International Journal of Research in Medical Sciences
Bhutto AR et al. Int J Res Med Sci. 2019 Dec;7(12):4607-4611
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20195526

Original Research Article

Liver abscess: demographic, clinical, biochemical, imaging and microbial spectrum

Abdul Rabb Bhutto[1]*, Amanullah Abbasi[2], Shumaila Rafi[1], Ali Hassan Abro[3]

[1]Department of Medicine, Al-Tibri Medical College Hospital, Isra University Karachi Campus, Karachi, Pakistan
[2]Department of Medicine, Medical Unit II, Dow University of Health Science, Karachi, Pakistan
[3]Department of Medicine, Southend University Hospital, England, United Kingdom

Received: 04 September 2019
Accepted: 04 November 2019

***Correspondence:**
Dr. Abdul Rabb Bhutto,
E-mail: drbhuttoarabb@yahoo.com

ABSTRACT

Background: Liver abscesses are localized suppurative destruction of liver tissue due to infections of either bacterial (Pyogenic) or protozoa (Amoebic). Historically; pyogenic liver abscess has been described since the time of hippocrates (400 BC). Despite the more aggressive approach to treatment, the mortality rate remained at 60-80%.
Methods: This Cross-sectional analytical study carried out at Department of Medicine, Al-Tibri Medical College Hospital, Karachi, from June 2017 to December 2018. All participants of either gender with diagnosis of liver abscess were included in this prospective study. Patients with co morbidities like malignancy, autoimmune disease or on immunosuppressive treatment for any reason were excluded from the study. Following confirmation of the diagnosis; different characteristics of either type of liver abscess like demographic, clinical features, biochemical and imaging findings were evaluated.
Results: Data of 73 subjects, 65(89.0%) males and 08(11.0%) females were analyzed with mean age was 45.42±14.518 years. Fifty-four (73.97%) patients had pyogenic liver abscess while amoebic liver abscess was found in 19(26.03%) subjects. Clinically, the most common symptom was abdominal pain, found in 66(90.4%) subjects, followed by fever in 61(83.6%), hepatomegaly in 47(64.4%), jaundice in 18(24.7%) and vomiting in 10(13.7%) cases. Demographics and clinical features are shown in (Table 1).
Conclusions: Local trends have been changing and majority of liver abscess were of pyogenic liver abscesses. Clinically, clear differentiation between two types of abscesses is not possible always but few manifestations like typical symptoms, raised alkaline phosphatase and leucocytosis may be helpful.

Keywords: Amoebic, Liver abscess, Microbial, Pyogenic

INTRODUCTION

Liver abscesses are localized suppurative destruction of liver tissue due to infections of either bacterial or protozoa. In historical perspective; bacterial Pyogenic Liver Abscess (PLA) has been described since the time of hippocrates (400 BC), with the first published review by Bright appearing in 1936. In 1938, Ochsner's classic review heralded surgical drainage as the definitive therapy; however, despite the more aggressive approach to treatment, the mortality rate remained at 60-80%.[1] PLA is caused by different types of micro-pathogens and its several risk factors have been identified, including diabetes mellitus, malignancy, splenectomy, herpes zoster and zolpidem use.[2-6] Recently, although pathologic conditions of the biliary tract have been implicated as main etiologies of PLA; however, up to 55% of patients

with PLA have no clear risk factors and these cases are called cryptogenic.[7-9]

Another type of liver abscess is Amebic liver abscess (ALA); it is the most common extra intestinal manifestation of amebiasis. Globally, about 50 million symptomatic cases of amebiasis occur worldwide each year, resulting in 40,000 to 100,000 deaths annually.[10] Mortality from amebiasis is mainly due to extra-amebic colitis, of which ALA is the most common. In recent years, clinically diagnosed ALA has been emerged one of the two most important parasitological public health problems (second only to malaria) in Jaffna, northern Sri Lanka.[11-13] Amebae establish hepatic infection by ascending the portal venous system.[14]

Clinically; both types of liver abscesses usually present with similar picture ranging from malaise to fever, chills, abdominal pain, and vomiting. Hence it is very difficult to differentiate clinically these two types of liver abscesses. Furthermore; the differentiation is essential for certain reasons; firstly, medical treatment is entirely different for each type; secondly, pyogenic subtype requires prompt treatment because of its comparatively aggressive nature and high mortality rate.

