

## Original Research Article

# Different modalities of management of liver abscess

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**Received:** 15 January 2023

**Revised:** 20 February 2023

**Accepted:** 23 February 2023

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### ABSTRACT

**Background:** Liver abscess is an acute suppurative infectious disease of liver parenchyma which may be pyogenic, amoebic or tubercular. It can occur due to direct blood spread through enterohepatic circulation or due to ascending infection occurring through biliary tree. Aim was to evaluate effectiveness of various management strategies in the management of liver abscess.

**Methods:** It is a prospective study carried out in 100 patients of age 12-80 years between 1st December 2021 to 31st May 2022 who presented to general surgery department and diagnosed with liver abscess.

**Results:** 10% cases were treated conservatively with antibiotics only, 59% cases were treated with percutaneous needle aspiration, 21% patients were treated with percutaneous pigtail catheter drainage, 10% cases were treated with open surgical drainage.

**Conclusions:** Liver abscess with size less than 5 cm or 50 cc can be managed conservatively but liver abscess with size >5 cm need intervention.

**Keywords:** Liver abscess, Percutaneous needle aspiration, Pigtail catheter insertion, Surgical drainage

### INTRODUCTION

A liver abscess is a tropical disease in which a suppurative cavity forms in the liver resulting from the invasion and multiplication of microorganisms, entering directly from an injury through the blood vessels or by the way of the biliary ductal system. Liver abscesses are most commonly due to pyogenic, amoebic or mixed infections. Liver abscesses develop insidiously with abdominal pain, nausea, vomiting, fever, weight loss and no local signs other than painless or slightly tender hepatomegaly. Loss of appetite, jaundice and respiratory symptoms are less common clinical features. In patients it presents with abrupt onset of fever, nausea, severe abdominal pain and leukocytosis. Complications from liver abscesses occur secondary to rupture of the abscess into the peritoneum, pleural cavity, or pericardium. Ruptured liver abscesses

occur in 2-17% of patients and are associated with mortality rates between 12% and 50% according to the present literature.<sup>1</sup> It is an important cause of morbidity and mortality in tropical countries. Morbidity is due to sepsis, pleural effusions, empyema, and pneumonia. Abscesses may also rupture intrathoracic or intraperitoneally, which is frequently fatal. Usually, however, the abscess does not rupture, but develops a controlled leak resulting in a capsule of liver (subcapsular rupture).<sup>2</sup> From the 1950s to 1990, mortality rates varied from as low as 11% to as high as 88%.<sup>3</sup> With advances in diagnosis and treatment modalities currently the mortality has been reduced to 2.5%. The primary mode of treatment of amoebic abscess is medical. Many cases may be refractory to medical therapy, abscesses larger than 5 cm and secondary bacterial infection may complicate 20% of amoebic liver abscess. In such patients and in patients with

pyogenic liver abscesses, percutaneous needle aspiration (PNA) and/or percutaneous catheter drainage (PCD) have been the traditional mode of treatment; with open surgical drainage being used only in patients who fail to respond to such treatment.<sup>4,5</sup>

### ***Aim and objectives***

Aim of the study is to evaluate the liver abscess and its management strategies. Objectives of the study were; to study various clinical presentation of liver abscess, to study various investigation modalities in early diagnosis of liver abscess to reduce the chances of fatal complications, to evaluate effectiveness of various management strategies in the management of liver abscess, conservative medical treatment, percutaneous needle aspiration, percutaneous catheter drainage, open surgical drainage like laparotomy, thoracotomy, intercostal drainage (ICD) tube insertion, incision and drainage (I&D) and to study various complications of liver abscess.

## **METHODS**

### ***Study design, duration and location***

The prospective study was conducted among indoor patients of general surgery department of SMIMER, Surat admitted between 1st December 2021 to 31st May 2022 (1.5 year). Patient data was collected from all patients attending General Surgery department (OPD), casualty and inpatient departments who were diagnosed with liver abscess and giving consent for appropriate interventions and falls into inclusion criteria. Total 100 patients were included in the study. Statistical data analysed by statistical package for the social sciences (SPSS) version 20 software.

### ***Inclusion criteria***

Inclusion criteria for current study were; confirm diagnosis of liver abscess on USG or CT scan, managed by single treatment modality (e.g.: either percutaneous needle aspiration was done or percutaneous catheter drainage, not both), patients who gave consent for operative intervention, whenever required.

### ***Exclusion criteria***

Exclusion criteria for current study were; patients with cavitary lesion of liver in whom USG abdomen or CECT abdomen does not suggest presence of liver abscess. No confirm diagnosis of liver abscess. Patient requiring both percutaneous needle aspiration and percutaneous catheter drainage. Patients younger than 12 years.

