

**Research Article****Comparison of Various Techniques Used in The Management of Liver Abscess**Preeti Kathel<sup>1</sup>, Madan Mohan Mudgal<sup>2</sup>, Naveen Kushwah<sup>3</sup><sup>1</sup>Post-graduate student, <sup>2</sup>Associate professor, <sup>3</sup>Assistant Professor, Department of Surgery, Gajra Raja Medical College, Gwalior, Madhya Pradesh, India**\*Corresponding author**

Dr. Preeti Kathel

Email: [drminipreeti@gmail.com](mailto:drminipreeti@gmail.com)

---

**Abstract:** This study was designed to determine the frequency of various clinical features in liver abscess and to evaluate the outcome of patients treated by medical management vs. percutaneous drainage intervention in terms of hospital stay. In this prospective study, 75 patients (71 males and 4 females; age range- 15-80 years) with liver abscess during the course of one year (September 2013 to August 2014) were included. Patients with abscess >100cc, aspirable and multiple with largest cavity >100cc underwent percutaneous drainage, either USG guided needle aspiration (n=29) or pigtail catheter drainage by seldinger technique (n=32) along with appropriate antimicrobial therapy. In cases of multiple liver abscess <100cc or non-aspirable content, medical management (n=3) and in ruptured abscess, laparotomy (n=10) was done. To evaluate the outcome of the treatment, length of hospital stay (till alleviation of clinical symptoms) was assessed. Of the most common signs and symptoms, abdominal pain and right hypochondriac tenderness (n=75) were present in 100% of cases. Among the successfully treated patients, the average time for clinical improvement and the mean hospital stay were slightly different among groups. The average time for alleviation of symptoms was greater in the medically treated group than in the aspiration and catheter group (7 vs. 6.2 days) with P value >0.05, (7 vs. 6.7 days) with P value <0.05 respectively. Our results shows that percutaneous catheter drainage and aspiration is more effective than medical treatment in management of liver abscess.

**Keywords:** liver abscess, laparotomy, abdominal pain, catheter drainage, aspiration.

---

**INTRODUCTION**

In tropical areas both amoebic and pyogenic liver abscess continues to be an important cause of morbidity and mortality. Though a readily treatable disease, if left untreated, can be potentially fatal, leading to mortality ranging from 60-80% [1]. However, with the advances in radiological investigations like ultrasonography and CT scan for diagnoses together with interventional radiology has reported a success rate ranging from 75-100% for treatment of liver abscess, decreasing mortality to 5-30%, and surgical intervention which is associated with significant morbidity and mortality ranging from 10-47% is now becoming unnecessary, thus shifting management away from open surgery to minimally invasive techniques [2]. Now percutaneous drainage combined with antimicrobial has become the first line and mainstay of treatment for most of the abscesses [3]. It is suggested that percutaneous drainage (needle aspiration and catheter drainage) can improve response to antibiotic treatment, reduce hospital stay and the total cost of treatment [4-5]. They are nonetheless an invasive procedure requiring the passage of a wide bore needle and pigtail catheter into a highly vascular organ, and can be associated with the risk of bleeding,

secondary infection, pain, catheter in situ; therefore it seems important to determine the possible role of medical management and percutaneous intervention in the treatment of liver abscess.

**MATERIAL AND METHOD**

This prospective study of 75 patients was conducted in the department of General Surgery, Gajra Raja Medical College, Gwalior (M.P.) during the course of one year from September 2013 to August 2014. Patients who were admitted with the clinical features of liver abscess and confirmed by abdominal ultrasound or CT scan findings with following criteria: Male and female 15-80 years, aspirable and non-aspirable liver abscess, solitary or multiple liver abscess and with any complications were included in the study. All other patients were excluded.

Evaluation of patient started first by collecting general information about the age, sex, socioeconomic status, past surgical history, past history of liver abscess, diabetes, and any immunodeficiency state. Detailed history specific to pain in abdomen (site, duration, intensity, and radiation), fever, jaundice, alcoholism, non-specific symptoms like

nausea/vomiting, anorexia, weight loss and history of any respiratory symptoms like cough, dyspnoea and chest pain was taken. Patients were examined head to toe with emphasis given to tenderness in right hypochondrium, hepatomegaly, icterus, chest examination (pleural effusion, decreased breath sounds, crepitation). All the included patients underwent routine blood investigation like haemoglobin, total leucocyte count, differential count, ESR, random blood sugar level, liver function test with more emphasis given to prothrombin time, total serum bilirubin level, serum albumin level, alkaline phosphatase, SGOT and SGPT level.