This study was aimed to assess demographic and clinical features along with biochemical, imaging findings of both types of liver abscesses and also to some extent microbial spectrum of pyogenic liver abscess.

METHODS

All patients of either gender with diagnosis of liver abscess either visited outpatient department or admitted in the Medical Units of a tertiary care Hospital; Al-Tibri Medical College Hospital, Karachi, during June 2017 to December 2018 were included in this prospective study. Due approval of study protocol was obtained from the Ethics Committee of the Institution and all patients provided written informed consent to participate in the study. Patients with co morbidities like malignancy, autoimmune disease or on immunosuppressive treatment for any reason were excluded from the study.

For fulfillment of inclusion and Exclusion criteria all the patients underwent of detailed history, meticulous clinical examination and routine laboratory investigations. Following routine laboratory work up, the diagnosis and differentiation of either type of liver abscess was made with more specific laboratory tools like, microbial culture of blood and/or abscess, antibodies to Entamoeba histolytica by an Indirect Hemagglutination (IHA) assay and in selected subjects, Computed Tomography (CT) Scan. Following the confirmation of diagnosis of either type of liver abscess; the different variables like demographic and clinical features were assessed along with biochemical, imaging findings were recorded in preformed proforma and these characteristics of both types of liver abscesses were evaluated.

Statistical analysis

For evaluation of the differences between demographic data for two types of liver abscesses, the Chi square test was used for categorical variables and student's t-test for quantitative variables. Results with p-values <0.05 were considered as statistically significant.

RESULTS

Data of 73 subjects, 65(89.0%) males and 08(11.0%) females was analyzed. The overall mean age was 45.42±14.518 years with a range of 25-75 years while on the basis of type of abscess, the pyogenic group had higher mean age (49.19±13.498) as compare to amoebic liver abscess group (34.74±11.985) of subjects. Of the 73 patients with confirmed diagnosis of liver abscess, 54(73.97%) patients had pyogenic liver abscess while amoebic liver abscess was found in 19(26.03%) subjects.

Regarding presenting clinical features, the most common symptom was abdominal pain, found in 66(90.4%) subjects, followed by fever in 61(83.6%) cases hepatomegaly in 47(64.4%) patients, jaundice in 18(24.7%) cases, vomiting in 10(13.7%) cases and respiratory symptoms especially rhonchi was noticed in 07(9.6%) subjects. Diabetes mellitus was the most common comorbid found in 21 subjects and observed more common in pyogenic group of patients 18 versus 03 in amoebic group of cases but statistically that difference was not significant. Demographic and clinical features of all 73 study subjects with either type of liver abscess is shown in (Table 1).

Occupation wise; majority were laborer 27(36.98%), followed by driver 11(15.06%), tailor 07(9.6%), miscellaneous 05(6.8%) while in females 07 (out of total 08 females) were housewives. Addiction was found in 43(58.90%) subjects; 13(17.8%) were smokers, 11(15.1%) were addictive of pan/chhalia, 09(12.3%) of naswar/snuff tobacco, 07(9.6%) of alcohol while 03(4.1%) subjects had previous history of smoking. (Table 1). Laboratory results revealed some important findings especially in liver function tests. Alkaline phosphatase mean was found higher in subjects having multiple abscesses (769.347±694.909) as compare to patients with single abscess (402.84±588.929). Pyogenic liver abscess patients shown a significantly higher mean WBC count in comparison to amoebic liver abscess subjects (15.790±7.173 vs 9.184±2.372) (p<000.1).

