Epidemiology and Clinical Outcomes of Patients with Amoebic Liver Abscess

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ABSTRACT

BACKGROUND
Amoebic liver abscess is a common clinical problem, encountered in clinical practice. There is sparse literature about socio epidemiological and current clinical trends and treatment outcomes. The current article describes the outcomes in a prospectively studied cohort of patients from a tertiary referral centre from Himalayan foothills and Sub Himalayan Gangetic plains of North India.

METHODS
101 prospectively enrolled, serial patients, fulfilling the criteria for amoebic liver abscesses were included in the study to evaluate the socio epidemiological, clinical variables and abscess outcomes. The intervention done for abscesses requiring drainage (one-time aspiration vs. indwelling catheter drainage) was mainly dependent upon the content of liquefied pus in the abscess cavity rather than absolute size of the abscess. The colour of the aspirated pus and final outcomes of patients were recorded.

RESULTS
There were 9.75 cases of lever abscess per 10,000 hospital admissions, similar to the trends reported from other endemic regions. While the socio epidemiological and clinical variables remained unchanged for the last 60 years, the clinical outcome has dramatically improved. The average volume of the abscess noted in the study appeared smaller than the average volume of the abscess noted in earlier studies, possibly suggesting early diagnosis. About 1 / 3rd abscess were noted to be complicated, either with symptomatic pleural effusion (29) or rupture (5 / 101) and correlated significantly with socio economic status and history of alcoholism. There was no statistical difference in the average volume of the abscess cavity, in patients managed either with one-time aspiration or indwelling catheter drainage. All patients had excellent outcome. None of the patients required surgery and there was no mortality.

CONCLUSIONS
While there is no change in the epidemiology of amoebic liver abscess, there is a marked change in the outcome, and amoebic abscess is a potentially curable disease.

KEYWORDS
Amoebic Liver Abscess; Catheter Drainage

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DOI: 10.18410/jebmh/2021/18

How to Cite This Article:
Gupta S, Verma A, Sarda P. Epidemiology and clinical outcomes of patients with amoebic liver abscess. J Evid Based Med Healthc 2021;8(02):91-96. DOI: 10.18410/jebmh/2021/18

Submission 17-09-2020,
Peer Review 24-09-2020,
Acceptance 10-10-2020,
Published 11-01-2021.

BACKGROUND

Amoebiasis, caused by *Entamoeba histolytica*, is the second leading cause of death from parasitic disease worldwide and a major health problem in developing countries including India. *E. histolytica* disease results in 40,000 to 100,000 deaths each year from amoebic colitis and extra intestinal infection.[1] Mortality is mainly related to extra intestinal infections, liver abscess being the most common which occur in fewer than 1 % of *E. histolytica* infections. Amoebic liver abscesses grow inexorably and, at one time, were almost always fatal, but now even large abscesses can be satisfactorily cured.[2,3]

During last few decades, due to great advancement in imaging and biliary and pancreatic intervention, the incidence of pyogenic liver abscess has decreased substantially, and are mostly limited to patients with hepatobiliary disorders. Hence, most insidiously developed liver abscesses seen sporadically are likely to be amoebic etiology. There are only few studies done on socio-demographic determinants and clinical outcome in patients with liver abscess in India. Various studies have demonstrated that liver abscess is associated with low socioeconomic status, rural habitat, poor sanitation, excess intake of alcohol and impaired host defense mechanism.[4]

This study, done in a tertiary care centre assumes significance as the hospital caters to the population of both the hilly terrain of Himalayan foothills and Gangetic plains of western India. It may also further help to modify the existing guidelines as per the local needs and outcome.

Objectives

- To study the demographic profile (age, sex, residence etc.) of patients presenting with liver abscesses.
- To study the clinical and radiological profile of these patients
- Interventions required for management of liver abscesses.
- Final outcome of patients with liver abscesses.

METHODS

This is a prospective cross-sectional study conducted at SGRR Medical College, a tertiary care referral hospital, Dehradun, Uttarakhand, over a period of 18 months, from July 2016 till Dec 2017. All patients presenting to the hospital and diagnosed to have liver abscesses or referred to this hospital for management of liver abscesses were included in the study.

