e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(12); 95-102

Original Research Article

A Shifting Trend in Liver Abscess Appearance, Demographics, and Microbiological Flora

Poulami Nandi[1], Purbasha Ghosh[2], Anwesha Pan[3]

[1]M.B.B.S., M.D. (Microbiology), Associate Professor, Department of Microbiology, Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal, India
[2]M.B.B.S., M.D. (Microbiology), Associate Professor, Department of Microbiology, Burdwan Medical College, Baburbag, Burdwan, West Bengal, India
[3]M.B.B.S., M.D. (Internal Medicine), Assistant Professor, Department of Internal Medicine, Gouridevi Institute of Medical Sciences and Hospital, Rajbandh, Durgapur, West Bengal, India

Received: 28-10-2022 / Revised: 19-11-2022 / Accepted: 07-12-2022
Corresponding author: Anwesha Pan
Conflict of interest: Nil

Abstract

Aim: Space-occupying liver lesions known as pyogenic liver abscess (PLA) have a high mortality and morbidity rate. The purpose of this study is to examine the epidemiology, clinical trends, and management of PLA in the Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal.

Methodology: For patients treated for PLA between 2020 and 2021, we carried out a retrospective, explanatory case series at a single hospital to evaluate demographic traits, presenting patterns, etiological variables, microbiological aetiology, and medication.

Result: A hundred patients were located. The majority of patients (72%), right upper abdomen discomfort (63.2%), vomiting, and nausea (28.3%), all presented with fever. Increased blood levels of C-reactive protein and fibrinogen were the most prevalent laboratory abnormalities among the listed items, occurring in 97% and 93.8% of cases, respectively. In 42.3% of instances, abdominal ultrasonography served as the primary diagnostic test. A CT scan or MR imaging was used in 51.0% and 3.2% of cases, respectively. Only 53.4% of the 90 cases with blood or pus cultures that we observed had positive microbiological findings. Escherichia coli was the most typical organism found, followed by Streptococcus spp. All patients received early antibiotic therapy, and 66.6% of cases required diverse techniques, including percutaneous abscess drainage in 66% of cases and ultrasound- or CT-guided needle aspiration in 10% of patients.

Conclusion: Due to its atypical presentation, PLA is a difficult condition to diagnose. The microbiological yield discovered had an Escherichia coli infection predominance and was typical of Europe. Once diagnosed, percutaneous drainage and antibiotic therapy serve as the cornerstones of PLA care.

Keywords: Clinical presentation, microbiology, percutaneous drainage, pyogenic liver abscess, risk factors

Introduction

In roughly 40% of instances, biliary tract disorders now emerge as a consequence of pyogenic liver abscess (PLA), a puss filled inflammation of the hepatic parenchyma that still has a mortality association. [1] The causes of PLA have recently changed from intra-abdominal infections like acute appendicitis and trauma to pathologic disorders of the biliary system; nonetheless, close to 55percent of the total of patients with PLA have no obvious risk factors, and these cases are referred to as cryptogenic. [2–4] A geographical area's PLA incidence ranges between 8 to 22 patients per 1,000,000 residents; significantly higher rates have been noted in Taiwan. [5–8].

Since the symptoms of these patients can be subtle and non-specific (abdominal discomfort, fever, nausea, and vomiting), early diagnosis and treatment are essential steps in their management. This presents a challenge for doctors today, and a greater index of suspicion is the key to avoiding misdiagnosis and improving prognosis. [9] Combining antibiotic therapy with percutaneous drainage has increasingly been used as the first line of treatment for patients, considerably improving their prognosis: the death rate has decreased from 70% to 6.31%. [10] Escherichia coli, Enterobacteriaceae, anaerobes, as well as other gut flora members are the bacteria most frequently linked as causal pathogens to PLA.

In the past 20 years, Klebsiella pneumoniae has been more prevalent, accounting about 50% - 88% of PLA with in Asian population. It has also been more frequently recorded in South Africa, Europe, and the US. [7] We looked at the PLA examples that were witnessed at our institution since such encounters have still not been documented in Italy. In the current investigation, demographics, etiological variables, presentation patterns, microbiological aetiology, and treatment of PLA cases that were seen in an Italian hospital over a 16-year period were retrospectively analysed.