Microbial status of study subjects revealed form pus and/or blood culture revealed the commonest organism was *Klebsiella pneumoniae* found in 28(51.85%) among pyogenic liver abscess followed by Polymicrobial in 13(24.07.0%), *Escherichia coli* in 07(12.96%), cryptogenic (no growth and negative amebic serology) in 06(11.11%) while *Streptococci viridans* was found to be culprit agent in 05(9.26%) subjects of pyogenic liver abscess. Five patients with cultures positive for bacteria

but also with very high IHA titers were included in the amoebic group and were labelled as amoebic abscesses with superimposed bacterial infection. Laboratory, imaging and microbial spectrum of study subjects was shown in (Table 2).

Table 1: Demographic and clinical characteristics of liver abscess patients.

Variable			N (%)	Pyogenic 54(73.97%)	Amoebic 19(26.03%)	p-value
Gender	Males		65(89%)	48(88.9%)	17(89.5%)	1.000
	Females		08(11%)	06(11.1%)	02(10.5%)	
Age (years)	≤ 50		51(69.9%)	36(66.7%)	15(78.9%)	0.393
	>50		22(30.1%)	18(33.3%)	04(21.1%)	
Addiction	Yes		43(58.9%)	30(55.56%)	13(68.42%)	0.079
	Alcohol		07(9.6%)	07(13.0%)	00	
	Smoker		16(21.9%)	12(22.2%)	04(21.1%)	
	Others		20(27.4%)	11(20.4%)	09(47.4%)	
	No		30(41.1%)	24(44.44%)	06(31.58%)	
Clinical features	Fever	Yes	61(83.6%)	46(85.2%)	15(78.9%)	0.497
		No	12(16.4%)	08(14.8%)	04(21.1%)	
	Abdominal pain	Yes	66(90.4%)	48(88.9%)	18(94.7%)	0.665
		No	07(9.6%)	06(11.1%)	01(5.3%)	
	Yellowish discoloration	Yes	18(24.7%)	12(22.2%)	06(31.6%)	0.537
		No	55(75.3%)	42(77.8%)	13(68.4%)	
	Vomiting	Yes	10(13.7%)	06(11.1%)	04(21.1%)	0.275
		No	63(86.3%)	48(88.9%)	15(78.9%)	
	Hepatomegaly	Yes	47(64.4%)	34(63.0%)	13(68.4%)	0.784
		No	26(35.6%)	20(37.0%)	06(31.6%)	
	Rhonchi	Yes	07(9.6%)	05(9.3%)	02(10.5%)	1.000
		No	66(90.4%)	49(90.7%)	18(89.5%)	

NS- Non-significant

Table 2: Laboratory, imaging and microbial spectrum of liver abscess patients.

Characteristic	N (%)	Pyogenic 54(73.97%)	Amoebic 19(26.03%)	p value
CBC (Mean±SD)	HB (G/DL) 11.460±1.3884	11.415±1.502	11.589±1.019	0.577
	WBC (×103/ml) 14.071±6.914	15.790±7.173	9.184±2.372	<0.0001
	PLT(×103/ml) 248.205±79.7276	254.537±86.854	230.210±51.849	0.153
LFTS (Mean±SD)	Bilirubin (MG/dl) 2.401±2.407	2.123±2.0995	3.193±3.051	0.170
	ALT (IU/ml) 64.329±35.097	60.222±33.364	76.000±38.401	0.122
	ALP (IU/ml) 518.315±624.139	579.07±676.540	345.631±409.827	0.082
	Albumin (G/dl) 3.278±0.6267	3.276±0.650	3.284±0.5698	0.958
Abscess features	Location			
	Right 45 (61.6%)	32 (59.3%)	13 (68.4%)	0.450
	Left 13 (16.6%)	09 (16.7%)	04 (21.1%)	
	Both 15 (20.5%)	13 (24.1%)	02 (10.5%)	
	Number			
	Single 50 (68.5%)	35 (64.8%)	15 (78.9%)	0.198
	Multiple 23 (31.5%)	19 (35.2%)	04 (21.1%)	
Bacteriology/ amebic serology	Culture of abscess/blood culture 54 (74%)	54	00	--
	Klebsiella pneumonia 28 (51.85%)			
	Polymicrobial 13 (24.07%)			
	Escherichia coli 07 (12.96%)			
	Cryptogenic 06 (11.11%)			
	Streptococci viridans 05 (9.26%)	05		
	Amebic serology 19 (26%)		19	