The study was approved by the ethics committee of the hospital. After informed consent, the patients were subjected to detailed history taking, clinical examination, and laboratory investigations, ultrasound examination and specialised investigation including topographic examination. All information including clinical and socio demographic information was recorded using questionnaires and data recording sheets.

Inclusion Criteria

- All cases of liver abscess suspected to be of amoebic aetiology, diagnosed in this hospital, or referred to this hospital for intervention and management.
- Age more than 18 years.
- Abscess size more than 5 cms in at least one dimension.

Exclusion Criteria

- Patients not fulfilling the inclusion criteria.
- Patients with liver abscesses having biliary obstruction and suspected cholangitis.

Study Planning

Besides routine blood chemistries, and amoebic serology, paired blood cultures were drawn from all patients at the time of admission and before initiation of specific therapy. As computed tomography (CT) scans were not done on all patients, ultrasound scan of the abdomen was used for measurement of the abscess dimensions and volume, at the time of diagnosis and subsequently on follow up, wherever required. All the measurements were done by a single radiologist, who was involved in the interventional management of the abscess also. The data were collected on a standard Performa and included.

- Socio-demographic profile of the patients.
- Clinical and laboratory profile of the patients at the time of presentation.
- Abscesses characteristics (site, size and number, interventions done etc.)
- Duration of hospitalisation and final outcome.

Definitions Used in the Study

- Illiterate: a person who is not able to read and write.
- Socio economic status: as per Prasad's classification using per capita income.
- Urban / Rural: Defined as in census of India 2011.
- Alcoholism: Person taking > 180 gm / day of alcohol daily for past > 6 months.
- Evolving liver abscess: Liver abscess with changing number, volume, and liquefied contents on serial ultrasound screening over 3 to 4 days.
- Complicated Liver Abscess

  Patients with liver abscess having symptomatic pleural effusion / Ruptured liver abscess / Left lobe abscess in vicinity of large vessels and porta.

Intervention

Intervention of the abscess was decided by a team of gastroenterologist and intervention radiologist and depended on following characteristics.

- Size of the abscess

- Location of the abscess in relation to liver lobe, capsule and large blood vessels.
- Liquefied content in the abscess.
- Patient's symptoms related to the abscess.
- Simple or complicated abscess.

Depending upon these variables noted on the ultrasound, following approaches were used.

- One-time aspiration, including diagnostic and therapeutic.
- Diagnostic aspiration and pigtail insertion.

The patients were examined daily for clinical improvement. Improvement in pain, fever, signs of sepsis and biochemical improvement were considered criteria for successful treatment.

RESULTS

A total of 101 patients, either diagnosed elsewhere and referred for management or newly diagnosed to have liver abscesses were enrolled in the study. Of the total of 101 patients included in the study 71 (70 %) were already diagnosed to have liver abscesses and referred to this hospital for management / intervention. Table 1 depicts the socio- demographic and clinical profile of the patients.

Those patients, who had already been diagnosed with liver abscesses and had been referred to this hospital, had already been on antibiotics nitroimidazole derivatives at the time of presentation. 30 (29.7 %) patients were diagnosed to have abscesses after admission in this hospital. Of the 101 patients 91 patients (90 %) were males and 10 (10 %) females. Most of the patients were of middle age group, with mean age at presentation being 42.89 + 12.54 years. 70 / 101 (70.2 %) patients were of rural background. 77 / 101 (76.2 %) belonged to Sub Himalayan Gangetic plains. Most 70 / 101 (70.2 %) belonged to the lower income groups (lower class and lower middle class); 73 / 101 (72 %) were alcohol abusers, and 77 / 101 (76.2 %) were involved in unskilled or semi-skilled professions like drivers, street vendors etc. However, approx. 10% were students, mainly hostellers, and paying guest dwellers.

