

Radiological and Epidemiological Investigation of Liver Abscess

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ABSTRACT

Liver abscess is not an uncommon disease entity. Early diagnosis and prompt interventions improve the survival and outcome of the disease. The objectives of present study were to see the common types of liver abscesses prevalent in the area, to study the socio-demographic and clinical correlates and to compare among the major types of liver abscesses. This hospital based cross sectional study was conducted among patients presenting with signs and symptoms of Liver Abscess attending outdoor of the institution. Confirmation of diagnosis was made by abdominal Ultrasonography (USG) and examination of aspirates. Socio-demographic and clinical information were collected in a pre-designed and pre-tested schedule.

KEY WORDS: alkaline phosphatase, amoebic liver abscess, liver enzymes, pyogenic liver abscess, , ultrasonography

INTRODUCTION:

Liver abscess has been an important clinical problem which requires prompt diagnosis and early interventions. Two types of liver abscess are common Amoebic (ALA) and Pyogenic liver abscess (PLA). Worldwide about 40-50 million people are infected with amoebic abscesses with majority in developing countries. Hepatic involvement is a frequent extra-intestinal complication which is encountered in 3 to 9% of the cases of amoebiasis. The prevalence of infection of amoebic abscess is higher than 5-10% and has been reported as high as to be 55% in some areas. India has 2nd highest incidence of liver abscess in the world. PLA and ALA have many features in common and diagnosis is often delayed due to vague clinical symptoms resulting in adverse outcomes. Liver abscesses, both amoebic and pyogenic, continue to be an important cause of morbidity and mortality in tropical countries.

However, recent advances in interventional radiology, intensive care, progress in antibiotic therapy, and liberal use of sonography and computerized tomography scanning of the abdomen have led to early diagnosis and treatment of patients with liver abscess, thus improving the patient outcome. PLA is still a serious illness and diagnostic challenge. So identification of risk factors and early diagnosis are the key issues for effective interventions. Information on LA is very limited from this part of the country. Keeping all these views in mind; the present study was

conducted with the following objectives: To see the types of liver abscess prevalent in the area; To study the different socio-demographic and clinical correlates; To compare between the major types of liver abscesses.

MATERIALS & METHODS: This cross sectional study is conducted in Chirayu Medical College, Bhopal & Asian Globus Hospital, Bhopal, during 2016-17. Patients presenting with signs and symptoms of Liver Abscess (LA) in outdoor were included in the study. After suggestive history and examination, diagnosis was confirmed by abdominal Ultrasonography and examination of the aspirates. Pyogenic liver abscess were diagnosed based on positive bacterial cultures of the aspirates and response to sensitive antibiotic therapy.

ALAs were diagnosed by the nature of the pus (Anchovy Sauce), negative culture and response to standard anti-amoebic therapy. CT scan was not required for diagnosis of any of the cases. Stool microscopy or serologic test was not done. Stool microscopy is not helpful for diagnosis as most patients with an amoebic liver abscess do not have coexistent amoebic colitis. The drawback of serologic tests that detect antibodies against total amoebic antigens is that individuals in areas of endemicity can remain positive for years after infection. Informed consent was taken from each patient prior to inclusion in the study. LA cases with coexistent malignancies

were excluded. Considering the fact that primary tuberculosis of liver is rare and difficult to diagnose, in the present study, no attempt was made to isolate tubercular bacilli. However, chest X-ray was done in all patients. Information on socioeconomic demographic profile, personal habits was taken in a pre-designed and pre-tested schedule. For the study purpose, alcoholics were divided into regular and occasional drinkers. Persons consuming alcohol more than or equal to 3 times per week were considered as regular alcoholic. However, the amount and type of alcohol consumed could not be considered. Although source of water consumption is an important variable, considering the fact that people used to drink water from different sources, this variable was not considered. Modified Kuppuswamy scale was used to assess the socioeconomic status. Random blood sugar (RBS) estimation was done on all patients at the first visit. Patients with RBS > 200 mg/dl were further subjected to fasting and post-prandial blood sugar estimation. Interpretation of all biochemical analysis was according to the reference range of laboratory. However, known or diagnosed diabetic cases were also considered as diabetic irrespective of their RBS status.

