# **Original Research Article**

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# Assessment of outcome and complications of ultrasonography guided pigtail catheter drainage in management of liver abscess

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## **ABSTRACT**

**Background:** Liver abscess (LA) is defined as an encapsulated collection of suppurative material within the liver parenchyma. Liver abscesses are most commonly due to bacterial, amoebic or mixed infections. Less commonly these may be fungal in origin. Liver abscess are associated with mortality of up to 20% and are categorized into various types based on aetiology, of which amoebic (ALA) and pyogenic (PLA) liver abscess are major types. The objective is to evaluate and assess the response of percutaneous pigtail catheter drainage in treatment of liver abscess and to document the complications of liver abscess (LA).

**Methods:** The study was conducted on patients who were admitted from casualty and outpatient department with a diagnosis of liver abscess (LA). 100 patients of LA were included in the study. They were divided into two groups. Group 1 consists of LA patients without associated complications and Group 2 consists of LA patients with associated complications like rupture, jaundice, IVC compression, persistent or recurrent LA.

**Results:** There were 88% males and 12% were females in the study. 30% patients had complications. Out of them, 14 (46.6%) patients of LA presented with intra-peritoneal rupture. 12 (40%) with jaundice, 2 (6.7%) with rupture into pleural cavity and 2 (6.7%) patients had IVC compression. (70%) had involvement of right lobe while minimum patients (12.9%) had bilateral lobe involvement in group 1 and (10%) had involvement of left lobe of liver in group 2. **Conclusions:** Pigtail insertion and percutaneous catheter drainage (PCD) of abscesses, peritoneal or pleural cavity are safe procedures. PCD is a good alternative to open surgical drainage.

Keywords: Liver abscess, Complications, Pigtail catheter, Percutaneous drainage

# INTRODUCTION

In the time of Hippocrates i.e. around 400 B.C., liver abscess (LA) or hepatic abscess (HA) was first described. According to Huang et al, in early 1900s the most common cause of LA was pylephlebitis. This was secondary to appendicitis and in late 1900s, biliary tract disease becomes the most common cause which remains the commonest cause still today.

In both developing and developed countries, liver abscess has high disease burden with increase mortality rate. It

occurs as a complication of various intra-abdominal infections or by haematogenous spread through portal vein from the gastrointestinal tract or may develop due to traumatic liver injury. Liver abscess (LA) is defined as an encapsulated collection of suppurative material within the parenchyma of liver. In the western countries, majority of LAs are infected with bacteria which occurs due to the invasion and multiplication of microorganisms getting entry from an injury through the blood vessels or by the biliary tract. Liver abscesses were most commonly occurred due to bacterial, amoebic or mixed infections while fungal origin was less commonly. 10

Hepatic abscess may also develop due to an altered immune response like in patients with malignant diseases, AIDS or granulocyte functional disorders. Hepatic abscesses were associated with trauma and can show delayed manifestion.<sup>11</sup>

Now a days high incidence of HA was seen which were associated with malignancies and their treatment specially from liver metastasis and as complications of transarterial chemoembolization (TACE) or radiofrequency ablation (RFA).<sup>12,13</sup>

Liver abscess show mortality rate of 20%. They are categorized into various types depending upon the aetiology, of which amoebic (ALA) and pyogenic (PLA) liver abscess are the most common types. <sup>14</sup>

In developing countries, Amoebic liver abscess accounts 3-9% cases of amoebiasis. <sup>15</sup> The annual incidence of pyogenic liver abscess was seen 2.3 cases per 100,000 populations and higher incidence was found among men than women (3.3 vs. 1.3 per 100,000). <sup>16</sup>

More number of cases of amoebic liver abscess found between second to fourth decade of life but can occur at any age. Hepatic abscesses occur most common on the right lobe of liver (approximately 75% of cases) while the left lobe of liver is involved in approximately 20% of the cases and the caudate lobe is rarely involved (5%). Bilateral lobe involvement is less common. About 50% of hepatic abscesses are found solitary. Hepatic abscesses may differ in size i.e. from less than 1 mm to 3 or 4 cm in diameter and can be seen as multi locular or a single cavity. The classical symptoms of pyogenic liver abscess are fever, chills, jaundice and abdominal pain but many nonspecific symptoms can also be present.

Now a days, percutaneous drainage of liver abscess has been an important advancement in the management of pyogenic liver abscesses. Percutaneous treatment (needle aspiration or catheter drainage) is now considered as a standard management for liver abscesses. The common complications of ALA are rupture into pleural cavity and peritoneal cavity while vascular complications are less common.<sup>17</sup>

# Aims and objectives

To evaluate and assess the response of percutaneous pigtail catheter drainage in treatment of liver abscess and to document the complications of LA.