Fever 81 / 101 (79.2 %), abdominal pain 46 / 101 (45.5 %), jaundice 30 / 101 (29.7 %) and vomiting 28 / 101 (27.7 %) were the most common presenting features and these results are comparable with other reports in our country. Raised temperature 48 / 101 (48.5 %), was the most important clinical sign. Enlarged tender liver was noted in only 19 / 101 (18.8 %) patients in our study and was possibly less frequent due to smaller average size of the abscesses noted in our study. Anaemia was noted in 29 / 101 (28.7 %) and jaundice was noted 13 / 101 (12.8 %) patients only. Septic shock was noted in one patient only.

Variables	N	%
Gender		
Male	91	90.9 %
Female	10	9.9 %
Age		
< 35 yrs.	45	44.5 %
35 to 65 yrs.	55	54.4 %
> 65 yrs.	1	0.9 %
Socio Economic Status		
Upper Class	6	5.94 %
Upper Middle Class	12	11.8 %
Middle Class	13	12.8 %
Lower Middle Class	29	28.7 %
Lower Class	41	40.5 %
Residence (Urban vs. Rural)		
Urban	31	30.6 %
Rural	70	68.3 %
Residence (Hills vs. Plains)		
Plains	77	76.2 %
Hills	24	23.7 %
Education		
No formal education	29	28.7 %
Primary Level	52	51.4 %
Higher Education	30	29.7 %
Occupation		
Machinery Operators	33	32.6 %
Shop and Market Sales Workers	44	43.5 %
Armed Forces	7	6.9 %
Students	12	11.8 %
Unemployed	5	4.9 %
Habit of Alcoholism		
Yes	73	72.2 %
No	28	27.7 %

Table 1. Sociodemographic Profile of Liver Abscess Patients (N = 101)

Variables	N	%
Symptoms		
Fever	80	79.2 %
Abdominal pain	46	45.5 %
Vomiting	28	27.7 %
Jaundice	30	29.7 %
Cough	8	7.9 %
Diarrhea	4	3.9 %
shock	1	0.9 %
Clinical Signs		
Enlarged tender liver	19	18.8 %
Temp > 100	49	48.5 %
Anemia	29	28.71 %
Jaundice	13	12.8 %
Lab Parameters		
Hemoglobin		
Hb <10 gms	29	28.7 %
Hb > 10 gms	72	71.3 %
Total Leukocyte Counts		
TLC > 12,000 / mm^3	70	69.3 %
TLC < 12,000 / mm^3	31	30.7 %
Levels of ALP		
Raised	60	59.4 %
Normal	41	40.6 %
Serum Albumin		
Albumin < 2 gm / dL	4	3.96 %
Albumin 2 – 3 gm / dL	32	31.6 %
Albumin > 3 gm / dL	29	25.7 %
INR		
Less than 1.4	19	18.8 %
More than 1.4	82	87.8 %
Serum Creatinine		
Raised above normal (1.4 mg / dL)	16	14.8 %
Normal range	87	86 %
Location of Abscess		
Right lobe	72	71.2
Left lobe	3	2.97
Both right and left lobe	26	25.74

Table 2. Clinical and Laboratory Parameters of Patients with Liver Abscesses

Determinants	Complicated Liver Abscess	Non-Complicated Liver Abscess	Odds Ratio	95 % CI	P Value
Residence					
Rural	32 (31.68%)	38 (37.6%)	13.75	2.99 - 63.04	< 0.05
Urban	2 (1.98%)	29 (28.71%)			
Habit of Alcoholism					
Yes	29 (28.7%)	44 (43.5%)	16.95	2.15 - 133.62	< 0.05
No	5 (4.95%)	23 (22.7%)			