Methodology:

100 consecutive patients with pyogenic liver abscesses who were hospitalised to the Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal between January 2020 and December 2021 are included in the study. The International Classification of Disease code for the diagnosis of "pyogenic liver abscess" from the hospital database at that time was searched to find these patients. Clinical factors, imaging examinations, and the results of microbiology tests on blood or aspirate cultures were used to make the diagnosis of PLA. Exclusion standards included: Patients with a history of liver transplantation, amoebic or hydatid liver abscesses, previous episodes of PLA, and age 19 years. The Hospital Archival Records C system assessed medical records. Demographic information, etiopathological variables, clinical characteristics, laboratory information, the number, size, and location of lesions, microbiological results, diagnostic and therapeutic approaches, treatment response, and death were all obtained.

The researcher used a standard technique to make a judgement on the presumed cause of the liver abscess at the time of the retrospective study. In patients having a clinical picture of cholecystitis or cholangitis or a proven biliary duct abnormalities, PLA was regarded as secondary to biliary tract disease. It was regarded as secondary to hematogenous spread when another infection source was discovered. A secondary investigator analysed cases that were deemed unclear in order to confirm the cause. A cryptogenic abscess was described as a PLA in patients who were immunocompetent but for whom no evident source of infection had been identified despite assessment using imaging

techniques and the gathering of medical history.

Abdomen ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI) findings. Using the common diagnostic methods, cultures of aerobic and anaerobic organisms were isolated. The organisms obtained from the abscess were presumed to be the causative if both blood and pus cultures were positive.

All patients got antibiotic treatment; the kind, length, and method of administration for each case were noted. Antibiotics were administered to PLA empirically, and if there was no response to the initial therapy, the antibiotic was changed empirically or based on the results of cultures if the cultures came back negative. After four days of intravenous antibiotics, a patient was considered to have not responded to the first therapy if sepsis symptoms were still present.

In the radiology department, percutaneous needle aspiration and drainage were carried out under ultrasound guidance. The absence of signs and symptoms as well as imaging scans that produced no results compatible with PLA were used to determine cure. Case fatality was outlined as a hospital mortality that was connected to PLA. Common statistical tests were used to compare variables between groups. The Kaplan-Meier method was used to produce survival probability curves, and the log-rank test was used to compare them. To evaluate factors independently linked to 2-month survival, a multivariate Cox proportional hazards model was used. Using SPSS software, all statistical analyses were carried out. The mean and standard deviation are used to express the results for continuous variables. All statistical tests had a significance threshold of 0.04 two-tailed.

Results:

At Nil Ratan Sircar Medical College and Hospital, Kolkata, West Bengal 100 patients with PLA received a diagnosis from January 2020 to December 2021, with 60 patients (56.8%) being male and 40 patients (43.0%) being female. The patient was between the ages of 18 and 92, with a mean age of 65.3 (SD: 14.2).

Fever was observed in 72% of PLA patients; other symptoms included right upper abdomen pain (63.2%), nausea and vomiting (28.1%), asthenia (26.5%), weight loss (17.3%) and jaundice (12.7%) in addition to fever. 24 individuals overall (22%) had diabetes mellitus. Of the diabetic patients, 56% had poor glycemic control (excellent glycemic control is defined as a glycated haemoglobin (HbA1c) of less than 6%). [11] The Charlson comorbility index score (CCIS) was used to assess overall systemic health; there was a stepwise increase in cumulative mortality with each level of CCIS, with score 1 having a 99% 11-year survival rate and score 4 having a 33% 11-year survival rate, respectively [12]. In the study population, 18 patients (17.3%) had CCIS scores of 0 to 2, which is indicative of mild morbidity; 21 patients (20.1%) had scores of 3 to 34; and 62.3% of cases had scores of >4, which is indicative of significant morbidity and cumulative mortality.

Increased blood levels of C-reactive protein and fibrinogen were the most prevalent laboratory anomaly among the listed items, occurring in 97% and 93.8% of cases, respectively (Table 1).