RESULTS:

The present hospital based study included all the cases attended outdoor of the institution during the study period. The patients with suggestive signs and symptoms were subjected to Ultrasonography (USG) of abdomen, examination of aspirates and X-ray of Chest. Laboratory investigations like Total Leucocyte Count (TLC), liver enzymes (SGOT, SGPT, and Serum Alkaline Phosphatase), random blood sugar were done in all cases. Out of the total of 47 Liver Abscess (LA) cases 37 (78.7%) were amoebic and 10 (21.3%) were Pyogenic.

The distribution of liver abscess cases according to the socio-demographic variables. Majority (40.43%) of the cases of both Amoebic Liver Abscess (ALA) and Pyogenic Liver Abscess (PLA) were in the 41-50 years age group. The proportion of LA cases contributed by very young age (20 years or less) and elderly (>60) were found to be the same (6.38%) in both the groups. Occurrence of ALA was high (66.67%) in both the groups. The relationship was not found to be statistically significant. In

Table 1: Distribution of liver abscess cases according to the Socio-demographic correlates.

genderwise distribution, male predominates in both ALA and PLA. No significant association was found between gender and type of liver abscess. In assessing SES status, no case was found in Class I and Class II of Modified Kuppuswamy SES scale. Majority (68.09%) of LA cases were from low SES group and ALA was predominant (87.5%) in this group. However, ALA and PLA cases were found to be unequal frequency (50%) among the cases belonged to Class III SES. Relationship between SES status and type of liver abscess was not found to be significant ($p=0.08$) (Table 1).

The distribution of liver abscess cases according to certain variables like diabetes and use of alcohol. Diabetes was found to be significantly associated with type of liver abscess ($p=0.049$). Majority (70%) of LA cases were found to have diabetes. Out of them, 88% had ALA. Non-diabetic comprised of 30% of LA cases, where ALA were 57% and rest were PLA. In relation to use of alcohol, 23.40% were found to be never user. Among them, 54.55% were ALA cases and rest PLA. Among the regular user, majority (87.5%) had ALA. No statistical association was found between use of alcohol and type of liver abscess (Table 2).

The various laboratory findings in both ALA and PLA cases. TLC was in normal range in almost 60% of cases. TLC was raised in 40% of cases. In majority (90%) PLA cases, TLC were raised. In patients who had normal TLC, majority had ALA. The difference was significant ($p=0.0003$). SGOT and SGPT were found to normal in majority of LA cases i.e. 78% and 89% respectively. Out of the total cases, where SGOT and SGPT were found to be raised, ALA and PLA frequency was 70% and 80% respectively. While analyzing the liver enzymes status, serum Alkaline Phosphatase was found to have significant relationship with type of liver abscess ($p=0.0001$) (Table 3).

The Ultrasonography findings regarding number of abscess and lobe involvement. These two

Age	ALA		PLA		Liver Abscess		x2	p-value		
	No.(%)	%	No.(%)	%	Total(%)	%				
<20	2(66.67)	5.4	1(33.33)	10	3(100)	6.38	1.032	0.96		
21-30	6(75)	16.22	2(25)	20	8(100)	17.02				
31-40	5(83.33)	13.51	1(16.67)	10	6(100)	12.77				
41-50	15(78.95)	40.54	4(21.05)	40	19(100)	40.43				
51-60	7(87.50)	18.92	1(12.50)	10	8(100)	17.02				
>60	2(66.67)	5.4	1(33.33)	10	3(100)	6.38				
Total	37	100	10	100	47	100				
<u>Gender</u>										
Male										
	31(81.58)	83.78	7(18.42)	70	38(100)	80.85	0.2809	0.5961		
Female										
	6(66.67)	16.22	3(33.33)	30	9(100)	19.15				
TOTAL										
	37	100	10	100	47	100				
<u>Socio Economic class</u>										
III										
	2(50)	5.4	2(50)	20	4(100)	8.51	4.937	0.08		
IV										
	7(63.64)	18.99	4(36.36)	40	11(100)	23.4				
V										
	28(87.50)	75.67	4(12.50)	40	32(100)	68.09				
TOTAL										
	37	100	10	100	47	100				

Table2: Distribution of liver abscess cases according to certain variables.

