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Original Research Article

Clinico-pathological study of liver abscesses with special reference to different treatment options

Sailendra Nath Paul, Vijay Kumar Jain*

Department of General Surgery, KPC Medical College and Hospital, Kolkata, West Bengal, India

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***Correspondence:**
Dr. Vijay Kumar Jain,
E-mail: drvijayjain18@gmail.com

ABSTRACT

Background: Liver abscess is a serious life threatening condition if left untreated. Most of them were amoebic in nature in tropical countries. The present study was done with the aim to assess the epidemiology of liver abscesses, to determine the fast, accurate and cost effective diagnostic approaches and to find out the best mode of management for amoebic liver abscess (ALA) and pyogenic liver abscess (PLA) in the study population.
Methods: This was a prospective study done at KPC Medical College and Hospital for a period of 2 years, from June 2013 to May 2015. A total of 50 patients diagnosed with liver abscess were included in the study. Patients were categorized into ALA and PLA cases based on the type of abscess cavity. Authors have studied correlation of socio-demographic factors with disease, etiology, diagnostic findings, types of treatment and their outcome in the study population.
Results: ALA was the most common type among the study groups (90%). Male preponderance was seen. Majority of them belongs to low-socioeconomic status (80%). The most common etiology of PLA was E. coli. Ultrasonography (USG) of the abdomen was accurate and cost-effective diagnostic procedure for assessing liver abscesses. Percutaneous catheter drainage was the most effective method of treatment (with a 100% success rate) in both ALA and PLA cases.
Conclusions: Most of the patients in the study had ALA and had a chronological association with alcohol addiction, diabetes and low-socioeconomic status. Rapid diagnosis of the condition (ALA and PLA) with USG will reduce the rate of morbidity and mortality in the patients.

Keywords: Catheter drainage, Liver abscess, Ultrasonography

INTRODUCTION

Liver abscess is potentially a life-threatening condition resulting from the invasion and multiplication of microorganisms either directly from injured blood vessels or by the biliary ductal system.[1,2] Abscess of liver were of many types. Among them amoebic liver abscess (ALA) and pyogenic liver abscess (PLA) were the most commonly seen in the population.[3] In tropical and subtropical countries, about 50-70% liver abscess cases were of amoebic in origin.[4] The common cause of PLA was biliary disease. The rate of incidence ranges from 1.1 to 2.3 cases per 1 lakh population every year and the common etiological factors are known to be the *Escherichia coli*, *Klebsiella* and *Streptococcus*.[5]

The diagnosis of liver abscess is confirmed by ultrasonography (USG), blood culture and abscess aspirate. Both ALA and PLA are found to be the important causes of morbidity and mortality in tropical countries. Conservative management with antibiotics is the main stay of treatment for ALA and PLA in initial

stages. Now-a-days, due to progress of diagnostic approaches by radiological imaging the therapeutic strategy has been altered to percutaneous approach using needle aspiration or catheter drainage. While open surgery is reserved for treating the complicated cases.[2]

The present prospective study was designed to assess the epidemiology of liver abscesses, to determine the fast, accurate and cost-effective diagnostic approach and to find out the best mode of treatment for ALA and PLA in the study population.

This was a prospective study conducted from June 2013 to May 2015. All patients included in the study were admitted in the inpatient ward of KPC Medical College and Hospital. After getting approval from Institutional ethics committee, and consent letter from the patients; the diagnosis of liver abscesses was made from past history, clinical features, laboratory investigations, radiology (X-ray, ultrasonography and CT scanning), serological investigation, blood culture and culture from the aspirate.

A total of 50 patients were participated in the study. Treatment was given based on the size of abscess cavity. Patients with abscess cavity less than or equal to 300cc (4cm diameter) received only medical management. Patients with abscess cavity greater than 300cc (4cm diameter) or smaller abscesses which failed to respond to drug therapy alone, left lobe abscess, abscess with complications like rupture were treated with both antibiotics and other interventional treatments like needle aspiration, percutaneous catheter drainage or open surgical drainage. During treatment, all patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia and hepatomegaly, improved liver function tests, ultrasonographic evidence of decrease in size CVF abscess cavity were considered criteria for successful treatment. The mean stay in hospital for each patient was recorded. On discharge, each patient was followed up weekly for one month and then every two monthlies for six months. During each visit patient's body weight was recorded, any new clinical symptom was noted, by ultrasonography upper abdomen.