Table 1: An overview of the laboratory findings presented to patients with liver abscesses

Results	Range	Mean±DS	% of cases outside the range
White cell count	4.1-10.1	15 ± 8	76%
Hemoglobin, g/L	<11	11.3 ± 1.8	61,5%
C-reactive protein, mg/L	≤ 11	156.0 ± 84.8	97%
Procalcitonine, ng/mL	<0.045	24.05± 52.6%	99%
Fibrinogen, mg/dL	151-451	693.7 ± 176.6%	93.8%
Albumin, g/L	<34	26.4 ± 5.3	96.2%
AST, U/L	> 41	96.6 ± 179.5%	56.8%
ALT, U/L	8-55	78.4 ± 94.7%	44%
ALP, U/L	37-125	258.7 ± 200.3	66%
Bilirubin, mg/dL	1,3-2,4	1.4 ± 1.5	32%

Following these were increased ALP in 66% of instances and an abnormal total leucocytic count in 76% of patients. All 33 patients who had their procalcitonine levels checked had high levels.

In 42.3% of instances, abdominal ultrasonography served as the diagnostic test; CT scan and/or MR imaging procedures were then carried out as needed for a differential diagnosis. 3.2% of patients required MR, while about 51.0% of patients had to get a CT scan. The average liver abscess measured 7 x 3.4 cm. 54% of the abscesses in this study were lone at the time of presentation. 18.2% of cases and 26.5% of patients had more than four lesions, including two abscesses. In 18.5% of instances, gas was found in the cavity of the abscess. About 19.6% of liver abscesses were confined to the left lobe, while 65.3% of liver abscesses were located in the right lobe. 14% of individuals had involvement in both lobes. In 42.3% of instances, abdominal ultrasonography served as the diagnostic test; CT scan and/or MR imaging procedures were then carried out as needed for a differential diagnosis. 3.2% of patients required MR, while about 51.0% of patients had to get a CT scan. The average liver abscess measured 7 x 3.4 cm. 54% of the abscesses in this study were lone at the time of presentation. 18.2% of cases and 26.5% of patients had more than four lesions, including two abscesses. In 18.5% of instances, gas was found in the cavity of the abscess. About 19.6% of liver abscesses were restricted to the left lobe, while 65.3% of liver abscesses were seen in the right lobe. 14% of individuals had involvement in both lobes.

In 25.6% of cases, the underlying cause—a cryptogenic abscess—was unknown. In 54% of instances, biliary system disorders such as cholelithiasis, cholecystitis, and malignancies were found. Hematogenous was identified as the aetiology of PLA in 11% of patients. Diabetes mellitus was the only known PLA risk factor in 7.2% of cases. Seven people (28.4%) with 27 cryptogenic abscesses received colonoscopies, but neither incidental colon cancer nor high-grade dysplasia were discovered.

All patients recieved intravenous antibiotic therapy, and 66.6% of cases required some sort of intervention. When the first clinical signs of infection appeared, an empirical antibiotic treatment was begun and adjusted based on the findings of antibiotic susceptibility tests. The modest size of the abscess, the clinical improvement after antibiotic treatment, or the advanced stage of the cancer were the reasons why image-guided aspiration and drainage was not performed. The average time spent taking antibiotics was 29.6 days (standard deviation: 19.7). The most common initial intervention was radiological drainage;

percutaneous abscess drainage was conducted on 70 patients (66%) and ultrasound- or CT-guided needle aspiration of PLA was performed in 12 patients (10%). A percutaneous French 7 pigtail catheter was typically placed. Based on the patient's clinical and laboratory results, the percutaneous drain was removed. The average drainage time was 12.5 ±14 days.

Out of the 70 instances that underwent radiological drainage, five patients needed surgical intervention due to the abscess' failure to clear up and recurrence. When there was a lithiasic or neoplastic biliary blockage, endoscopic retrograde cholangiopancreatography (ERCP) was performed to treat liver abscess in 5 patients (5.5%). 8.4 days (SD: 11.6) passed between the administration of the antibiotic and discharge.