DISCUSSION

An impending life-threatening condition associated with liver abscess is of pyogenic nature, with high mortality and morbidity. Worldwide frequency of pyogenic liver abscess is around 1.1-2.3 per 100,000 person-years.[15] While in China the incidence rate of 5.7 per 100,000 populations.[16] In this study, 65(89%) of males were affected with liver abscess. The overall mean age was 45.42±14.5 years, while on the basis of variety of abscess, the pyogenic group had higher mean age (49.19±13.498) as compare to amoebic liver abscess group (34.74±11.985) of subjects. However, the mean age in the previous study by Zhu X was 59.6±12 years. This inconsistency might be due difference in socioeconomic status, lack of sentience and health care provision of the studied subjects.[17]

This study results revealed that males were more commonly affected with pyogenic liver abscess in 48(88.9%) of the patients in contrast to females 06(11.1%) and this finding of male gender dominancy was in agreement to previous studies by Baig A et al, who had demonstrated 76.6% males in their study and Chen YC et al, found in their study that 63.6% of males were affected with pyogenic liver abscess.[18,19] This male gender dominancy was common in those studies but with variation in value might be due to the different socioeconomic status of the subjects and different study design.[18]

The percentage of amoebic liver abscess to pyogenic liver abscess relies on the landscape of the revealing institution. In Pakistan, amoebic liver abscess is substantially more typical as compared to pyogenic abscess. In this study pyogenic liver abscess was present in 54(73.97%), this was in dissimilarity to the previous study that demonstrated 46(88%) of amoebic liver abscess that might be due to comparatively the small sample size and the precipitating risk factor of diabetes mellitus was not declared in previous study by Ahsan.[20]

Most common complaints in this study was abdominal pain in 66(90.4%) followed by fever present in 61(83.6%) especially with pyogenic abscess. The utmost common signs observed were hepatomegaly in 47(64.4%), while jaundice observed in 18(24.7%) of subjects. This was in inconsistency to Tian study that analyzed the diabetic and non-diabetic cases with liver abscess that revealed 47% and 52% respectively with abdominal pain while fever was present in 86% and 90% respectively and the difference could be due to diverse climatic region.[21]

Most common and important liver function abnormality in this study was raised alkaline phosphatase in overall both types of abscesses but more in pyogenic liver abscess (579.07±676.540) as compare to amoebic liver abscess 345.631±409.827 and this finding was in support of study by Lodhi et al, who shown higher mean ALP in pyogenic vs amebic liver abscess (236 vs 211) but statistically those differences were insignificant.[22] No significant difference was found in serum bilirubin, ALT and serum albumin between two types of abscess. Leukocytosis help to differentiate between the nature of liver abscess. In this study mean leukocyte count was 15.790±7.173 in pyogenic abscess in contrast to amoebic liver abscess 9.184±2.372 with a significant p value of <0.0001. This finding of higher leukocyte count in pyogenic liver abscess was in agreement to study conducted by Serraino C et al.[23]

When pus was obtained and cultured from the abscess or blood cultures from patients with pyogenic liver abscesses revealed *Klebsiella pneumoniae* was the dominant organism found in 28(51.85%) subjects followed by polymicrobial in 13(24.07.0%), Escherichia coli in 07(12.96%) and cryptogenic (no growth) in 06(11.11%). *K. pneumoniae* being a commonest culprit was also supported by different studies carried out in Asian countries like Taiwan, China, Korea, Singapore and Pakistan.[18,21,24-26]