Statistical analysis

The data collected was analysed. Raw data were entered into a MicroSoft Excel spreadsheet and were given in number and percentages.

RESULTS

Socio-demographic data was presented in Table 1. Of the total 50 patients, 45 (90%) had diagnosed with amoebic liver abscess (ALA) and 5 (l0%) with pyogenic liver abscess (PLA). Out of 45 patients with ALA 42 were male and 3 were females with male:female ratio of 14:1. Among patients with PLA, 3 were males and 2 were females (1.5:1). Majority of them belong to Hindu religion (ALA-71%; PLA-40%). The maximum age incidence in ALA cases was 2l-40 years and PLA were 41-60 years. Most of them belong to low economic group 40 (80%). Source of drinking water in the majority are municipal water 25 (50%). Among the 45 patients of ALA, 27 (60%) were addicted to alcohol and out of 5 with PLA, 3 were addicted to alcohol. The incidence of diabetes was more common in PLA group.

Table 1: Demographic characteristics of the patients.

Demographic variables	ALA	PLA
No. of patients (%)	45 (90)	5 (10)
Male:female	14:1	1.5:1
Age group in years (%)		
0-20	3 (6)	0
21-40	23 (51)	1 (20)
41-60	18 (40)	4 (80)
61-80	1 (2)	0
Religion (%)		
Hindu	32 (71)	2 (40)
Islam	8 (18)	2 (40)
Christian	5 (11)	1 (20)
Addicted to alcohol (%)	27 (60)	3 (60)
Diabetic (%)	14 (30)	3 (60)
Socioeconomic status (%)		
Low	40 (80)	
Middle	5 (10)	
High	5 (10)	
Drinking water source		
Municipal supply	25 (50)	
Hand pump	15 (30)	
Tube well	5 (10)	
Others	5 (10)	

Table 2: Comparison of signs and symptoms between two groups.

	ALA (%)	PLA (%)
Signs		
Right upper quadrant tenderness	41 (90)	5 (100)
Intercoastal tenderness	41 (90)	4 (80)
Hepatomegaly	32 (70)	3 (60)
Jaundice	9 (20)	1 (20)
Chest findings	5 (11)	1 (20)
Others	9 (20)	1 (20)
Symptoms		
Abdominal pain	41 (90)	5 (100)
Fever	38 (85)	4 (80)
Jaundice	9 (20)	1 (20)
Weight loss	18 (40)	1 (20)
Diarrhoea	9 (20)	0 (0)
Anorexia	27 (60)	3 (60)
Cough	5 (10)	1 (20)
Others	5 (10)	1 (20)

Clinical characteristics were given in Table 2. Abdominal pain was the common symptom noted in about 90% of the patients with ALA and 100% in all the patients of PLA. Tenderness in the right upper quadrant area and in intercoastal region was the important signs of the diseases noted in almost all the patients.

Table 3 presents the laboratory investigations done in all the patients. Leukocytosis, raised ESR and raised alkaline phosphatase were seen in all patients with PLA and 75%-80% in ALA patients.

Table 3: Comparison of laboratory and USG findings between two groups.

Investigations	ALA (%)	PLA (%)
Laboratory findings		
Leukocytosis (>10000)	34 (75)	5 (100)
Eosinophilia	4 (8)	2 (40)
Raised ESR	36 (80)	5 (100)
Hb% (<10gm%)	22 (50)	3 (60)
Bilirubin (>1mgm/dl)	9 (20)	1 (20)
Raised alkaline phosphatase	27 (60)	5 (100)
Raised SGOT	22 (50)	4 (80)
Raised SGPT	22 (50)	4 (80)
Abnormal prothrombin time	20 (45)	1 (20)
Hypoalbuminemia	18 (40)	2 (40)
USG abnormal findings	40 (88.8%)	5 (100)

Ultrasonography (USG) of abdomen was done in all cases. However, CT scan abdomen had to be done in two cases due to diagnostic dilemma. Ultrasonographic findings showed that in 40 (88.8%) cases of ALA the right lobe was affected and in 5 (10%) cases both lobes were affected. In75% patients the abscess was single and in 25% it was multiple. In case of PLA, 3 (60%) had right lobe affected, l (20%) left lobe and in 1 (20%) both lobes were affected. 60% patients had single abscess and, 40% had multiple abscesses. Chest X ray- they showed abnormalities in about 50% patients.