Depending upon the hydration status parenteral fluid therapy was given, initially all the patients started on broad spectrum antimicrobial therapy with metronidazole. Percutaneous USG guided aspiration was done in patients who had abscess <100cc with aspirable content by 18 gauge needle and USG guided single puncture pigtail catheter drainage was done in patients who had abscess >100cc with aspirable content, under local anaesthesia, using a range of different sized drainage catheters (8-12Fr). Patients who had non aspirable content irrespective of the size and number were managed conservatively with antimicrobials and metronidazole given for 10-14 days. Patients with ruptured liver abscess with signs of peritonitis underwent urgent surgical intervention as laparotomy. Aspirated pus was routinely sent for culture analysis and depending on the culture sensitivity intravenous antibiotic coverage was given along with metronidazole till the patient was in the hospital or for 14 days.

Patient's symptom relief clinically was the criteria for the discharge from the hospital for all except those who had undergone laparotomy, which were discharged after complete stitch removal and Mean hospital stay of all the patients, were recorded.

Descriptive statistical analysis had been carried out in the present study. Results on continuous measurements were presented on Mean ± SD (Min-Max) and results on categorical measurements were presented in percentages. 95% Confidence Interval had been computed to find the significant features. Significance was assessed at 5% level of significance with student T-test. The Statistical software namely, SPSS version 20.0, were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

**RESULTS**

Age of the patients included in this study varied from 17-70 years. The mean age was 36.5years. The highest incidence was noted in the age group of 26-35 years (37.0%) and 36-45 years (24%). Of all the studied patients, 94.6% of patients were male and 5.4% were female. 68% of the patients were alcoholics.

Frequency of symptoms was noted as shown in the table 1. Abdominal pain was present in all cases (100.0% of patients), Fever was the most consistent symptom occurring in 73 out of 75 (97%).

**Table-1 : FREQUENCY OF SYMPTOMS**

Symptoms	Number of patients (n=75)	%
Pain in abdomen	75	100.0
Fever	73	97.0
Jaundice	15	20.0
Malaise	50	66.6
Vomiting	23	30.6
Appetite	69	92
Cough	47	62.6
Dyspnoea	36	48
Bowel habit change	18	24

Leucocytosis (> 11,000cells/cumm) was found in 31 out of 75 (41.3%) of cases. Anemia (Hb% < 10 gm/dl) were found in 29 out of 75 (38.6%) of the cases. The liver function tests which were most consistently raised were with prothrombin time (>14 sec), SGPT (>40 IU/L), SGPT (>40), 62 out of 75 (82.6%), 62 out of 75 (82.6%), 55out of 75 (73.3%) respectively. Alkaline phosphatase was found to be raised in 39 out of 75 (52.0%) of cases in this study. Hypoalbuminaemia

(<3gm/dl) was observed in 23 out of 75 (30.6%) of the cases. Raised bilirubin level more than normal limit (>1.2gm/dl) was found in 45 out of 75 (60.0%) of the cases in this study.

Pus culture analysis of the current series is described in table 2. E. coli & S.aureus were most common organisms cultured, 12.0% each.

**Table-2 : PUS Culture Analysis**

PUS culture	Number of patients (n=75)	%
Enterobacter	2	2.6
Klebsiella	5	6.7
E. coli	9	12
Staph aureus	9	12
Acinetobacter	2	2.7
Streptococcus	3	4
Proteus	1	1.3
No growth	44	58.7

USG abdomen showed isolated right lobe abscess as the most common finding seen in 61 out of 75 (81.3%) of cases, solitary abscess being the most

common presentation found in 53 out of 61 (86.8%) cases. Multiple right lobe liver abscesses were seen in 8 out of 61 (13.1%) cases (table 3).