Three examples of serious complications from interventional drainages were reported: one patient had a biliary fistula that was treated with ERCP decompression and nose-biliary drainage, and the third patient had a right pneumothorax that was treated without the use of a drainage tube. There was only 1 instance of a thoracic empyema or abscess rupture. During their stay in the hospital, 10 patients (10%) acquired pneumonia, and 3 individuals (3.6%) had splenic multiple abscesses. There was no association between length of hospital stay and PLA management (interventional drainage vs. antibiotic treatment alone, P=NS). Ten people passed away while they were being treated at the hospital; these deaths were directly related to the abscess or to a treatment-related issue. Patients who passed away had a mean age of 65.28, and 6 of them were men. Inpatient stays typically lasted 23 days (SD: 12.7).

Discussion:

This study reviews and reports on the clinical traits, etiology, microbiology, therapy, and mortality of 100 patients with PLA. In our sample, PLA patients were 65.3 years old on average. This is consistent with other studies that show that patients who acquire PLA are now often older; in our study, the average presentation was in the following year. Once more, a male predominance was seen [13, 14]. While physical examination revealed jaundice in 12.6% of cases, the symptoms of PLA were many and low-specific, including fever, right upper abdomen pain, vomiting, nausea, and asthenia. Raised levels of C-reactive protein, white blood cells, and alkaline phosphatase should point to the possibility of PLA in conjunction with the symptoms that are currently being experienced. Due to the generic presentation characteristics, there may be a low index of suspicion for PLA; however, the underlying predisposing disease processes may point to the diagnosis. Hepatic-pancreatic-biliary system issues were present in the majority of instances (54%) of the predisposing disorders linked to the formation of abscesses [13].

Although it has been hypothesised that cryptogenic liver abscess is an indicator of occult gastrointestinal malignancy, [15,16] only a small percentage of patients with cryptogenic abscess (28.3%) underwent a colonoscopy during their indexed hospitalisation, and no colon cancer or polyp with high-grade dysplasia was discovered. Imaging of the liver is necessary to confirm the diagnosis of PLA: ultrasound alone was the sole diagnostic investigation in 42.3% of cases; CT scans were administered to 51.0% of patients due to the diffuse availability and, of course, in case further testing for a differential diagnosis was required. As a result of the portal vein morphology, greater hepatic mass, and denser network of bile canaliculi in the right hepatic lobe, we confirmed the hypothesis that PLAs are primarily restricted to this lobe[9]. Compared to other research, our study's microbiological yield from blood and abscess culture was lower at 54.1%.

Although there is little formal research on the ideal length of antibiotic therapy, the majority of units follow a routine that involves 1 week of parenteral treatment, followed by a longer course of treatment (3-5 weeks), switching to oral antibiotics when clinical and inflammatory responses permit. [18] Our study included oral antibiotic treatments that lasted for a minimum of 29.6 days and a maximum of 19.7 days following discharge.

This investigation revealed a normal European microbiological spectrum, with a majority of E coli infections. Streptococcus spp, Enterococcus spp, and anaerobics comprised the other major isolates. We only found K pneumoniae, the PLA infection that is most common in Southeast Asia, in 1 patient. [19] The high incidence of a biliary aetiology of PLA is likely connected to the high incidence of E coli and Enterococcus spp. [20]

The combination of antibiotics and percutaneous needle aspiration and catheter drainage has been demonstrated to be effective in the treatment of PLA; this combination is currently the accepted standard of care. All of the patients in our cohort received antibiotic treatment, and 66.6% of them underwent surgical drainage, percutaneous aspiration, or drainage.

According to a meta-analysis, percutaneous catheter drainage (PCD) is preferred to percutaneous needle aspiration (PNA) for the following reasons: A better success rate, shorter time to clinical relief, and a 51% reduction in abscess cavity size are all made possible by PCD. [21, 22] At our hospital, image-guided catheter drainage was preferred over PNA. For patients with PLA, ERCP can be an effective investigation and therapy method. In this series, 6.4% of patients underwent ERCP to treat a lithiasic or neoplastic biliary blockage, which was the cause of PLA. Pulmonary problems were the most prevalent; 11.8% of individuals experienced pneumonia [23-28].

