



General Surgery

STUDY OF ETIOLOGY OF LIVER ABSCESS IN TROPICAL COUNTRY AND COMPARATIVE STUDY AMONG DIFFERENT WAYS OF ITS MANAGEMENT

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ABSTRACT

Introduction: Liver abscess, a disease troubling mankind from ancient times, has earliest documentation in the works of Bhrigu Samhita (3000 B.C.), wherein there is mention of blood and mucus in diarrhea with right upper abdominal pain. They have potentially lethal consequences, if prompt diagnosis and treatment are not accomplished. Liver abscess can be of various types depending on etiology. However two major types are amoebic and pyogenic in nature. **Aims:** To make early, accurate and cost effective diagnosis of liver abscess on clinical, radiological and microbiological basis, etiological and epidemiological basis of liver abscess and to show association with other co-morbid condition and addiction (diabetes mellitus, hepatitis B, hepatitis C, HIV and alcoholism) and the different treatment option of liver abscess, amoebic or pyogenic in order to have some guidelines in our setting. **Materials and Methods:** This study was a prospective, non-randomized, comparative study from November 2020 to August 2022 at Department of General Surgery and Department of Radiology Darbhanga Medical College and Hospital. Total 50 patients were included in this study. **Result:** In our study we found that more than 80% patient were of amoebic liver abscess and among pyogenic liver abscess most common pathogen was E coli followed by klebsiella. Only 12% patients of our study presented with jaundice. Jaundice is not that common in hepatic abscesses. It occurs following intrahepatic obstruction or associated hepatitis and is usually seen in large or multiple abscesses and also in abscesses situated at porta hepatis due to extra-hepatic biliary obstruction and study subjects (78%) had solitary liver abscess (88% of ALA and 25% of PLA) and 78% of our patients had their right lobe involved (87.55 of ALA and 37.5% of PLA). **Conclusion:** CT guided aspiration showed excellent result however it was only done where USG was inconclusive and only two patient underwent CT guided aspiration so it will not be prudent to comment on this procedure however further studies are required for this intervention in our setting where cost of treatment is most important factor as most of the patient belong to low socioeconomic strata.

KEYWORDS : Liver abscess, Amoebic abscess, Pyogenic abscess and Klebsiella pneumonia.

INTRODUCTION

Liver abscess, a disease troubling mankind from ancient times, has earliest documentation in the works of Bhrigu Samhita (3000 B.C.), 1 wherein there is mention of blood and mucus in diarrhea with right upper abdominal pain. They have potentially lethal consequences, if prompt diagnosis and treatment are not accomplished. Liver abscess can be of various types depending on etiology. However two major types are amoebic and pyogenic in nature.1

The world distribution of amoebic liver abscess should parallel that of amoebic infection. Unfortunately, after going through the literature one gets thoroughly confused regarding the actual incidence of amoebic liver abscess largely because incidence of amoebic liver abscess varies throughout the world and large number of cases in developing countries (constituting major bulk of total cases) remains unreported. However many of the studies have shown that the amoebic liver abscess is more common of the two types in developing countries. Pyogenic liver abscess constitute major bulk of hepatic abscess in western countries, they result from ascending biliary tract infection, hematogenous spread via portal venous system, generalized septicemia with involvement of liver by way of hepatic arterial circulation, direct spread from intra-peritoneal infection, other causes. Escherichia coli, klebsiella and streptococcus are most common organism followed by staphylococcus and pseudomonas.1

Although no distinct clinical criteria exist for distinguishing the two types, the diagnosis of amoebic and pyogenic abscess can be made by following points-younger age, resident or recent travel to areas of endemic amoebiasis, diarrhea and marked abdominal pain raise clinical suspicion of amoebic liver abscess. The diagnosis is confirmed by ultrasonography, serological tests like indirect hemagglutination test, reddish brown (anchovy-paste like material) aspirate from abscess, with negative gram stain, rapid resolution after metronidazole treatment. The diagnosis of pyogenic liver abscess is made by symptoms of picket fence configuration of temperature chart, nausea, vomiting and anorexia. Pain is late symptom and is more common with large solitary abscesses. Investigations reveal leucocytosis, anemia and positive blood culture for bacteria.

MATERIALS AND METHODS

1. Study Area-

Darbhanga Medical College and Hospital, Upgrade Department of General Surgery and Department of Radiology.

2. Study Design-

Prospective, non-randomized, comparative study

3. Study Population-

Patient admitted in different ward of Department of Surgery in Darbhanga Medical College and Hospital during study period.

4. Study Period-

November 2020 to August 2022.

