admitted to our department were included in the study based on inclusion and exclusion criteria. Detailed history, physical examination, baseline investigations, ECG and chest x-ray, ultrasound whole abdomen, contrast enhanced CT of abdomen and pelvis was done, and patients were followed till discharge from hospital premises.

**Results:** Majority (23/45) of our patients were not having any kind of known or preexisting morbidity at the time of admission to hospital, these patients accounted for 60% of our study population. Imaging with both ultrasound and contrast enhanced computed tomography was done in all patients, 24/45 patients i.e., 53.33% of patients were having abnormalities evident on CT and 21/45 patients i.e., 46.66% were having features of pyogenic abscess on ultrasonography. We followed guidelines-based treatment for management of pyogenic abscesses. Majority 23/45 of our patients were managed by pigtail drainage i.e., 51.11%. 17/45 patients were managed by IV followed by oral antibiotics making this category of patients 37.77% of our total sample population. Open surgical drainage was done in four patients (8.88%), two out of them were directly taken for surgical intervention and other two after failure of pigtail drainage. Only one patient had to undergo USG guided pigtail drainage after failure of IV antibiotic therapy.

**Conclusion:** Abscess can lead to sepsis and significant morbidity and mortality for patients. Patients with abscess, especially deep abscess, can be critically ill. Image-guided

percutaneous drainage is very beneficial for these patients as it allows for successful drainage of the abscess with minimally invasive techniques. General anesthesia can be avoided, which may reduce hospital stay and also decrease the cost of care.

**Keywords:** Pyogenic Liver Abscesses, Laparoscopy, Ultrasonography, Mortality.

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## Introduction

Liver abscess is the condition which consist of collection of purulent material in liver parenchyma due to bacterial, parasitic, fungal or mixed infections. Liver abscess is broadly divided into amoebic and pyogenic liver abscess with majority of the amoebic etiology in developing countries and pyogenic in developed countries [1]. During the early years of 20th century, pyogenic liver abscess was seen most often secondary to appendicitis but later on biliary tract diseases usually precede the pyogenic liver abscess[2].

Early detection and localization secondary to advancements in CT and ultrasonography (US) advanced the treatment of pyogenic liver abscess considerably. Nowadays percutaneous treatment of pyogenic liver abscess whether single or multiple abscesses has become the standard of care. In addition, endoscopic and laparoscopic option for drainage in patients who are not responsive to antibiotic treatment have been explored with good outcomes[3-7].

Reported risk factors associated with development of pyogenic liver abscess include diabetes (odds ratio [OR] = 3.6; 95% confidence interval [CI], 2.9 to 4.5) [8]. This may relate to patients with diabetes, increasing risk for severe gram-negative infections and bacteremia [9]. Patients with cirrhosis are also at increased risk of pyogenic liver abscess with standardized incidence ratio of 15.4 (95% CI 9.2 to 23.6) versus 1.0 in the background population [10]. The clinical presentation of pyogenic liver abscess can be quite variable and the early presentation of symptoms is non-specific or vague

prodromal symptoms such as weight loss, fever, fatigue, malaise, anorexia and myalgia may occur many weeks before more specific symptoms which may localize the process such as right upper quadrant pain, hepatomegaly or jaundice. The classical triad of right upper quadrant pain, fever or chills and generalized malaise is not universally seen. Fever is most common presenting sign and is present in at least 2/3rd of the patients [11]. Right upper quadrant pain is also frequently present [12].

Percutaneous drainage has become the first line treatment of pyogenic liver abscess with diminished need for open surgical drainage. Needle aspiration is simple procedure has better patient comfort and is cost effective [13]. Percutaneous aspiration has a higher success rate, a shorter duration of hospital stay and a lower mortality rate [14].

