

## Management of Liver Abscess by Ultrasound Guided Percutaneous Catheter Drainage: Our Experience

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### Abstract

Liver abscesses have plagued mankind from times immemorial with well-documented reference of the abscess since the time of Hippocrates (400 B.C.). The two common causes of liver abscess are pyogenic and amoebic. Amoebic liver abscesses are more common in our series as compared to pyogenic. There is a third entity, namely Fungal Live Abscess is rare. In our series of 61 patients, the most common cause was amoebic abscess and it was seen more often in alcoholic patients.

**Keywords:** Liver Abscess; Pyogenic; Amoebic; Fungal.

### Introduction

The liver is the most important organ located in the right hypochondrium and extending upto the left hypochondrium. The liver is also subjected to various insults through drugs, infections (bacterial, viral, fungal and parasitic), storage diseases, and autoimmune diseases. The liver has dual blood supply systemic and portal circulation with the portal supply responsible for 80% of the venous supply. There is considerable difference in the Etiology of liver abscess in the western world and our setup. Owing to the tropical climate, unhygienic food practices, poor access to clean water supply, low socioeconomic status were usually the main causative factors for the liver abscess. There is a male predominance [1]. High

grade fever and right upper quadrant pain are the cardinal clinical features for both amoebic and pyogenic abscess [2]. However in our series only 4 patients out of a total of 61 presented with fever and no pain and liver abscess was an incidental finding on radiological examination. 30 patients had a history of a previous diarrhea. The diagnosis can be confirmed by image-guided percutaneous aspiration and drainage [3-5]. Continuous Catheter drainage along with antibiotics is now widely accepted and is considered a safe and effective method of management of liver abscesses [6,7]. Appendicitis was traditionally the most common cause for liver abscess [8] but with improved treatment and radiological investigations there is a dramatic reduction in the cause of liver abscess secondary to appendicitis. Although, Amebic liver abscess occurs mostly in the right lobe, considerable variations exist.

### *Aim of the Study*

The aim of the study is to assess the effectiveness of ultrasound guided per-cutaneous drainage in liver abscesses as compared to open drainage procedure.

### Material and Methods of Study

This study was conducted in the department of surgery at Punjab Institute of medical sciences Jalandhar. All patients who presented to the department or referred by the other departments were included in the study. All the patients treated for liver abscess of size 5 cms or more in the maximum diameter or volume of more than 100ml, as measured sonologically or those who failed initial medical therapy were included in the study. The study period was from May-June 2012 to June 2017. Previously

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drained abscesses, which had failed the initial drainage procedure, were also included in the study. All patients underwent ultrasound guided drainage procedure. Along with catheter drainage, the patients were given parenteral antibiotics and metronidazole for five days after which oral medication was started.

All patients who were too sick for the procedure (bleeding disorders) or who underwent laparotomy for the same in ruptured abscesses were excluded from the study. Children under the age of 12 years or moribund or patients on ventilator support were not included in the study. Patients were included in the study with a mean age group of 42 to 43 years with our youngest patient being 16 years and our oldest patient being 70 years. Majority of the patients were males. 5 patients who had a subcapsular rupture also underwent catheter based drainage. The drainage procedure was considered successful if there was symptomatic improvement in the patient and decrease in the leucocyte count by 50% of the initial count and a repeat ultrasound showing decreasing trend in the volume of pus by 50% of the original volume.

*Procedure*

The seldinger technique was used for performing the procedure. Before the commencing the procedure all patients were explained about the procedure verbally and a written consent was taken. All patients had a complete liver function assessment done through laboratory investigations and coagulopathy was ruled out. Within the radiology suite the radiologist visualized the liver abscess and complete measurement of the size and volume of the abscess cavity was noted. Local anaesthetic lignocaine 2%

along with adrenalin was used for infiltration at the site of cannulating the liver. 18 gauge chiba needle was used under direct vision through ultrasound. Once the abscess cavity was entered, pus was aspirated for confirming the location and direction of the needle. A guide wire was introduced in the abscess cavity following which the tract was dilated using sequential dilators. Once the largest dilator was removed malecot drain no-14 or no-16 french size was placed and anchored to the abdominal wall using no-1-0 silk suture.

**Results**

Our study comprised of 56 patients suffering from liver abscess. Out of total of 56 patients 51 (91%) were males and 5 (9%) were females (Table 1).

Majority of the patients had an abscess size of 100 to 300ml with 17 (30.4%) patients of size of 100 to 200 ml and 24 (42.8%) patients with a size of 200ml to 300ml. 7 (12.5%) patients had abscess cavity size of more than 300ml while 8 (14.3%) patients had a size of less than 100m. Table2.

In our series majority of patients were diagnosed with amoebic liver abscess (66%) as compared to pyogenic abscess (34%) which can be attributed to poor living conditions (Table 3).

In our study percutaneous catheter drainage of the liver abscess has been successful in majority of the patients (Table 4). Out of 56 patients 53 (94.6%) patients had a complete resolution of symptoms with only 3(5.4%) patients undergoing re-aspiration of the abscess cavity. None of our patients had to undergo laparotomy for the same.

**Table 1:**

Age	Male	Female	Total No. of patients
12- 20 years	01	00	01
>21 - 30 years	02	00	02
>31 - 50 years	39	04	43
>50 years- 70years	08	01	09
>70 years	01	00	01
Total	51	05	56

**Table 2:** Size of Abscess

Size/volume	Male	Female	Total No. Patients
< 100ml	07	01	08(14.3%)
100-200ml	15	02	17(30.4%)
200-300ml	23	01	24(42.8%)
>300ml	06	01	07(12.5%)

*Alcoholics Versus Non-Alcoholics*

In our series of patients 23.2% of men were consuming alcohol at the time of diagnosis as compared to 67.8% who were non-alcoholics. In these subgroup of patients the symptoms and the disease process took a longer time to heal (Table 5).