5. Sample Size-

first 50 patient with different type of liver abscess will be study sample.

6. Sample Design-

first 50 patients admitted in surgery ward with clinical, laboratory and radiological feature of liver abscess.

The patient were divided into two treatment group

Group 1- with abscess cavity <4 cm (300 cc) – they received only medical management.

Group 2- with abscess cavity >4 cm (>300 cc) or smaller abscess which failed to respond to drug therapy alone, left lobe abscess they in addition treated with USG guided – percutaneous needle aspiration or catheter drainage.

7. Criteria Selection

Inclusion Criteria-

Primary -

Patients suggestive of having liver abscess on the basis of history, clinical assessment.

Confirmatory-

On USG and laboratory work up (raised alkaline phosphatase and other liver function test).

Exclusion Criteria-

Patient not having clinical and radiological feature of liver abscess are

excluded from study.

Patient with recurrent liver abscess.

Patient with ruptured liver abscess.

Patient who underwent open surgical procedure for liver abscess.

RESULT AND DISCUSSION

We try to find out etiology on the basis of clinical features, imaging by USG, Gram stain of aspirate from liver abscess, aspirate culture and blood culture. Patients with typical clinical features, USG finding along with aspirate staining positive considered to have pyogenic liver abscess which was further confirmed by aspirate culture, and blood culture. Amoebic serology by ELISA not included in our study as this test was not available in our hospital. For other rare etiology where liver abscess is due to HBSAg, immunocompromised people due to HIV, and HCV was seen each patient to look for any rare association or as an etiological agent none of our patient in study group was positive for these three.

Treatment modalities include medical management, USG guided percutaneous and pig tail catheter drainage. Open surgical method was excluded from the study. We divided our study population in two group one with liver abscess size less than 4cm who received only medical management and another group of size more than 4cm who received guided aspiration percutaneous needle aspiration or pigtail catheter drainage and CT guided drainage in two patients where USG was inconclusive CT was done in same sitting therapeutic aspiration done. Analysis of outcome done separately for medical management and different guided procedures as both groups are not comparable as indication is different for both groups however different guided procedures compared among each other.

All of our study subjects were from West Bengal. Majority of my study subjects were in occupation with low income most common being the labourer, bus conductor and truck driver. However no standard literature mention about association of particular occupation.

In our study most of the patients were between the age group 30-40 years (38%) and mean age of the study subjects was 40.56 years. ALA can affect at any age however it is more frequent in adult life with the highest incidence in the 3rd and 4th decade. The maximum age incidence is seen in 30-40 years of age group.

In one study of 263 cases Debakey And Ochsner et al, in 1951, found that the incidence was maximum in 31- 40 years of age groups.² In another study in India by Kapoor et al, 1972, found incidence highest in 21-30 year age group.³

Earlier pyogenic liver abscess was disease affecting young age group 20-30 years with acute appendicitis as main cause. As development in management of acute appendicitis the disease now mainly affects patient 50-60 year primarily related to biliary tract disease or is cryptogenic.⁴ In our study male to female ratio was 7.3:1. For ALA it is 7.6:1 and for PLA 7:1.

Reports in the literature show there is a male preponderance in a ratio ranging from 10:1 to 17:1. A retrospective analysis in 1978 reported that the male: female ratio was 7.66:1 which had remained constant over 30 years (between 1946 – 1976)⁵.

Majority of our study population was suffering from fever (84%) at the time of presentation and 64% of the study subjects got associated chill and rigor.

Conter and his colleagues in 1986 carried out a study from 1968 to 1983 in the University of California, Los Angeles that 88% of patients suffering from pyogenic liver abscess and 93% of patients suffering from amebic liver abscess got fever. Another study carried out by Barnes and his associates during the period of 1979 to 1985 in University of Southern California showed that 77% of the patients with pyogenic liver abscess and 87% of the patients with amebic liver abscess got fever at the time of presentation.⁶

94% of the patients had abdominal pain (Right hypochondriac). 60% of our study subjects had anorexia and malaise (Table no.5). But no other study is available regarding this clinical feature except the one carried out by Onkar Singh et al in 2009. Their study showed that 54% of the patients got anorexia and malaise. Our study result is close to this one. But Samsi and Patwardhan showed in a study in 1974 that 35% patients with amebic liver abscess presented with anorexia as an

associated clinical feature.⁷

Only 12% patients of our study presented with jaundice. Jaundice is not that common in hepatic abscesses. It occurs following intrahepatic obstruction or associated hepatitis and is usually seen in large or multiple abscesses and also in abscesses situated at porta hepatis due to extrahepatic biliary obstruction. A study carried out by Khanna, Chaudhary and Kumar in 2005 showed 31.94% patients got jaundice. Majority of our study subjects (58%) had nausea or vomiting.