Table 3. Correlation of Sociodemographic Determinants to the Gravity of Illness

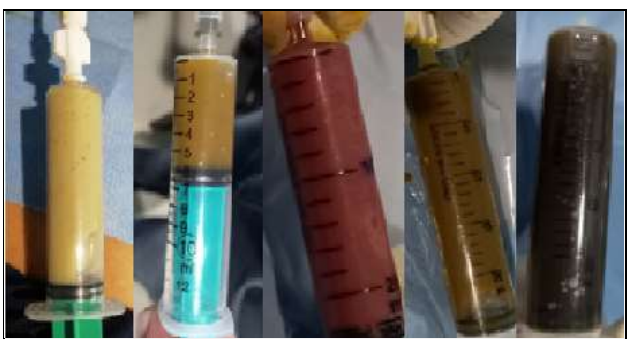

Figure 1. Different Types / Colors of Pus Aspirated from Abscesses

Characteristics of Liver Abscess

Approx. 71 % of all abscesses were located in the right lobe; segment V accounting for almost half of all the right lobe abscesses. Both right and left lobes were involved in nearly 26 (25.7 %) of our cases. Isolated left lobe abscesses were rare, accounting for approximately 3 (2.9 %) of all cases. The volume of the abscesses varied from 45 cc to > 1400 cc. In all, 34 / 101 (33.6 %) were noted to have complicated abscesses 29 / 101 (26.7 %) with pleural effusion and 5 / 101 (4.9 %) with rupture.

Histolytica Serology

E. histolytica serology (by commercially available ELISA-enzyme linked immunosorbent assay) was sent soon after admission. It was noted to be positive in 61 / 101 (60.39 %) patients only. Serologies may be negative during early in the course of evolving abscesses. However, while a positive ELISA results supports the diagnosis, the negative results does not rule out amoebic liver abscess. All except two pus cultures were sterile. (Anaerobic cultures were not done). Both positive pus cultures grew contaminants.

Intervention

The abscesses were aspirated either under ultrasound or CT guidance using the criteria listed earlier. The aspirated pus was immediately subjected to laboratory examination including smear for *E. histolytica* trophozoites, gram stain smear and pus culture. The quantity and colour of the pus aspirated was recorded and patients were followed up by routine ultrasound as required.

The decision whether to do one-time aspiration or place an indwelling catheter was decided upon the volume of the abscess and liquefied content. Fully evolved abscesses, having more than 50% of liquefied pus, were subjected to one-time aspiration. Evolving abscess and those with less than 50% of liquefied contents were treated with catheter drainage. Very large abscesses requiring controlled evacuation were also managed with catheter drainage. Patients with symptomatic pleural effusions and intra thoracic rupture of the abscesses were treated with additional chest tube drainage. Multiple intraabdominal drains besides catheter drainage of the liver abscess cavity was done in patients with intra peritoneal rupture of the abscess.

Pus colour aspirated from the abscess varied in both consistency and colour, even among different abscesses aspirated at the same time in the same patient. The consistency varied from thin fluid like to thick paste like. The colour varied from grossly haemorrhagic to brownish to varying shades of whitish to yellowish. Gross bile was detected in the catheter aspirates of 5 / 44 (11.3 %) patients, in whom drainage catheter was inserted. Classical 'anchovy sauce' type pus was seen in approx. 44 / 101 (43.5 %) patients only.

Duration of Hospitalisation and Mortality

The duration of hospitalisation was less than 10 days in 51 / 101 patients. It was between 10 days and 14 days in 31 / 101 patients, and more than 14 days in 19 / 101 patients. There was no mortality.

DISCUSSION

101 contiguous patients fulfilling the criteria were included in the study. The total hospital admissions during this period in the corresponding age group were 68,400. Thus, the prevalence of amoebic liver abscess in this study was 9.75 cases per 10.000. hospital admissions per year. Similar prevalence rates have been reported by other researchers from endemic areas.[5] This study confirmed that the mid-aged males (mean age, 42.89 + 12.54 are more susceptible to the liver abscess disease as has been previously reported[6] and isolated right liver lobe is the most frequent site of infection, as found in 72 / 101 (71.2 %) of our cases. In concordance with our results, other studies have shown that such abscesses are 10 times more common in males as compared with females.[7,8] A large number 26 / 101 (25.74) of liver abscess were multiple and involved both lobes of the liver. Previous studies had shown that factors like absence of urban services, inadequate hygienic practices and social determinants were associated with higher prevalence of *E. histolytica* infections;[8,9] possibly the consumption of untreated contaminated water and lack of urban civic amenities are mainly responsible for amoebiasis. 34 / 101 (33.6 %) abscess were complicated with either intraperitoneal or intrathoracic rupture and symptomatic pleural effusions.