Though the diabetic population is considered as a immune-comprised population but in our series only 10.7% of the people were diabetic as compared to non-diabetic.

There were 39.3% of smokers with liver abscess as compared to 60.7% no-smokers. Smoking increases the risk of liver abscess.

*Complications during Procedure*

Foley's catheter have been used in previous studies [9] and Unical Drain-a closed drainage system has been constructed by some researchers [10]. In our study we have used malecot catheter for ultrasound guided percutaneous drainage of the liver abscess. In our study pain was the main complaint of the some patients during procedure (19 out of 56 patients).

The pain was mild to moderate and oral analgesics were sufficient in the post procedure period for this. In two cases catheter was required to be flushed because of blockade.

**Table 3:** Type of abscess

Type	Male	Female	Total
Amoebic	34	03	37 (66%)
Pyogenic	17	02	19 (34%)
Others	00	00	00
Total	51	05	56

**Table 4:**

Total Patients	Success	Repeat Aspiration
56	53 (94.6%)	3 (5.4%)

**Table 5:**

Sex	Alcoholic	Non-Alcoholic	Total
Male	13 (23.2%)	38 (67.8%)	51
Female	00	05	05
Total	13	43	56

**Table 6:** Diabetics

Diabetes status	Male	Female	Total
Diabetics	05	01	06 (10.7%)
Non-Diabetics	46	04	50 (89.3%)
Total	51	05	56

**Table 7:** Smokers vs Non smokers

Smoker status	Male	Female	Total
Smokers	22	00	22 (39.3%)
Non smokers	29	05	34 (60.7%)
Total	51	05	56

**Table 8:**

Complication	Male	Female	Total
Pain	17	02	19
Bleeding	00	00	00
Shock	00	00	00
Bile leak	00	00	00
Blockage of Catheter	02	00	02

## Discussion

Liver abscess is a uncommon medical entity with serious complications and mortality. With improvement in the medical services and patient awareness for their health, we have come a long way from causes arising in people with acute appendicitis to people who are either immunosuppressed or in the lower socioeconomic strata of the society. Biliary infections such as cholecystitis, cholangitis, infection of devascularized liver hydatid cyst may result in pyogenic liver abscess [11] or infection may reach liver from diverticulitis, appendicitis or inflamed bowel via portal vein [12]. Though controversies exist in the management of liver abscess [13], percutaneous drainage of the liver abscess (either needle aspiration or catheter drainage) coupled with systemic antibiotics has become the preferred treatment for the management of pyogenic abscess [6,14,15]. Early recognition of liver status is of prime importance otherwise the mortality and morbidity of the patient increases [16]. The common presentation of patients was with fever, vomiting, severe retching and loss of appetite in our series with fever being the main symptom. It was difficult to rely on any biochemical markers though there were certain non specific markers in our series comprising of elevated ALP (Alkaline Phosphatase), elevated prothrombin time and international normalized ratio [17]. Majority of our patients had low serum albumin levels, it was difficult to tell whether this low albumin level because of the disease itself or the lower socioeconomic backgrounds of these patients increasingly been in favour of non-surgical methods. It has been shown in several investigations that many patients with liver abscess can be treated with percutaneous drainage along with use of parenteral antibiotics [5,6-8,18-23]. In our study majority (91%) patients were males with only 9% females with the maximum patients following in the age group of 31 to 50 years. Our youngest patient was 16 years old male who had a history of travel and diarrhea prior to presentation, these patients had a common symptom among them that was fever which was high grade and diarrhea. Patients with liver abscess who presented to us were subjected to a complete clinical work with radiological assessment and a laboratory examination. Out of a total of 56 patients 51 patients (94.6%) had complete resolution of their symptoms and the procedure was deemed a success with fall in the size of abscess cavity or volume of the abscess. 5 patients in whom re-aspiration was done that pyogenic abscess with multiple abscesses cavities and failure of aspiration. Some studies suggest that continuous catheter drainage is a reliable

and effective treatment of liver abscesses [5,14,24,25,26-29]. Both diabetes and smoking are considered as a risk factor for various cardiac and respiratory diseases respectively but we could not find any direct correlation of smoking and liver abscess. In our series, the diabetic patients were type 2 and on oral hypoglycemics with a raised HBA1C. These patients had a history of poor education of their diabetes and were not taking any dietary precautions. We could not find any direct correlation between smoking and liver abscesses. An interesting fact was noted that during cannulation of the abscess cavity in patients with alcoholic liver disease experienced more pain during the procedure though no complication was recorded. The most plausible reason of this pain can be descended liver capsule in patients in with alcoholic liver disease. The results are good and very occasionally the need of exploration arises. None of our patients underwent an open procedure. Ultrasound guided technique is cost effective as well.

## Conclusion

Percutaneous ultrasound guided drainage of any abscess is a safer and a better option for patients presenting with any abscess. Also it is cost effective. The similar technique has been used for drainage of retroperitoneal and perinephric abscesses. The procedure is simple and has very few procedure related complications. We recommend that ultrasound guided percutaneous drainage should be the first line treatment for any accessible abscess cavity. Surgical procedure should be attempted in cases of failure of percutaneous drainage or inaccessible areas.

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