## Methods

This observational study was conducted in Alfalah School of Medical Sciences And Research Centre, Dhauj, Faridabad, Haryana in the department of general surgery, 45 patients with clinical and imaging (ultrasound and contrast enhanced CT) features suggestive of pyogenic liver abscess and admitted to our department were included in the study based on inclusion and exclusion criteria. Detailed history, physical examination, baseline investigations, ECG and chest x-ray, ultrasound whole abdomen, contrast enhanced CT of abdomen and pelvis was done, and patients were followed till discharge from hospital premises.

Confirmation of diagnosis was made by abdominal Ultrasonography (USG) and examination of aspirates. Socio demographic and clinical information were collected in a predesigned and pre-tested schedule. It is a condition where the disease can be diagnosed and Pathology can be determined easily. A patient with right upper abdominal pain and associated fever could raise it is suspicion and an USG maybe more than enough to confirm it.

In all patients, the clinical parameters, hematologic and biochemical findings, microbiological assays, and radiologic findings were documented and obtained from the case records and a computerized database. Size of abscess was determined by the widest diameter of the largest abscess identified. Multiloculation was defined as an abscess with 2 or more septations within its cavity. After initial workup of blood cultures, broad-spectrum antibiotics in the form of ceftriaxone and metronidazole were given parenterally. This was modified accordingly when bacterial cultures and sensitivities were subsequently available.

The approach to drainage of the abscess was determined and carried out by the individual surgeons. All patients that underwent SD had their CT scans reviewed prior to the procedure to assess

the position and best route of drainage. Intraoperative ultrasonography (IOUS) was used to locate and mark the extent of the abscess. The position of major vascular and biliary pedicles was also noted. Diagnostic aspiration with a 20-Fr needle was used to confirm the location of the abscess and mark the site for drainage. Drainage was carried out by complete removal of all pus. Intra-abscess loculations were broken down by gentle blunt dissection. Following drainage, the abscess cavity was flushed with saline for clearance of residual pus and necrotic debris. IOUS was used to confirm the complete drainage and hemostasis was secured. Large-bore soft tube drains (28 Fr) were placed within the abscess cavity proper. Individual consultant surgeons of the teams supervised all surgical procedures. In both drainage procedures, abscess cavities were followed up by US or CT imaging. Drainage tubes are removed only after drainage is minimal. All patients were subsequently followed up for at least 3 months after discharge from hospital.

## Results

Demographic profile of the study population is given in the (table 1). Mean age of patients was  $46.37 \pm 17.93$ , majority (48.89%) of the patients belonged to age group of less than 40 years.

**Table 1: Demographic profile of the study population**

| Variables        | Frequency | %           |
|------------------|-----------|-------------|
| Sex M/F          | 21/24     | 46.67/53.33 |
| Businessman      | 3         | 6.67        |
| Driver           | 2         | 4.44        |
| Electrician      | 1         | 2.22        |
| Employee         | 1         | 2.22        |
| Farmer           | 6         | 13.33       |
| Gardner          | 1         | 2.22        |
| Govt employee    | 1         | 2.22        |
| Housewife        | 13        | 28.89       |
| Policeman        | 1         | 22.22       |
| Retired employee | 1         | 22.22       |
| Shopkeeper       | 2         | 4.44        |

|         |   |       |
|---------|---|-------|
| Student | 8 | 17.78 |
| Sweeper | 1 | 22.22 |
| Teacher | 4 | 8.89  |

Majority (27/45) of our patients were not having any kind of known or preexisting morbidity at the time of admission to hospital, these patients accounted for 60% of our study population. Eight patients were having history of intake of anti-hypertensives making hypertension as most common co-morbidity in our study population (17.78%). Type 2 diabetes was

present in four (8.89%) patients and all of them were on oral hypoglycemic agents. Three (6.67%) patients were having both hypertension and diabetes. There was one (2.22%) patient each in the categories of chronic obstructive pulmonary disease, dilated cardiomyopathy, and hypothyroidism. These findings are presented in (Table 2).