The decision of intervention (one-time aspiration vs. catheter insertion) was different than in other studies. While other studies stressed the need to put drainage catheters in large abscesses, more than 500 cc;[3,8,9] we preferred to put drainage catheters in abscesses depending upon whether they were still evolving, and where the liquefied content in the abscess was less than 50 % of the total content, regardless of the size of the abscess. The average volume of the abscess thus requiring catheter drainage was approx. 302 cc and was required in 44 / 101 patients (43.5 %). In contrast 37 / 101 (36.6 %) patients were managed with one-time aspiration of the abscess cavity only and the average volume was 249 cc approximately. ($p = 0.06$ for both volume and number of patients). 20 patients with smaller abscess were managed conservatively without any intervention. Complicated liver abscesses were significantly more common among patients residing in rural areas ($p < 0.05$) and habit of alcoholism ($p < 0.05$)) (Table 3). It is as expected as patients in rural areas, not only are more prone to develop abscesses, but also delayed investigations and treatment at specialty centers due to illiteracy, poor health facilities in rural setups and racquet of quacks. In addition, people residing in hilly terranean have additional problem of approachability and affordability. It is not surprising therefore that 77 / 101 (76.2 %) patients in our series were residing in plains, rather than hilly terranean. Even then, however, the average size of the liver abscesses noted in our study was smaller than the average size of abscesses documented in other studies[3] reflecting perhaps, the changing trends towards health perspectives even in rural areas, and easy accessibility of ultrasound scanners with improved resolution and expertise of radiologists, to diagnose abscesses.

Pus Colour Controversy

The classic description of an amebic liver abscess aspirated pus as thick paste called as 'anchovy sauce' has been overstressed in past, and was observed in our study in only 44 / 101 (43.5 %) aspirates only. 21 / 43 (47.7 %) of these patients were noted to have hemoglobin less than 10 gms. Smaller abscesses were less likely to have anchovy type pus, than the larger abscesses. Hemorrhage, during abscess aspiration, may also give appearance of 'anchovy sauce' type pus. Different color of pus (anchovy type and yellow) was aspirated from simultaneous aspiration of two different abscesses in a single patient. Clear bile drainage was noted in 5 / 44 (11.3 %) patients, five to six days after the insertion of drainage catheter, once pus had cleared. Interestingly all patients had large abscess, and jaundice and raised alkaline phosphatase (ALP) at the time of presentation, suggesting possible erosion of the abscess in a biliary radical, possibly causing cholangitis and jaundice. There was no bile leak / biloma formation in any of these patients after removing the drainage catheters.

Thus, it appears, that the color of pus does not depend upon the color of the liver, but change in color of the pus from ivory to various shades of reddish, yellowish, brownish, anchovy type etc. depends upon erosion of the abscess in radicals of portal veins and bile ducts. (Fig 1) The consistency of the pus depends upon the content of liquefied pus in the abscess cavity.

The average hospital stay of patients in our study was 14 days. 51 / 101 (50.4 %) patients could be discharged in less than 10 days. These patients had excellent outcome and correlated with conservative management or single time aspiration of the abscess. It was between 10 days and 15 days in 31 / 101 patients, and correlated with evolving abscesses, abdominal pain and less than 50% liquefaction of the abscess cavity. Hospitalization was more than 15 days in 19 / 101 patients. All these patients had complicated abscesses including 5 of those having ruptured abscesses, and 14 having symptomatic pleural effusions, requiring multiple intraabdominal drains and prolonged chest tube insertions; all correlated with history of alcoholism, had low hemoglobin and low serum albumin levels and required supportive care with blood products and albumin infusion with prolonged antibiotics and other supportive medication. Clearly, early presentation and intervention improved the hospital stay and cost of treatment in 82 / 101 (88 %) patients.

There were no deaths. One patient presented in shock and encephalopathy. The excess morbidity in this patient was possibly more due to alcoholic hepatitis and acute liver failure rather than liver abscess. All the patients were managed medically and none, required surgery. Five patients 5 / 101 (4.9 %) presented with radiologically demonstrated ruptured abscess. All were managed with multiple intrathoracic and intraabdominal drains besides catheter drainage of the liver abscess cavity. All these patients had signs of sepsis, poor nutrition and hypoalbuminemia, making them poor surgical candidates anyway. Chest tube drains were placed in patients with symptomatic large effusions, requiring multiple aspiration. This is in sharp contrast to the earlier reported mortality of surgical intervention (42 %) in 1980s[5] and (45.4 %) reported in 1990s.[10] All patients were treated with standard dose of metronidazole and none required high dose of metronidazole, chloroquine or emetine.