**Table-3 : USG FINDINGS**

USG findings	Number of patients (n=75)	%
<b>Right lobe abscess</b>	<b>61</b>	<b>81.3</b>
Solitary abscess	53	86.8
Multiple abscess	8	13.1
Ruptured abscess	6	9.8
<b>Left lobe abscess</b>	<b>4</b>	<b>5.3</b>
Solitary abscess	1	25
Multiple abscess	1	25
Ruptured abscess	2	50
<b>B/l lobe abscess</b>	<b>10</b>	<b>13.3</b>
<b>Volume</b>		
>100cc	63	84
<100cc	12	16

Table 4 shows comparison between different modalities of treatment used in the study. Comparing the mean hospital stay of antibiotic only (7 days) with aspiration under antibiotic coverage (6.2 days), aspiration under antibiotic coverage is better modality but statistically not significant (P

value>0.05). Comparing the mean hospital stay of antibiotic only (7 days) with pigtail catheter drainage under antibiotic coverage (6.7 days), pigtail catheter drainage under antibiotic coverage is better modality and statistically significant (P value<0.05).

**Table-4: TREATMENT MODALITIES**

Treatment	Number of patients (n=75)	%	Range of days of hospital stay	Mean of days of hospital stay	95%CI
Antibiotic coverage only (Conservative)	3	4.0	5-10	7	0.4-13.5
ASP (Percutaneous Aspiration) + Antibiotic Coverage	29	38.6	2-20	6.2	4.6-7.8
Laparotomy	10	13.3	1-20	8.6	4.2-12.9
Pig Tail Catheter	32	42.6	3-10	6.7	5.9-6.4
Pigtail + Aspiration	1	1.3	-	10	-

**DISCUSSION**

The changing scenario in incidence, diagnostic methods, treatment & complications associated with liver abscess due to increasing percentage of alcoholics and immuno-compromised population; the current

serious problem in our country, has inspired us in doing an in-depth study into the topic.

Most of the patients who presented with Liver Abscess were in the middle age with patients in third to

fifth decade accounting for 71.0% of the cases. Mean age of presentation in our study is 36.5yrs, which is comparable to other Studies. Present study shows a very high incidence of Liver Abscess in males (94.6%) as seen in other Indian studies like Shyam Mathur (86.0%) [7] and Kapadia S et al (96.0%) [8].

All of the patients (100%) who presented in this series presented with abdominal pain. Most of the patients had Right Hypochondriac pain; some shows Epigastrium and generalized abdominal pain. Fever was also more significant (97.0%) symptom in our study as compared to other studies listed below. Alcoholism was found to be present in 68.0% of cases in our study which is comparable to the study by Shyam Mathur et al. [7] where 70.0% of the cases were alcoholic which concludes alcoholism has a strong association with liver abscess patients.

In our study E.coli along with S.aureus (12.0% each) were most common organisms isolated as compared to the study of Hyo Min Yoo et al<sup>9</sup> in which only E.coli accounted for 63.0%. Klebsiella was found common in culture findings in Khee-Siang Chan et al.(82.3%) [10], Hyo Min Yoo et al (28.0%) [9] and it was next to the E.coli with 6.7% in our study. This study showed 58.7% of cases as no growth, out of this only 6.6% cases had positive stool examination for amoebic cyst. So they might be cases of amoebic abscess with no secondary bacterial infection or pyogenic abscesses that had been taken empirical antibiotic treatment which rendered the pus sterile or low bacterial load in pus to show growth in culture.

In USG abdomen right lobe involvement (81.3%) and bilateral lobe involvement (13.3%) was comparable to other studies listed but isolated left lobe involvement was 5.3% in our study as compared to other study of Hyo Min Yoo et al.(20.0%) [9], Khee-Siang Chan et al. (17.9%) [10] and Rustam Khan (23.7%) [11].

Controversies in the management of liver abscess still exist. Interventional drainage of liver abscess has been an accepted therapy for decades. The diagnosis and treatment of liver abscess has changed due to advances in imaging techniques. Out of the 75 cases in this study, 3 patients who had multiple small abscess and solitary abscess with non-aspirable content were treated conservatively. 62 patients out of 75 irrespective of the size and number if the content was aspirable, were subjected to intervention as compared to Hyo Min Yoo et al[9] where 100.0% patients underwent intervention. 38.6% cases underwent Percutaneous aspiration under antibiotic coverage as compared to Hyo Min Yoo et al[9]. Study where 79.0% patients underwent Percutaneous Aspiration. 42.6% cases underwent Pigtail catheter drainage under USG guided as abscess cavity was big and not completely liquefied (In our study size of abscess cavity was >100cc).