#### **METHODS**

This was a hospital based cross sectional study conducted between January 2018 to June 2019, on patients who were admitted from casualty and outpatient department with a diagnosis of LA in a tertiary care hospital (Uttar Pradesh University of Medical Sciences).

100 patients were included in the present study. Out of these, 70 patients were categorized as group 1 (LA without complications) while 30 patients as group 2 (LA with complications). The findings were recorded on a pre-determined format.

## Inclusion criteria

Patients of LA without complications and patients of LA with complications

#### Exclusion criteria

Patients with bleeding diathesis, peritonitis with septicemia, cholestatic jaundice due to hepatitis, drugs etc., extra hepatic biliary pathology like choledocholithiasis or CBD strictures etc. were excluded from the study.

# Methodology

Technique of pigtail catheter insertion

Pigtail catheter is an angiographic type polyethylene tube usually ranging in size from number 16 to 18 F with the distal end tapered. Catheter is accompanied with a trocar and cannula. The position of patient was determined by the site chosen for the drainage. The site of insertion of by the catheter was guided transabdominal ultrasonography using 3.5-5 MHz transducer. The selected area after meticulous surgical toilet was infilterated with 2 to 3 ml of 1% xylocaine using a 24gauge needle. A small puncture with a stab knife was made in skin at site of pigtail insertion. Insertion was done under ultrasound guidance using 16 to 18 F pigtail catheter with trocar. The pigtail was fixed to the skin immediately after procedure using 1-0 silk. The proper insertion was confirmed by positioning of pigtail.

## Ethical clearance

It was obtained from the Institutional Ethical Committee of the hospital before the start of the study. The written informed consent was also obtained from each patient before the conduct of the study.

# Statistical analysis

The Data thus collected was entered in Micro-Soft Excel work sheet which was analyzed using SPSS V- 24.0, IBM Inc. Chicago, USA software. Chi square test was applied for analysis and interpretation of data.

# **RESULTS**

Fever (100%) and abdominal pain (99%) over right hypochondrium were the most common symptoms in LA patients. Hepatomegaly, anorexia and vomiting were present in 95%, 69% and 66% of patients respectively

while cough and pedal edema were least common symptoms (Table 1).

Table 1: Symptoms in patients of liver abscess.

Symptoms	Number	Percentage (%)
Fever	100	100
Abdominal pain	99	99
Hepatomegaly	95	95
Anorexia	69	69
Vomiting	66	66
Abdominal distension	15	15
Jaundice	13	13
Cough	3	3
Pedal edema	2	2
Dyspnoea	0	0

Maximum patients (70%) had involvement of right lobe while minimum patients (12.9%) had bilateral lobe involvement in group 1 and (10%) had involvement of left lobe of liver in group 2. The association was not found to be statistically significant that means there is no relationship between complications and liver lobe involvement (Table 2).

Table 2: Association of liver lobe involvement in group 1 and group 2.

Liver lobe involvement	Total (n=100)	Group 1 (n=70) (%)	Group 2 (n=30) (%)	Chi square test
Right	70	49 (70)	21(70)	.2 1 42
Left	15	12 (17.1)	3 (10)	$\chi^2=1.42$ , p=0.490
Bilateral	15	9 (12.9)	6 (20)	p=0.490

Majority of the pus culture report was sterile in both the groups. In group 1, *E. coli* was found in 22 patients of LA while absent in group 2 patients (Table 3).

Table 3: Culture report of pus of LA patients.

Culture	Group 1	Group 2	Total
Sterile	45	26	71
E. coli	22	0	22
Klebsiella	3	1	4
Streptococci	0	2	2
Enterococci	0	1	1

32% patients belonged to 21-30 years age group and 27% patients belonged to 31-40 age group while 5% belonged to less than 20 years of age group (Figure 1). Majority of the patients (14%) had complication of rupture into peritoneal cavity while IVC compression and rupture into pleural cavity were less commonly seen (Figure 2). Maximum patients had single abscess, 82.8% in group 1 and 66.7% in group 2 while multiple abscess was seen only 17.2% in group 1 and 33.3% in group 2 (Figure 3).

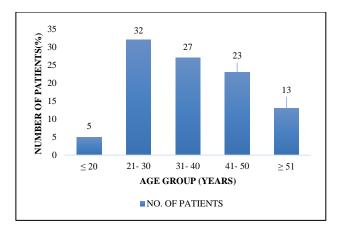


Figure 1: Age wise distribution of liver abscess patients.