Aspirate cultures were negative for bacteria in ALA cases and were positive in three cases in PLA category showing presence of *E. coli.* Blood culture was positive in a single case of PLA showing the presence of *E. coli* and in rest of the cases cultures were negative.

Treatment outcome

Abscess cavity with volume less than or equal to 300cc was observed in 6 (13%) patients with ALA and 1 (20%) patient with PLA. Abscess cavity with volume >300cc was noticed in 39 (87%) patients with ALA and 4 (80%) patients with PLA (Figure 1).

Of the 6 patients with ALA treated conservatively there were two failures that were then treated with catheter drainage. Single patient of PLA was treated by parenteral antibiotics.

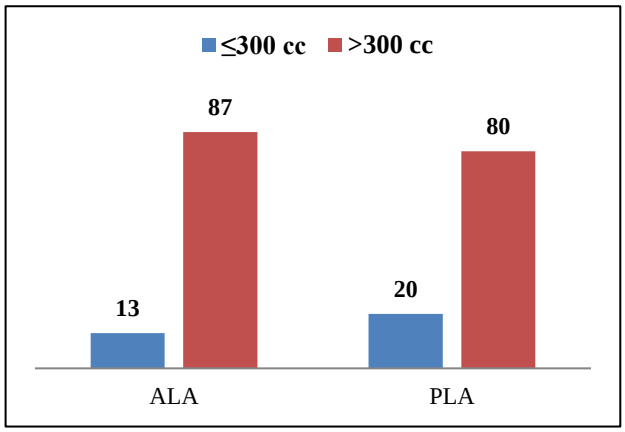

Figure 1: Comparison of percentage of cases with abscess cavity volume in ALA and PLA.

Out of 43 patients with abscess cavity >300 cc, 9 patients had presented with signs of peritonitis due to intra-peritoneal rupture of the abscess. They were treated with laparotomy and drainage. There were three deaths among these nine patients. This was mainly due to their late presentation and due to poor general condition preoperatively. Among these 34 patient's halves were treated with ultrasonic guided needle aspiration (ALA-15; PLA-2). There were 5 failures among patients with ALA and 1 failure among patients with PLA. Other half of patients was treated with ultrasonographic guided percutaneous catheter drainage (ALA-15; PLA-2). No failure was reported among these patients.

Table 4: Percentage of success rate of different treatment procedures.

Treatment	ALA			PLA		
	Total no. of cases	Failure (%)	Success (%)	Total no. of cases	Failure (%)	Success (%)
Conservative	6	2 (33)	4 (67)	1	0 (0)	1 (100)
Needle aspiration	15	5 (33)	10 (67)	2	1 (50)	1 (50)
Catheter drainage	15	0 (0)	15 (100)	2	0 (0)	2 (100)
Open drainage	9	3 (33)	6 (67)	0	-	-

DISCUSSION

ln this study, the maximum age incidence for amoebic liver abscess was 21-40 years. The male to female ratio was 14:1. This was consistent with the findings of Ramani et al.[6] Among PLA patients, the maximum age of incidence was 41-60 years which is consistent with the observations Bugti et al.[7] The male to female ratio was 1.5:1 in which the findings were consistent with those of Lone et al.[8]

Abdominal pain was the common symptom noted in both ALA (90%) and PLA (100%) cases which was followed by the fever, weight loss, jaundice, anorexia, diarrhea and cough. These findings were consistent with previous study reports.[3,9]

In this study 30% patients with ALA and 60% patients with PLA were diabetic. Our findings were in similar to those of Mathur el al.[10] The higher incidence of pyogenic liver abscess in diabetics is thought to be due lower immunity level.