**Table 2: Presentation of Study population on the basis of co-morbidity**

| Co Morbidity | Frequency | %     |
|--------------|-----------|-------|
| COPD         | 1         | 2.22  |
| DCM          | 1         | 2.22  |
| HTN          | 8         | 17.78 |
| HTN, T2DM    | 3         | 6.67  |
| Hypothyroid  | 1         | 2.22  |
| Nil          | 27        | 60.00 |
| T2DM         | 4         | 8.89  |

Laboratory analysis on automated CBC analyzer was done in all patients, 23/45 patients were having normal parameters on complete blood count, making these patients 51.11% of our total sample

population, leukocytosis defines as leucocyte count more than 10 thousand were seen in 22/45 patients i.e., 48.89% (Table 3).

**Table 3: Derangements in complete blood count**

| CBC parameters | Frequency | %     |
|----------------|-----------|-------|
| Leukocytosis   | 22        | 48.89 |
| WNL            | 23        | 51.11 |

Imaging with both ultrasound and contrast enhanced computed tomography was done in all patients, 24/45 patients i.e., 53.33% of patients were having abnormalities

evident on CT and 21/45 patients i.e., 46.66% were having features of pyogenic abscess on ultrasonography (Fig 1).

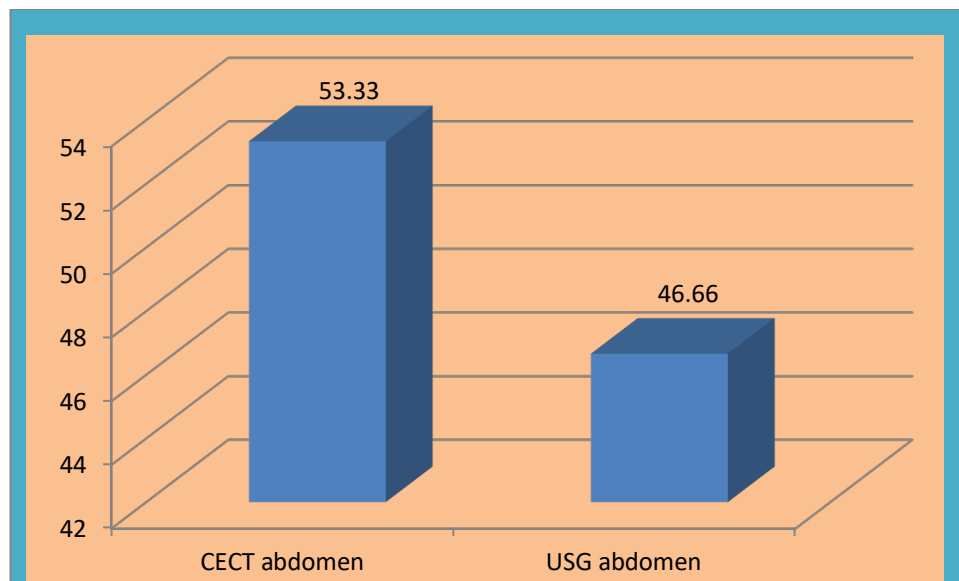


Figure 1

Majority 23/45 of our patients were managed by pigtail drainage i.e., 51.11%. 17/45 patients were managed by IV followed by oral antibiotics making this category of patients 37.77% of our total sample population. Open surgical drainage

was done in four patients (8.88%), two out of them were directly taken for surgical intervention and other two after failure of pigtail drainage. Only one patient had to undergo USG-guided pigtail drainage after failure of IV antibiotic therapy (Fig. 2).