Turrill et al in 1966 showed that 41% patients with liver abscess had nausea and vomiting. Our study result is similar to this one. But other study results are different. The study carried out by Oschner and DeBakey showed 22.7% patients presented with nausea and vomiting.⁸ From India two studies, the first one carried out by Subramaniam and Madangopalan⁹ and the second one by Kapoor showed nausea and vomiting was present in 6.3% and 28.5% respectively.

Majority of our study subjects had four and more clinical features and only 3% had only one clinical feature. Most common symptom was pain right upper quadrant. Among the patients who had only one clinical feature most of them presented with right hypochondriac pain. Our study revealed that most of the patients (59.5%) of ALA and (75%) of PLA were alcoholic. A positive history of alcoholism was obtained by Waring in 67.5% of 40 cases, by Rogers in 54.5% of 44 cases¹, and by Chen and his associates in 67.7% of 31 cases¹². Petri reported it in 24% of 28 cases, and Jayasuria in only 18% of 73 cases. Other studies reported history of alcohol intake in patients with amebic liver abscess in 85%¹⁰, 35%, 40%.

Our study result is similar to that of last one. Excessive alcohol intake makes the liver more prone to developing liver abscess and is also responsible for the larger size of the abscess, greater frequency of complications and higher mortality¹⁰. Alcohol lowers the body resistance, suppresses liver function and is accompanied by malnutrition, all factors making the person, especially of the lower socioeconomic status, more prone to develop liver abscess¹⁰.

14.3 % of ALA and 37.5% of PLA in our study subjects were suffering from diabetes mellitus. Association of diabetes with liver abscess is seen more commonly with pyogenic than amoebic liver abscess. Surprisingly In our study the association of diabetes with PLA was higher than the standard literature most probably as burden of diabetes in tropical countries and north and eastern India increasing at epidemic form. In one study of ALA carried out by Mathur et al, in 2002, they found that about 21% cases were diabetic.¹¹ Krige et al, in 2001 diabetes mellitus was associated with PLA in about 15% of cases.⁹

Our study showed that most of the cases (60%) had leucocytes count ranging from 10001 to 15000 cells/mm³ with mean value of 11,500. Earlier studies had reported the mean TLC to be 15000 cells/mm³ with the range 7500 cells/mm³ to 25000 cells/mm³. Others had reported the mean TLC value to be 14800 cells/mm³ with the range of 6800 cells/mm³ - 19000 cells/mm³. In our study mean decrease in TLC after 72 hrs of treatment was maximum with PCD as compared to PNA and CT guided aspiration.

In our study subject aspirate from liver abscess shows gram staining positive for gram negative bacilli in seven cases and gram positive cocci in one case and after culture of the aspirate shows growth in seven cases most frequent microorganism was E.coli in 57% of PLA and next common was klebsiella (26%) and pseudomonas least common (14%).

In our study blood culture was positive in 3 cases (37.5%) and E. coli was found to be most frequent in 25% of PLA. In one study by Ruben Peralta et al, in 2006 found that blood culture was positive in 57% cases of PLA.¹ However in another study by Chaen et al, 2005 they have found klebsiella as most common but in our study E coli was most common and corroborates with most of standard literature.

In our study subjects (78%) had solitary liver abscess (88% of ALA and 25% of PLA) and 78% of our patients had their right lobe involved (87.55 of ALA and 37.5% of PLA). Earlier studies had reported right lobe abscesses in 55% cases of liver abscesses, multiple abscesses were 27.7% and isolated left lobe abscesses 16.6%. Solitary liver abscess had been reported in 77% cases and multiple in 23 cases. Thus the reported involvement of different lobes in our study is close to the

earlier results. So our result is similar to standard literature. In our study 84% of patients were found to have amoebic liver abscess and 16% of patients were found to have pyogenic liver abscess. Oschner and colleagues reported in 1938 that amoebic liver abscess is three times more common than pyogenic liver abscesses⁸. Improvements in public sanitation and hygiene led to a decrease in cases of amoebiasis and amoebic liver abscess. Currently, pyogenic liver abscesses make up the majority of hepatic abscesses in western literature.

In developing countries including India though number of pyogenic abscesses is increasing due to predisposing hepatobiliary disorder, the amoebic type still constitutes the majority. The study carried out by Onkar Singh showed that 67% patients had amoebic subtype.¹² So, our result corroborates with their result that amoebic liver abscess is more prevalent than pyogenic liver abscess.