In the present study, 60% patients with ALA and PLA abscesses had history of addiction to alcohol. Our findings were similar to those of Ramani et al and Mathur et al.[6,10] The higher incidence rate might be due to hepatic damage caused by the alcohol which predisposes to organ invasion, poor hygiene, malnutrition of the addicts resulting in lowering body resistance and suppress liver function.[6] 80% patients in this study were of lower socioeconomic status suggesting that liver abscesses were more common in people of lower socioeconomic status. The main reason for this was poor living conditions like crowded home, poor hygiene and drinking contaminated water. One important finding of our study was that most of these people used municipal water supply for consumption. Water being important source of amoebic infection, it can be estimated that either the water they consume was contaminated at source or during supply or was later contaminated during storage.

The most marked abnormality findings observed in both ALA and PLA are leukocytosis (75% and 100%), raised ESR (80% and 100%), anaemia (50% and 60%) and raised alkaline phosphatase (60% and 100%) respectively. among patients with ALA. Our findings in amoebic liver abscess were similar with findings of Ramani et al.[6] Most standard text books mention that the most common LFT abnormality is elevated prothrombine time.[11] However Mathur et al mentions that abnormally high alkaline phosphatase levels (seen in about 60-80% cases) is most reliable and consistent biochemical indicator of ALA.[10]

The most important diagnostic tool in this study was ultrasonography (USG), which was done in all the cases. The accuracy was 96%. The study findings were consistent with those of Mohsen et al, who found the sensitivity of USG to be >90%.[12] In only two cases abdominal CT scan was done due to diagnostic confusion. The USG findings showed that the abscess was localize to right lobe in 80% cases, left lobe in 10% and both lobes in rest 10% cases of ALA, 75% patients had single abscess and 25% multiple. Our findings were similar to that of Ramani et al who found the right lobe be involved in 87% cases.[6] In this study 87% cases had abscess size >300 cc. The reason for this was negligence of symptoms by patients for long time, wrong diagnosis and treatment, lack of proper referral facility, lack of proper treatment facility available in locality for patients of low socioeconomic status. In cases of PLA, USG showed that right lobe was involved in 60% cases, left in 20% and both lobes in 20%. The abscess was single in 60% cases and multiple in 20% cases. 80% patients had abscess size >300cc. This was again attributed to factors mentioned above. The accuracy of USG was 100%. This was slightly higher than that reported by Bugti et al.[7] Also the percentage involvement of right lobe was lower than that noted by Bugti et al, (noted 95% cases with right lobe involved.[7]

Of the five cases of PLA blood culture was positive in one (20%) case and showed presence of *E. coli*. Rest of the four cases was negative for blood culture. Abscess aspirate culture was positive in two more patients. All these patients had *E. coli* as the causative organism. This was different from those reported by Bugti et al, and Seo el al, who found the most common causative organism to be *Klebsiella pneumoniae*.[7,13] However our findings were similar to those of Lone et al and Alvarez et al who in their studies found *E. coli* to be the most common organism isolated from PLA.[7,14] Samples from two patients yielded no growth on culture of their abscess aspirate.

In this study in patients with ALA, 6 patients with abscess size ≤300cc were treated with conservative management and the success rate was 67% (n=4). The other two patients were later treated with percutaneous catheter drainage. Ramani et al in one study managed majority of his patients with abscess size <6cm (59.6%) by conservative management alone.[6] In this series, Needle aspiration was done in 15 cases and the success rate was seen 10 cases. This was comparatively less than Zafar et al, who has reported a success rate of 96.5%.[15] Fifteen patients were treated with percutaneous catheter drainage. The success rate in this group was 100% and the findings were in agreement with Rajak et al.[16] In this study 9 patients presented with features of peritonitis and were treated by surgical exploration and open drainage. The success rate in this group was 67%. This was mainly because of late presentation and poor general condition.