To summarize, while the basic socio demographic determinants associated with amoebic liver abscesses have remained unchanged since 1960s; there is a substantial change in the management outcomes. Emetine and Chloroquine, the mainstay of treatment in last century, have long been forgotten. Surgical intervention, the main stay of management of ruptured abscesses is no longer practiced, and visceral abscesses other than liver have become rare enough to be mentioned as case reports only. Morbidity and mortality have been steadily improved. The two basic management strategies – availability of and trained interventional radiologists to effectively drain the abscesses, have effectively changed the outcome of liver abscess management in the past 3 – 4 decades. It has been shown that regardless of the abscess size, drainage catheters need to be put only in cases where abscesses are evolving, require controlled drainage, have ruptured or have not liquidized sufficiently.

CONCLUSIONS

The prevalence and basic socio demographic profile of amoebic liver abscesses have remained unchanged since the past 50 – 60 years. The clinical profile of patients presenting with liver abscess have remained largely unchanged, although radiological profile reveals decrease in abscess size at the time of presentation.

Ultrasound abdomen is the main mode of intervention. The type of intervention (needle aspiration vs. catheter drainage) depends upon the need to intervene and estimated liquefied content in the abscess cavity. Even larger abscess with complete liquefaction can be safely evacuated with one-time aspiration. Evolving abscess and those with less than 50% liquefied content should at best be treated by indwelling catheters.

The colour of pus does not relate to the aetiology of abscess, but possibly to erosion of the evolving abscess into a biliary radical or a radical of portal vein.

Surgical intervention should be avoided, as even large and ruptured abscesses can be safely treated by ultrasound guided intervention. The outcome of properly managed liver abscess is excellent, and close to 100 %.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.
Financial or other competing interests: None.
Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

REFERENCES

[1] Haque R, Huston CD, Hughes M, et al. Amebiasis. N Eng J Med 2003;348(16):1565-1573.
[2] Stanley SL Jr. Amoebiasis. Lancet 2003;361(9362):1025-1034.
[3] Wuerz T, Kane JB, Boggild AK, et al. A review of amoebic liver abscess for clinicians in a non-endemic setting. Can J Gastroenterol 2012;26(10):729-733.
[4] Aradhana S, Tuhina B, Raju K, et al. Prevalence of cases of amebic liver abscess in a tertiary care centre in India: a study on risk factors, associated microflora and strain variation of Entamoeba histolytica. PLoS One 2019;14(4):e0214880.
[5] Eggleston FC, Handa AK, Verghese M. Amoebic peritonitis secondary to amoebic liver abscess. Surgery 1982;91(1):46-48.
[6] Farhana F, Jamaiah I, Rohela M, et al. A ten year (1999–2008) retrospective study of amoebiasis in University Malaya Medical Centre (UMMC), Kuala Lumpur, Malaysia. Trop Biomed 2009;26(3):262-266.
[7] Shirley DA, Farr L, Watanabe K, et al. A review of the global burden, new diagnostics and current therapeutics for amebiasis. Open Forum Infectious Diseases 2018;5(7):ofy161.
[8] Benetton MLFN, Gonçalves AV, Meneghini MEF, et al. Risk factors for infection by the Entamoeba histolytica/E. dispar complex: an epidemiological study conducted in outpatient clinics in the city of Manaus, Amazon Region, Brazil. Trans R Soc Trop Med Hyg 2005;99(7):532-540.
[9] Hathila TN, Patel CJ, Rupani M. A cross-sectional study of clinical features and management of liver abscesses in a tertiary care hospital in Ahmedabad, Gujarat. Nat J Med Res 2014;4(3):249-252.
[10] Meng XY, Wu JX. Perforated amebic liver abscess: clinical analysis of 110 cases. South Med J 1994;87(10):985-990.