Diabetes	ALA		PLA		Liver Abscess		x2	p-value		
	No.(%)	%	No.(%)	%	Total (%)	%				
No	8(57.14)	21.62	6(42.86)	60	14(100)	29.79	3.86	0.049		
Yes	29(87.88)	78.38	4(12.12)	40	33(100)	70.21				
TOTAL										
	37	100	10	100	47	100				
<u>Alcohol consumption</u>										
No										
	6(54.55)	16.22	5(45.45)	50	11(100)	23.4	5.095	0.0783		
Regular										
	21(87.50)	56.76	3(12.50)	30	24(100)	51.06				
Occasional										
	10(83.33)	27.03	2(16.67)	20	12(100)	25.54				
TOTAL										
	37	100	10	100	47	100				

findings were found to be significantly associated with solitary abscess, majority (86.05%) were amoebic. No type of liver abscess. Out of the 43% of cases with multiple abscesses were seen in ALA cases. Right lobe

Table 3: Laboratory findings of liver abscess cases.

Laboratory findings	Liver Abscess				Total(%)	%	x2	p-value
	ALA		PLA					
	No. (%)	%	No. (%)	%				
TLC								
4000 -11000	27(96.43)	72.97	1(3.57)	10	28(100)	59.57	12.963	0.0003
>11000	10(52.63)	27.03	9(47.37)	90	19(100)	40.43		
TOTAL	37	100	10	100	47	100		
SGOT								
Normal	30(81.08)	81.08	7(18.92)	70	37(100)	78.72	0.1051	0.7457
Raised	7(70)	18.92	3(30)	30	10(100)	21.28		
TOTAL	37	100	10	100	47	100		
SGPT								
Normal	33(78.57)	89.19	9(21.43)	90	42(100)	89.36	0.0054	0.9412
Raised	4(80)	10.81	1(20)	10	5(100)	10.64		
TOTAL	37	100	10	100	47	100		
Alkaline Phosphatase								
Normal	34(91.89)	91.89	3(8.11)	30	37(100)	78.72	14.498	0.0001
Raised	3(30)	8.11	7(70)	70	10(100)	21.28		
TOTAL	37	100	10	100	47	100		

Table 4: USG Findings of Liver abscess cases.

USG Findings	Liver Abscess				Total(%)	%	x2	p-value
	ALA		PLA					
	No. (%)	%	No. (%)	%				
No. of Abscess								
Single	37(86.05)	100	6(13.95)	60	43(100)	91.49	11.447	0.0007
More than one	0(0)	0	4(100)	40	4(100)	8.51		
TOTAL	37	100	10	100	47	100		
Lobe involved								
Right	35(87.50)	94.59	5(12.50)	50	40(100)	85.11	16.9	0.0002
Left	2(66.67)	5.41	1(33.33)	10	3(100)	6.38		
Both	0(0)	0	4(100)	40	4(100)	8.51		
TOTAL	37	100	10	100	47	100		

was involved in majority of the cases, which was more conspicuous in ALA. Both lobes were involved exclusively in PLA (Table 4).