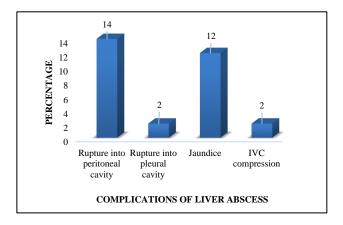


Figure 2: Frequency of complications in LA patients.

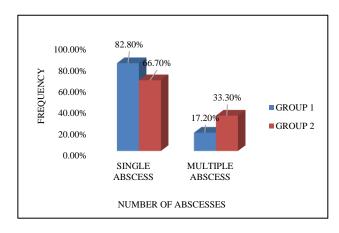


Figure 3: Distribution of number of abscesses in group 1 and group 2.

# **DISCUSSION**

In the present study, out of 100 patients, 70 patients belonged to group 1 (LA without complications) while 30 patients belonged to group 2 (LA with complications). Most of the LA cases occurred in second and third decade of life but the mean was higher (37.87 years) in patients of LA patients with complications, which suggest that LA is likely to occur before age of 50 years. If it occurs after

50 years, then it is more likely to be associated with complications. This would be because of weak host immunity in older age and poor nutritional status. This leads to various complications and invasive disease. Similar findings were observed in the study done by Abbas et al and Blessman et al.<sup>7,18</sup>

In the present study, maximum patients belonged to age group 21-30 years in group 1 while in group 2 maximum were from 31-40 years. Very few patients belonged to age group  $\leq$ 20 years (both groups) and  $\geq$ 51 years (group 1). The age group shows a statistically significant association with LA patients (p value <0.001). Majority of the patients were male 88%. In the study done by Abbas et al, 67 patients of liver abscess were admitted to the hospital. Out of this, 61 (91%) patients were males and 6 (9%) were females. The increased ratio may be due to that more male patients were available at the time of study.

In the present study, fever (100%) and abdominal pain (99%) over right hypochondrium were the most common symptoms in LA patients. Hepatomegaly, anorexia and vomiting were present in 95%, 69% and 66% of patients respectively. In the study done by Cosme et al, the most common signs and symptoms are abdominal pain which was associated with fever and diarrhoea.<sup>19</sup>

In the present study, amoebic serology was found to be positive in 97% patients. Maximum patients (70%) had involvement of right lobe. Memon et al also reported the similar findings.<sup>20</sup> In group 1, majority 58/70 (82.8%) of patients had single abscess and 12/70 (17.2%) had multiple abscess in liver. In group 2, majority 20/30 (66.7%) of patients had single abscess and 10/30 (33.3%) had multiple abscess in liver. The test was found to be statistically significant. That is number of abscess has association with complications in LA patients (p value <0.001). The patient who had single abscess were more prone to the development of complications. In the study done by Abbas et al, seven patients (64%) had single abscess in the right hepatic lobe and three patients (27%) had single abscess in the left hepatic lobe while one patient (9%) had multiple hepatic abscess.<sup>7</sup>

Nigam et al observed that jaundice is more common in patients of ALA with multiple abscess while Sharma et al in their study observed that jaundice is more common in patients of ALA in right lobe of liver.<sup>21,22</sup>

Now a days, percutaneous drainage has been an important advancement in the management of pyogenic liver abscesses. Percutaneous treatment (needle aspiration or catheter drainage) has now become a standard management for liver abscesses. It has replaced surgical exploration which has very limited indications. Needle aspiration is less expensive and it avoids problems related to catheter care and long-term hospital care. In the same sitting, multiple abscesses can also be aspirated through different tracts. Repeated needle aspirations are required

in a single patient. So to avoid this problem, percutaneous pigtail catheter drainage is now used in the management of liver abscesses. The advantage of catheter drainage is that it provides a continuous outlet to the pus. The most common complications of ALA are rupture into pleural cavity and peritoneal cavity while vascular complications are less commonly seen.<sup>23</sup>

## **CONCLUSION**

During the course of study, we have been able to document the complications that are encountered in liver abscess patients in our centre that is a tertiary care hospital. We also have been able to show that pigtail insertion and percutaneous catheter drainage (PCD) of abscesses, peritoneal or pleural cavity are safe procedures. PCD is a good alternative to open surgical drainage. Open surgical drainage is always has been considered to have higher morbidity and mortality. We encountered very little morbidity and no mortality in the management of these patients with PCD. None of these patients required open surgical drainage.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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