Laparotomy as initial line of treatment was performed in 13.3% patients having ruptured liver abscess cases as compared to Hyo Min Yoo et al[9]. Study where 21.0% patients underwent surgical intervention as laparotomy.

Thus in our study, in majority of cases USG guided percutaneous aspiration or pigtail catheter drainage were the main form of treatment under antibiotic coverage. All patients were started on antibiotics which were continued for 10- 14 days depending on improvement.

Majority of patients responded excellently to percutaneous aspiration and pigtail catheter drainage under antibiotic coverage with mean hospital stay days less than antibiotic only. While patients who had multiple small abscesses or abscesses of any size with non-aspirable content were successfully managed with antimicrobial therapy alone but the hospital stay were more.

## CONCLUSIONS

Liver abscess was commonly seen in middle age (30-60 years) with male preponderance with M: F- 1.8: 1. This study found the Alcohol as the single most consistent predisposing factor in all patients of liver abscess. For confirmation of diagnoses ultrasound abdomen was simple, non-invasive tool, easily available and should be the first radiological investigation to confirm the site, size, number and any complication if present. All cases of liver abscesses do not require invasive management. Multiple small abscesses and solitary abscess of any size with non-aspirable content can be managed successfully on conservative antimicrobial therapy alone but improvement in symptoms occurs slowly thus increasing the hospital stay. Ultrasound Guided Percutaneous Aspiration & Pig Tail Catheter drainage under the coverage of appropriate antibiotic according to the culture sensitivity is the safe procedure and effective method of liver abscess management, clinical improvement of symptoms is relatively fast thus decreasing the hospital stay and morbidity of patient. Laparotomy is only required in ruptured liver abscess into the peritoneal cavity with signs of peritonitis.

## REFERENCES

1. Ochsner M, Debaeky M, Murray S; Pyogenic Abscess of the Liver: An analysis of 47 cases with review of literature. Am J Surgery, 1938; 40(7): 292-315.
2. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S; Percutaneous treatment of liver abscess-needle aspiration versus catheter drainage. Am J roentgenology, 1998; 170(4): 1035-1039.
3. Gerzof SG, Johnson WC, Robbins AH, Nabseth DC; Intrahepatic pyogenic abscesses: treatment by percutaneous drainage. Am J Surg, 198; 149: 487-494.

4. Tandon A, Jain AK, Dixit VK, Agarwal AK, Gupta JP; Needle aspiration in large amoebic liver abscess. *Trop Gastroenterol*, 1997; 18: 19-21.
5. Ch Yu S, Hg Lo R, Kan PS, Metreweli C; Pyogenic liver abscess: treatment with needle aspiration. *ClinRadiol*, 1997; 52: 912-916.
6. Greenstein AJ, Barth J, Dicker A, Bottone EJ, Aufses AH Jr; Amebic liver abscess: a study of 11 cases compared with a series of 38 patients with pyogenic liver abscess. *Am J Gastroenterol*, 1985; 80: 472-478.
7. Mathur S, Gehlot RS, Mehta A; Liver abscess. *Journal of indian academy of clinical medicine*, 2002; 3(4): 78-79.
8. Kapadia S, Dattaroy D; Liver abscess. *Indian j sur*, 2002; 6(3): 511-519.
9. Yoo HM, Kim WH, Shin SK, Chun WH, Kang JK, Park IS; The changing patterns of liver abscess during the past 20 years- a study of 482 cases. *Yonsoi Medi Journal*, 1993; 34(4): 340-350.
10. Chan KS, Chen C, Cheng K, Hou C, Lin H, Yu W; Pyogenic liver abscess: a retrospective study of 107 patients during a 3 year period. *Jpn J Infect dis*, 2005; 58(2): 366-368.
11. Khan R, Hamid S, Abid S, Jafri W, Abbas Z, Islam M, Beg S; Predictive factors for early aspiration in liver abscess. *World J Gastroenterology*, 2008; 14(13): 2089-2093.