### ***Patients were treated according to respective protocol***

Patient on conservative line were followed up daily clinically. Repeat LFT and Ultrasound/ CT abdomen was done immediately if patient condition did not improve/

after 3-4 days as a routine prognostic factor. Management strategies were as follows; Injectable intravenous antibiotics alone (in uncomplicated abscess measuring less or equal to 5cm/50 cc of any size), Ultrasound abdomen suggestive of unliquefied abscess.

Sonography guided Percutaneous aspiration with Antibiotic coverage (in non-ruptured abscess measuring >5 cm to <10 cm, approachable on USG) with a 16G spinal needle. The site, depth, direction of aspiration was guided by ultrasonography and pus aspirated was then sent for culture and sensitivity and routine microscopical examination. Antibiotics were started according to sensitivity report. It was done as a day care procedure and was done on the same day of admission as and when possible after thorough blood investigations. Patient was kept indoor next day to look for any post procedure complication. Sonography guided Percutaneous catheter drainage with Antibiotics coverage (in non-ruptured abscess measuring >10 cm and in those requiring repeated aspirations) and catheter was removed 24hrs after drain output was nil and on follow up USG residual liver abscess was found to be less than 5 cm and in non-liquefied state in symptomless patient. Percutaneous catheter drainage was done with a 14Fr pigtail catheter. Surgical drainage being used only in patients who fail to respond to above treatment and in case of diffuse peritonitis due to intraperitoneal rupture and in intrathoracic rupture. All interventions done Ultrasound Abdomen guided were followed by a post aspiration Ultrasound Abdomen to look for residual liver abscess and its liquefaction status and X-ray chest PA view to look for iatrogenic complication for example pneumothorax.

### ***Follow up of patients after getting discharged***

Patients will be followed up for a minimum period of 6 months: Once a week for one month, once in 15 days for next 2 months, once a month for next 3 months; to monitor the efficacy of the treatment given. Patients were consulted immediately if they had recurrent attacks or they had complications of liver abscess.

## **RESULTS**

Age of the patients included in this study varied from 14 years to 82 years of age. Highest incidence was noted in age group of 51-60 years (33%) with a mean age of 47.95 years. Out of total 100 cases, 82 patients were male and 18 patients were female. Out of 100 patients 82 patients had liver abscess cavity of size 51-500cc (82%) followed by 11 patients who had <50 cc size cavity.

### ***Complication (rupture of liver abscess)***

Out of 100 patients complications (rupture) were observed in 10 patients, Amongst 10 cases of ruptured liver abscess, 1 had subcutaneous rupture, 7 cases had intraperitoneal rupture, 2 cases had intrathoracic rupture. In our study those cases who had sub capsular rupture were not taken

into consideration into category of ruptured liver abscess. 10 cases were such of sub capsular rupture. Only those cases who had intraperitoneal or intrathoracic rupture were taken into consideration of liver abscess.

**Table 1: Demographic data.**

Age group (years)	N	%
<20	3	3
21-30	9	9
31-40	12	12
41-50	31	31
51-60	33	33
61-70	8	8
>70	4	4
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 2: Gender wise distribution.**

Gender	N	%
Male	82	82
Female	18	18
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 3: Distribution of patients according to size of liver abscess.**

Size of abscess	N	%
≤50 cc	11	11
51-500 cc	82	82
501-1000 cc	5	5
>1000 cc	2	2
<b>Total</b>	<b>100</b>	<b>100</b>

Out of 100 cases 59 patients were treated with percutaneous needle aspiration with 16G metallic needle, 21 patients were treated with Percutaneous pigtail catheterisation, 10 patients were treated conservatively whereas 10 patients required surgical drainage. In the present study we can observe that 37 of 59 cases had volume aspirated between the range of 51-150 cc which correlates to high no of patients with residual liver abscess less than 20 cc (36 of 59 cases). 31 of 59 cases (52.4%) were treated with a single aspiration along with antibiotics. 23 of 59 cases (39%) required second aspiration attempt. 4 of 59 cases required three attempts of aspiration and only 1 case required fourth attempt of aspiration.

**Percutaneous pigtail catheterisation**

Out of 100 cases 21 cases required drainage of liver abscess by pigtail catheterisation. Pigtail catheter was kept in situ for an average of 9 days with range of 5 to 20 days.

**Open surgical drainage**

Out of 100 cases, 10 cases were treated with open surgical drainage. Out of total 10 cases, in 7 cases laparotomy was done, in 1 case incision and drainage was done for

subcutaneous rupture, in 1 case thoracotomy with decortication was done and in 1 case ICD insertion was done for intrathoracic rupture of liver abscess.