In previous span the diagnostic imaging has assumed a foremost role in initial diagnosis of liver abscess and because of enhancement in the ground of ultrasonography it has turned in to a standard for detection of liver abscess.[18] In this study right lobe involvement was present in most commonly of 45(61.6%) with both types of liver abscesses but predominantly pyogenic liver abscess (59.3%) as compare to the left in 13(16.6%) while both lobes involvement was present in 15(20.5%). This right lobe dominancy was also evidenced by Lodhi et al, in their study with 73% of pyogenic and 57% of amebic liver abscesses were found in right lobe followed by left lobe.[22]

There were few limitations of this study; first, single center-based study with limited sample size hence results can not represent whole population. Second, treatment outcomes of all subjects were not available hence prognosis couldn't be analyzed.

CONCLUSION

Current study highlighted that trends have been changing and majority of liver abscess were of pyogenic liver abscesses while male dominancy because of particular lifestyle still remain same.

Although clear differentiation between amoebic and pyogenic abscesses on clinical grounds or routine lab tests is not possible always but even though few manifestations like typical symptoms, raised alkaline phosphatase and leukocytosis may be helpful.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ochsner A, DeBakey M, Murray S. Pyogenic abscess of the liver: II. An analysis of forty-seven cases with review of the literature. Am J Surg. 1938 Apr 1;40(1):292-319.
2. Kaplan GG, Gregson DB, Laupland KB. Population-based study of the epidemiology of and the risk factors for pyogenic liver abscess. Clini Gastroenterol Hepatol. 2004 Nov 1;2(11):1032-8.
3. Tsai FC, Huang YT, Chang LY, Wang JT. Pyogenic liver abscess as endemic disease, Taiwan. Emerg Inf Dis. 2008 Oct;14(10):1592.
4. Lai SW, Lai HC, Lin CL, Liao KF. Splenectomy correlates with increased risk of pyogenic liver abscess: a nationwide cohort study in Taiwan. J Epidemiol. 2015 Sep 5;25(9):561-6.
5. Liao KF, Lin CL, Lai SW, Chen WC. Zolpidem use associated with increased risk of pyogenic liver abscess: a case-control study in Taiwan. Medicine. 2015 Aug;94(32).
6. Mei-Ling S, Kuan-Fu L, Sung-Mao T, Cheng-Li LM, Shih-Wei L. Herpes zoster correlates with pyogenic liver abscesses in Taiwan. Biomed. 2016 Dec;6(4).
7. Malik AA, Bari SU, Rouf KA, Wani KA. Pyogenic liver abscess: Changing patterns in approach. World J Gastro Surg. 2010 Dec 27;2(12):395.
8. Kuo SH, Lee YT, Li CR, Tseng CJ, Chao WN, Wang PH, et al. Mortality in Emergency Department Sepsis score as a prognostic indicator in patients with pyogenic liver abscess. Am J Emerg Med. 2013 Jun 1;31(6):916-21.
9. Huang CJ, Pitt HA, Lipsett PA, Osterman Jr FA, Lillemoe KD, Cameron JL, et al. Pyogenic hepatic abscess. Changing trends over 42 years. Annal Surg. 1996 May;223(5):600.
10. World Health Organization. Amoebiasis. Weekly Epidemiol Rec. 1997:72: 97-100.
11. Fernando K, Fernando R, Kandasami A, Jude R, Fernando N, Tennakoon S. SP6-3 Fermented sap of spiky Palmyra toddy (Borassus flabellifer) suggested as a vehicle of transportation of amoebiasis in the district of Mannar, Sri Lanka: 50 cases of amoebic liver abscess within 15 months. J Epidemiol Comm Health. 2011 Aug 1;65(1):A455.