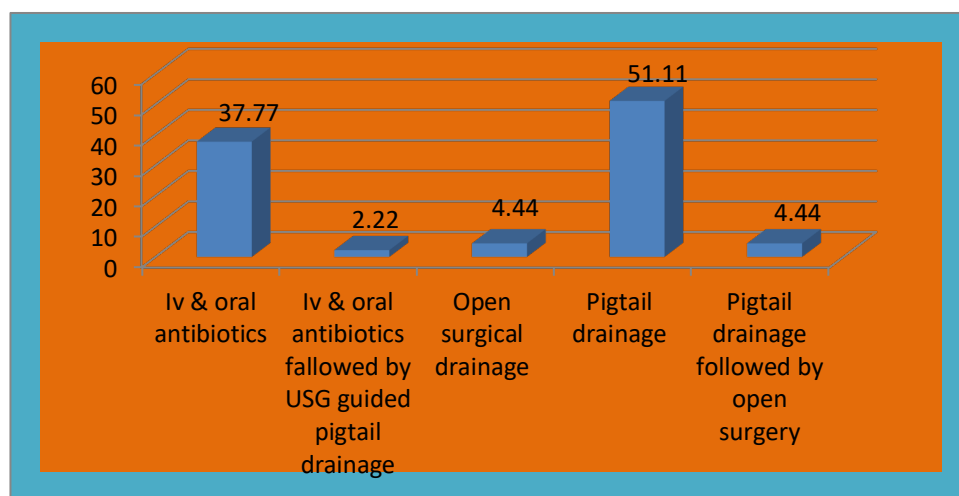
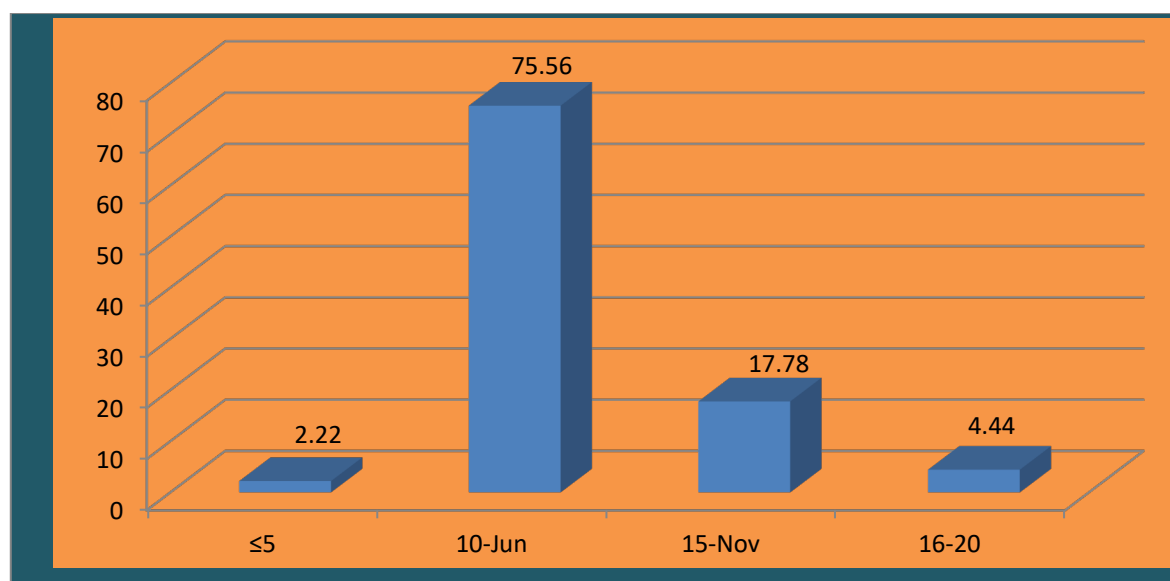


Figure 2

Mean hospital stay in our patient population was  $9.53 \pm 2.95$  days. Maximum days spent in hospital were 20 and minimum was one day. Majority (34/45) of patients stayed for six to ten days in

hospital (75.56%), 17.78% were admitted for eight days, only two patients needed prolonged admission of 16-20 days (Fig. 3).