Irrespective of the procedure done it has been seen in our study that 84% of the subjects attained $\geq 50\%$ reduction in abscess cavity size following therapy. But no further study regarding this issue is available. Percutaneous pigtail catheter drainage was successful in terms of $\geq 50\%$ reduction in abscess cavity size in 85.72% patients as compared to percutaneous needle aspiration which was successful in 80.76% patients.

Our study revealed that PCD was more successful in terms of recurrence of abscess, relief of symptoms and decreases in size of abscess cavity and TLC. Decrease in TLC at third day was found to be significant. Only 14.3% of patients who underwent PCD required readmission in hospital as compared to PNA in which only 15.8.8% patients were re admitted for recurrence.

In our study 100% of CT guided and 92.3% patient of PCD had their symptoms relieved within three days however in USG PNA also shows almost equivalent result.

CT guided aspiration showed excellent result however this was not included in our routine objective it was only done where USG was inconclusive.

Only two patient underwent CT guided aspiration so it will not be prudent to comment on this procedure however further studies are required for this intervention in our setting where cost of treatment is most important factor as most of the patient belong to low socioeconomic strata.

CONCLUSIONS

- In our study we found that more than 80% patient were of amoebic liver abscess and among pyogenic liver abscess most common pathogen was E.coli followed by klebsiella.
- There is increasing association of diabetes with both type of abscess and alcoholism remains important risk factor.
- Image guided drainage is the best modality of treatment for liver abscess size $>4\text{cm}$ in both pyogenic and amoebic liver abscess however in small size abscess medical management is equally good.
- In case of larger abscess ($>4\text{cm}$) Ultrasound guided percutaneous pigtail catheter drainage is a superior therapeutic approach than percutaneous needle aspiration.
- Though the initial cost of catheter posed a little burden to the patients, the overall expenditure, in terms of hospital stay and recurrence outweighed the initial cost of aspiration only.
- Patients treated with ultrasound guided percutaneous catheter drainage improved rapidly than those treated with needle aspiration.
- Abscess cavity resolves better in case of catheter drainage than needle aspiration.
- Recurrence rate is less in case of percutaneous catheter drainage than percutaneous needle aspiration.

CT guided aspiration showed excellent result however it was only done where USG was inconclusive and only two patient underwent CT guided aspiration so it will not be prudent to comment on this procedure however further studies are required for this intervention in our setting where cost of treatment is most important factor as most of the patient belong to low socioeconomic strata.

Table 1: Distribution between ALCOHOLIC and DIABETES with Amoebic Liver Abscess and Pyogenic Liver Abscess

		Amoebic Liver Abscess	Pyogenic Liver Abscess	Total	P Value	Significance
ALCOHOLIC	YES	25 59.5%	6 75.0%	31 62.0%	0.409	Not Significant
	NO	17 40.5%	2 25.0%	19 38.0%		
	Total	42 100.0%	8 100.0%	50 100.0%		
DIABETES	YES	6 14.3%	3 37.5%	9 18.0%	0.117	Not Significant
	NO	36 85.7%	5 62.5%	41 82.0%		
	Total	42 100.0%	8 100.0%	50 100.0%		

Table 2: Distribution between Recurrence

		Medical & Conservative	USG Guided Percutaneous Needle Aspiration	USG Guided Pig Tail Catheter Drainage	CT Guided Aspiration	Total	P Value
OUTCOME	No recurrence	6 75.0%	22 84.6%	12 85.7%	2 100.0%	42 84.0%	0.825
	Recurrence	2 25.0%	4 15.4%	2 14.3%	0 0.0%	8 16.0%	
	Total	8 100.0%	26 100.0%	14 100.0%	2 100.0%	50 100.0%	

Table 3: Nature of microorganism in aspirate culture growth

Growth	Frequency	Percentage	P-value
E.COLI	4	57.14	<0.001
KLEBSIELLA	2	28.57	
PSEUDOMONAS	1	14.28	
TOTAL	7	100	Significant

Table 4 : Blood culture

		TYPE OF ABSCESS		Total	P value	Sig
		Amoebic Liver Abscess	Pyogenic Liver Abscess			
BLOOD CULTURE	ECOLI	0 0%	2 25.0%	2 4.0%	<0.001	Sig
	PSEUDOMONAS	0 0%	1 12.5%	1 2.0%		
	NO GROWTH	42 100.0%	5 62.5%	47 94.0%		
	Total	42 100.0%	8 100.0%	50 100.0%		

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