Out of four cases of PLA with size of cavity >300cc, two patients were treated with percutaneous needle aspiration with one failure (50%) in this group who was managed by percutaneous catheter drainage later. The other two

patients were treated with percutaneous catheter drainage with 100% success rate. Our findings were in agreement with those of Rajak et al.[16]

The mortality rate among patients with ALA in this study was 7% and our findings were similar to those of Boonyapisit el al.[17] There was no mortality among patients with PLA. However, some studies like Bugti et al, have found the mortality to be 6%.[7]

CONCLUSION

In conclusion, ALA was more predominate approximately 90% cases in this region compared to PLA. Males are more affected and the incidence rate can relate to addiction of alcohol as it suppresses the functioning of Kupffer cells in the liver and acts as a direct hepatotoxin. People of low socio-economic status were more affected due to poor hygiene and drinking contaminated water. USG was found to be useful in diagnosing liver abscess with more accuracy. E. coli was the common causative organism identified in PLA cases by abscess aspirate culture. Management with catheter drainage had showed 100% success rate in both ALA and PLA case.

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REFERENCES

1. Menon AR, Kizhakkekarammal PK, Rao GK. Amoebic vs pyogenic liver abscesses: A comparative study in a tertiary care hospital. J Acad Clin Microbiol. 2015;17(2):89-93.
2. Singh S, Chaudhary P, Saxena N, Khandelwal S, Poddar DD, Biswal UC. Treatment of liver abscess: prospective randomized comparison of catheter drainage and needle aspiration. Ann Gastroenterol. 2013;26(4):332-9.
3. Pyogenic Liver Abscess. Available at: https://www.healthline.com/health/pyogenic-liver-abscess. Accessed on 30 May 2018.
4. Sifri CP, Madoff LC. Infections of the liver and biliary system. In: Mandell GL, Bennett JE, Dolin R, editors. Mandell, Douglas, and Bennett′s Principles and Practice of Infectious Diseases. 7th ed. Edinburg: Churchill Livingstone; 2010:1035-1044.
5. Jha AK, Das A, Chowdhury F, Biswas MR, Prasad SK, Chattopadhyay S. Clinicopathological study and management of liver abscess in a tertiary care center. J Nat Sci Biol Med. 2015;6(1):71-5.
6. Ramani A, Ramani R, Shivananda PG. Amoebic Liver Abscess: A Prospective Study Of 200 Cases In A Rural Referral Hospital In South India. Bahrain Med Bull. 1995;17(4).
7. Bugti QA, Baloch MA, Wadood AU, Mulghani AH, Azeem B, Ahmed J. Pyogenic liver abscess: Demographical, clinical, radiological and bacteriological characteristics and management strategies. Gomal J Med Sci. 2005;3:10-4.
8. Lone MA, Ahmad Wani R, Parray FQ, Wani SA, Bhat TH, Peer GQ. A Study of Diagnostic and Therapeutic Strategies of Pyogenic Liver Abscesses. Indian J Practising Doc. 2006;3(1).
9. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: Recent trends in etiology and mortality. Clin Infect Dis. 2004;39:1654-9.
10. Mathur S, Gehlot RS, Mohta A, Bhargava N. Clinical profile of amoebic liver abscess. J Indian Acad Clin Med. 2002;3:367-73.
11. Kapoor OP. Amoebic Liver Abscess. S S Publishers; 1979: 205.
12. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: Ten years experience in a UK centre. QJM. 2002;95:797-802.
13. Seo TJ, Park CH, Lee SH, Lee SJ, Park JH, Park JH, et al. A Clinical study on liver abscess for recent 15 years in Gwangiu-chonnam province. Korean J Med. 2005;68(1):26-38.
14. Alvarez JA, González JJ, Baldonedo RF, Sanz L, Junco A, Rodrfíguez JL, et al. Pyogenic liver abscesses: A comparison of older and younger patients. HPB (Oxford). 2001;3:201-6.
15. Zafar A, Ahmed S. Amoebic liver abscess: A comparative study of needle aspiration versus conservative treatment. J Ayub Med Coll Abbottabad. 2002;14:10-2.
16. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S. Percutaneous treatment of liver abscesses: Needle aspiration versus catheter drainage. AJR Am J Roentgenol. 1998;170:1035-9.
17. Boonyapisit S, Chinapak O, Plengvanit U. Amoebic liver abscess in Thailand, clinical analysis of 418 cases. J Med Assoc Thai. 1993;76:243-6.

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