**Figure 3**

### Discussion

Pyogenic liver abscess is still a serious disease and a diagnostic problem owing to absence of specific clinical signs and laboratory results [15]. Previously there are reports of even missing some cases intra-operatively [16]. Recent diagnostic techniques such as ultrasound and CECT has made diagnosis simpler but still other conditions such as parasitic infections, primary and metastatic hepatic tumor cannot be ruled out with certainty [17]. Radiological advances, combined with improvements in microbiological identification and treatment, has helped to decrease mortality rates [18].

In the present study mean age of patients was  $46.37 \pm 17.93$  years, Majority (48.89%) of the patients belonged to age group of less than 40 years, very few of our patients were seen in extremes of age groups with only two of our patients above 60 years of age. In this study, males (53.33%) were affected more than females, our data corroborate with other major studies showing a male majority of patients [19, 20], although some recent reports also suggest a trend to an equal sex incidence [21, 20].

In our study fever, right upper abdominal pain, nausea, and vomiting were main presenting symptoms, with fever in 37 and pain in 35 out of 45 patients, while on physical examination tender right hypochondrium was recognised in 60% and jaundice in 24.44% of cases. Studies suggest fever occurs in approximately 90% of patients with liver abscess, and abdominal symptoms like pain, guarding, tenderness occur in 50 to 75% [18]. In addition to presenting symptoms, the presence of a raised white blood cell count, bilirubin, liver enzymes and alkaline phosphatase should suggest the possibility of pyogenic liver abscess [22], our data found leucocytosis in 51.11% and laboratory abnormalities of liver function in 22.22%, (mainly hyperbilirubinemia) of patients.

In our study at the time of presentation to the hospital, 60% of our patients did not have any known or preexisting conditions, hypertension was most common co-morbidity, seen in 17.78% of our study population, followed by diabetes in 8.89% and only minority had some other significant past history of COPD, DCM, or hypothyroidism.

In the present study, all our patients were subjected to ultrasound examination and a

sensitivity of 46.66% in diagnosis was achieved. Predominant number 24/45 (55.33%) of patients in our series needed CT scan examination for confirmation of diagnosis, this apparent discrepancy with major studies can be explained by subjective nature and expertise dependence of USG as compared to CT. USG is very useful technique for documentation of the course of the hepatic abscess in our series. On ultrasound scans the pyogenic liver abscess appears as a hypoechoic lesion with irregular margin. Within the lesion these may be irregular areas of increased echogenicity [4].

While imaging studies are critical means to diagnose liver abscess, microbiological diagnosis is absolutely essential in establishing a causal relationship and strategizing further therapeutic plans. The most common pathogens of the pyogenic hepatic abscesses are *E coli*, *K pneumoniae*, *Bacteroides*, *Enterococci*, *Streptococci*, and *Staphylococci*. *K pneumoniae* has been believed to surpass *E coli* to become the predominant cause of pyogenic liver abscess [23] as is also seen in sepsis overall. Our data was suggestive of *E coli* as the predominant pathogen, which was found in 42.85% of the culture-positive patients, followed by *Streptococci* (31.4%), we found *K pneumoniae* only in five of our patients.

Percutaneous catheter drainage is considered as standard treatment of choice for liver abscess. It is safe, effective, and has been praised for its simplicity and excellent results [24]. It results in early relief of symptoms and faster resolution of abscess cavity. This is also evident from our series where 23 patients (51.11%) were subjected to this mode of treatment and only 2 patients (8.69%) among them subsequently needed open surgical drainage because of inadequate response to percutaneous drainage. Although of considerable benefit, some studies suggest it may be associated with a higher failure rate than surgical drainage<sup>86</sup> which our

study contradicts. Antibiotics were used in all of our patients, but 37.77% (n=17) of our patients were put exclusively on antibiotics only, this was also seen as highly effective modality of treatment with only one patient (5.88%) requiring subsequent pigtail drainage after antibiotic failure. In our study both pigtail drainage and antibiotic only, modalities were effective and have shown statistically significant reduction in hospital stay as compared to open drainage.

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