DISCUSSION:

The present study was conducted among the patients attending outdoor with signs and symptoms of liver abscess. During the study period, 47 cases liver abscess cases were amoebic origin and 10 (21.3%) were of Pyogenic origin. In a study done by Singh and his coworkers, ALA were encountered more frequently (58%) compared to Pyogenic (23%)^[7]. Similar finding of high prevalence of ALA in India was revealed by various authors^[10, 11, 12]. However in contrast to our finding, a very low percentage of ALA was reported in few other studies done in other parts of the globe^[13, 14]. This difference could be attributed to the fact that ALA is associated with hygienic practices of the people, which is largely low in developing countries with low living standard. Highest prevalence (40%) of liver abscess was observed in 5 decadeth (4150 years) of life with equal frequency in both ALA and PLA (Table 1) found. Out of the 47 patients, 37 (78.7 %) were reported higher occurrence of ALA between

31-40 years^[11,15,16,17]. Higher prevalence of ALA in the young age in a country like India could be due to high use of alcohol by this young group^[10].

Another explanation could be that people of this age keep out door for longer time, exposing themselves for amoebiasis through contaminated food and water. Bhatta and his co-workers reported a peak incidence of ALA between 14-30 years and PLA in the fourth decade. On the contrary, Alvarez JA and his co worker reported higher incidence (58%) of PLA cases in persons more than 60 years^[18]. A striking male preponderance was found in both ALA and PLA in the present study. However, no statistically significant association was found between gender and type of liver abscess. This male preponderance (1.3:1 to 13.3:1) in ALL was reported by many authors from time to time^[10,11,13-19]. PLL also shows male dominance over female^[20,21]. However in a study done in Kashmir, majority (60%) of the Pyogenic liver abscess cases were found to be females. Out of the total 47 LA cases, more than two third belonged to low socio-economic class. This was more so in case of ALA. However, no significant relationship was obtained between SES and ALA or PLA. High prevalence of ALA in low socioeconomic group was reported in many studies done in India^[10,11]. In India, due to poor sanitary condition and a lower socioeconomic status, amoebiasis is endemic and amoebic liver abscess accounts for 3-9% of all cases of amoebiasis. All the studies have been found to be unanimous in respect to pain abdomen, particularly right upper quadrant as the commonest presenting feature of liver abscess^[10,11,13,15,17]. Fever was found to be presenting symptom in 54% of ALA cases in the present study (Table 1). However all the PLA cases (100%) presented with fever. Fever has been described by most of our previous studies^[10,11,13,15,17]. Jaundice and diarrhoea in LA cases were found to be inconspicuous as clinical features in the present study, which is consistent with other studies^[11,12,15,17,18]. Hepatomegaly, which is observed in our study around 40% is in conformity with other studies^[10,11]. Abdominal tenderness and hepatomegaly were found as the most helpful signs in suggesting a Pyogenic liver abscess in another study^[8]. In Indian situation, ALA should be suspected in persons presenting with prolonged fever and pain abdomen to the emergency department and hepatomegaly as the presenting feature is not always present^[20].

Leucocytosis was observed in 68% of cases of PLA in a study done by Malik and his coworkers. The finding of significant association of^[8] alkaline phosphatase and type of liver abscess ($p=0.0001$) was in conformity with various studies. Alkaline phosphatase was found to be elevated in almost 70% of cases where none of the liver function tests were diagnostic^[16]. In PLA also, serum Alkaline Phosphatase was found to be elevated^[15,22]. So, this enzyme can be taken as consistent indicator for ALA and PLA. Regarding USG changes, Solitary abscess was seen in all ALA cases and 60% PLA cases in the present study no of abscesses and lobe involvement was found to be significantly associated with type of liver abscess. The present finding of high occurrence of solitary abscess and predominant involvement of right lobe was in conformity with other studies^[8,10,11,13,15,17]. E coli and Klebsiella has been reported by many authors to be the predominant organism^[8,10,11,12]. This is inconsistent with our finding.

CONCLUSION:

Liver abscess is a condition where the disease can be diagnosed and pathology can be determined easily. A patient with right upper abdominal pain and associated fevers should raise its suspicion and an USG may be more than enough to confirm it. In endemic areas, it may be technically considered as amoebic in origin until otherwise proved.

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