12. Kannathasan S, Iddawala WMDR, Silva NR De, Haque R: Knowledge, attitude and practice towards liver abscess among patients admitted to the teaching hospitals, Jaffna. Proc Peradeniya Univ Int Res. 2014;18:355.
13. Kannathasan S, Murugananthan A, Kumanan T, Iddawala D, de Silva NR, Rajeshkannan N, et al. Amoebic liver abscess in northern Sri Lanka: first report of immunological and molecular confirmation of aetiology. Parasites Vectors. 2017 Dec;10(1):14.
14. Aikat BK, Bhusnurmath SR, Pal AK, Chhuttani PN, Datta DV. The pathology and pathogenesis of fatal hepatic amoebiasis a study based on 79 autopsy cases. Transactions Royal Soc Tropical Med Hygiene. 1979 Jan 1;73(2):188-92.
15. Kong H, Yu F, Zhang W, Li X. Clinical and microbiological characteristics of pyogenic liver abscess in a tertiary hospital in East China. Med. 2017 Sep;96(37).
16. Tirkey AS, Jain M. Study of clinical, etiological, and biochemical profile of patients with liver abscess: A prospective study. Int J Med Sci Pub Health. 2018 Nov 1;7(11):905-9.
17. Zhu X, Wang S, Jacob R, Fan Z, Zhang F, Ji G. A 10-year retrospective analysis of clinical profiles, laboratory characteristics and management of pyogenic liver abscesses in a Chinese hospital. Gut Liver. 2011 Jun;5(2):221.
18. Baig A, Ishaq M, Kumar A, Sheikh MI. Pyogenic liver abscess: A five year retrospective study in slums of Karachi. JLUMHS. 2012 Jan;11(01):19.
19. Chen YC, Lin CH, Chang SN, Shi ZY. Epidemiology and clinical outcome of pyogenic liver abscess: an analysis from the National Health Insurance Research Database of Taiwan, 2000-2011. J Microbiol, Immunol Infect. 2016 Oct 1;49(5):646-53.
20. Ahsan T, Jehangir MU, Mahmood T, Ahmed N, Saleem M, Shahid M, et al. Amoebic versus pyogenic liver abscess. J Pak Med Assoc. 2002 Nov;52(11):497-501.
21. Tian LT, Yao K, Zhang XY, Zhang ZD, Liang YJ, Yin DL, et al. Liver abscesses in adult patients with and without diabetes mellitus: an analysis of the clinical characteristics, features of the causative pathogens, outcomes and predictors of fatality: a report based on a large population, retrospective study in China. Clin Microbiol Infect. 2012 Sep 1;18(9):E314-30.
22. Lodhi S, Sarwari AR, Muzammil M, Salam A, Smego RA. Features distinguishing amoebic from pyogenic liver abscess: a review of 577 adult cases. Trop Med Int Health. 2004 Jun;9(6):718-23.
23. Serraino C, Elia C, Bracco C, Rinaldi G, Pomero F, Silvestri A, et al. Characteristics and management of pyogenic liver abscess: A European experience. Med. 2018 May;97(19).
24. Lin YT, Wang FD, Wu PF, Fung CP. Klebsiella pneumoniae liver abscess in diabetic patients: association of glycemic control with the clinical characteristics. BMC Inf Dis. 2013 Dec;13(1):56.
25. Kim JK, Chung DR, Wie SH, Yoo JH, Park SW, Korean Study Group for Liver Abscess. Risk factor analysis of invasive liver abscess caused by the K1 serotype Klebsiella pneumoniae. Eur J Clini Microbiol Infect Dis. 2009 Jan 1;28(1):109.
26. Chan DS, Archuleta S, Llorin RM, Lye DC, Fisher D. Standardized outpatient management of Klebsiella pneumoniae liver abscesses. Int J Infect Dis. 2013 Mar 1;17(3):e185-8.

Cite this article as: Bhutto AR, Abbasi A, Rafi S, Abro AH. Liver abscess: demographic, clinical, biochemical, imaging and microbial spectrum. Int J Res Med Sci 2019;7:4607-11.