**Table 4: Various treatment choices for liver abscess.**

Method of treatment	N	%
Conservative with antibiotics only	10	10
Percutaneous needle aspiration	59	59
Percutaneous pigtail catheterisation	21	21
Open surgical drainage	10	10

**Table 5: Amount of liver abscess aspirated.**

Volume aspirated	N	%
≤50 cc	3	5.08
51-150 cc	36	61.01
>150 cc	20	33.89
<b>Total</b>	<b>59</b>	<b>100</b>

**Table 6: Number of attempts of aspiration.**

Attempts of aspiration	N	%
1	31	52.54
2	23	39
3	4	6.8
4	1	1.7
<b>Total</b>	<b>59</b>	<b>100</b>

**Table 7: Post procedural outcome.**

Outcome	N	%
Successfully treated	96	96
Mortality	4	4
<b>Total</b>	<b>100</b>	<b>100</b>

**Post procedural complications and outcome of treatment**

During Percutaneous needle aspiration, 1 patient developed pneumothorax and Percutaneous pigtail catheter drainage developed Pneumothorax in 1 patient both were treated with ICDT. During Post procedure treatment with percutaneous pigtail catheter drainage, 1 patient developed hemorrhagic tinge in the collection in drainage bag possibly due to injury to liver parenchyma, blood vessel or sudden collapse of abscess cavity. It was approximately 75 ml blood which was managed conservatively. Mortality rate in the present study was 4% (4 cases), rest 96 patients were treated successfully by one or other methods. Mortality was exclusively seen in those treated with open surgical method.

**DISCUSSION**

Age of the patients included in present study varied from 14 years to 82 years of age. Highest incidence was noted in age group of 51-60 years (33%) with a mean age of 47.95 years which coincides with findings in study done by Giorgio et al and Rajak et al study shows mean age of

35 years.<sup>6,7</sup> In present study of total 100 cases, 82% were male and 18% were female, which is consistent with the findings of other study done by Mangukiya et al.<sup>8</sup> Whereas Rajak et al had 76% male and 24% female and study by Mathur et al had 90% male and 10% female.<sup>7,9</sup> 31 of 59 cases (52.4%) were treated with a single aspiration along

with antibiotics. 23 of 59 cases (39%) required second aspiration attempt. 4 of 59 cases required three attempts of aspiration and only 1 case required fourth attempt of aspiration. Whereas number of attempts in other studies were compared in (Table 8).

**Table 8: Attempts of aspiration.**

No. of attempts of aspiration	Rajak et al <sup>7</sup>	Yu et al <sup>10</sup>	Baek et al <sup>11</sup>	Mangukiya et al <sup>8</sup>	Present study
<b>1</b>	88	51	72	59.46	52.54
<b>2-3</b>	10	41	24	36.93	45.8
<b>&gt;3</b>	2	8	4	3.8	1.7

***Percutaneous aspiration***

Rajak et al compared percutaneous needle aspiration (PNA) and Percutaneous catheter drainage (PCD) in a randomized study involving 50 patients with liver abscess. Those investigators concluded that PCD was more effective than percutaneous needle aspiration. In that study, lack of response to a second attempt at percutaneous needle aspiration was considered failure of treatment.<sup>7-11</sup> Yu and colleagues performed a randomized trial involving 64 patients with pyogenic liver abscess. Those investigators concluded that percutaneous needle aspiration was probably as effective as continuous PCD. They recommended percutaneous needle aspiration as a first-line approach because of procedure simplicity, patient comfort, and reduced price.<sup>10</sup> In our study, we considered a third unsuccessful attempt at percutaneous needle aspiration failure of treatment. That only one of 59 aspirations required more than three attempts confirmed that further needle aspiration is rarely successful. This result supported the design of the study by Rajak et al.<sup>7</sup> The results of our study confirmed that repeated percutaneous needle aspiration and PCD are equally efficient in the management of liver abscesses. Mortality rate in the present study was 4% (4 cases), in other study done previously shows different rates as follows; Yoo et al had 11% mortality rate in their study.<sup>12</sup> Tan et al showed mortality in their study to be 3.8%.<sup>13</sup> Mangukiya et al had 1.5% mortality rates in their study.<sup>8</sup>

***Limitations***

Limitations of this study include the fact that it is based on patients recruited from a single setting, our sample size may not be adequate to determine potential confounders.

**CONCLUSION**

From the study it's concluded that conservative treatment with only intravenous antibiotics can be done for liver abscess with size less than or equal to 5 cm and volume less than 50 CC. Percutaneous needle aspiration is the best treatment modality for liver abscess measuring 5-10 cm, Percutaneous pigtail catheter drainage is a choice of treatment for large cavity size more than 10 cm and

abscess having thick unliquified pus. Open surgical drainage procedures are reserved for ruptured liver abscess intrathoracic or intraperitoneal.

**ACKNOWLEDGEMENTS**

Authors would like to thank Dr. Jitendra Darshan (superintendent SMIMER) and Dr. Archana Nema (HOD general surgery department, SMIMER) for guidance and general support.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Tailor V, Bochiya G, Lad V. Different modalities of management of liver abscess. *Int Surg J* 2023;10:559-63.