Conclusion:

The study makes an effort to demonstrate our first-hand, authentic, unique experiences in this field and to offer helpful information. Clinicians should, in practise, keep a high index of suspicion for PLA in patients who have the risk factors, particularly pathologies of the hepatic, pancreatic, and biliary systems and clinical presentations of fever, right abdominal pain, elevated levels of C-reactive protein, and a low white blood cell count. Successful treatment might result from early detection of a liver lesion and the delivery of antibiotics and percutaneous drainage.

References:

1. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends in etiology and mortality. Clinical infectious diseases. 2004 Dec 1;39(11):1654-9.
2. Malik AA, Bari SU, Rouf KA, Wani KA. Pyogenic liver abscess: changing patterns in approach. World journal of gastrointestinal surgery. 2010 Dec 12;2(12):395.
3. Kuo SH, Lee YT, Li CR, Tseng CJ, Chao WN, Wang PH, Wong RH, Chen CC, Chen SC, Lee MC. Mortality in Emergency Department Sepsis score as a prognostic indicator in patients with pyogenic liver abscess. The American journal of emergency medicine. 2013 Jun 1;31(6):916-21.
4. Huang CJ, Pitt HA, Lipsett PA, Osterman Jr FA, Lillemoe KD, Cameron JL, Zuidema GD. Pyogenic hepatic abscess. Changing trends over 42 years. Annals of surgery. 1996 May;223(5):600.
5. Pérez JA, González JJ, Baldonedo RF, Sanz L, Carreño G, Junco A, Rodríguez JI, Martínez MD, Jorge JI. Clinical course, treatment, and multivariate analysis of risk factors for pyogenic

liver abscess. The American journal of surgery. 2001 Feb 1;181(2):177-86.
6. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: ten years' experience in a UK centre. Qjm. 2002 Dec 1;95(12):797-802.
7. Tsai FC, Huang YT, Chang LY, Wang JT. Pyogenic liver abscess as endemic disease, Taiwan. Emerging infectious diseases. 2008 Oct;14(10):1592.
8. Liu Y, Wang JY, Jiang W. An increasing prominent disease of Klebsiella pneumoniae liver abscess: etiology, diagnosis, and treatment. Gastroenterology research and practice. 2013 Oct;2013.
9. Ruiz-Hernández JJ, León-Mazorra M, Conde-Martel A, Marchena-Gómez J, Hemmersbach-Miller M, Betancor-León P. Pyogenic liver abscesses: mortality-related factors. European journal of gastroenterology & hepatology. 2007 Oct 1;19(10):853-8.
10. Su YJ, Lai YC, Lin YC, Yeh YH. Treatment and prognosis of pyogenic liver abscess. International journal of emergency medicine. 2010 Dec;3(4):381-4.
11. Wang HH, Tsai SH, Yu CY, Hsu HH, Liu CH, Lin JC, Huang GS, Cheng WT, Tung HJ, Chen CY, Chang WC. The association of haemoglobin A1C levels with the clinical and CT characteristics of Klebsiella pneumoniae liver abscesses in patients with diabetes mellitus. European radiology. 2014 May;24(5):980-9.
12. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. Journal of chronic diseases. 1987 Jan 1;40(5):373-83.
13. Bosanko NC, Chauhan A, Brookes M, Moss M, Wilson PG. Presentations of pyogenic liver abscess in one UK centre over a 15-year period. The journal of the Royal College of Physicians of Edinburgh. 2011 Mar 1;41(1):13-7.
14. Heneghan HM, Healy NA, Martin ST, Ryan RS, Nolan N, Traynor O, Waldron R. Modern management of pyogenic hepatic abscess: a case series and review of the literature. BMC research notes. 2011 Dec;4(1):1-8.
15. Lai HC, Lin HC. Cryptogenic pyogenic liver abscess as a sign of colorectal cancer: a population-based 5-year follow-up study. Liver International. 2010 Oct;30(9):1387-93.
16. Qu K, Liu C, Wang ZX, Tian F, Wei JC, Tai MH, Zhou L, Meng FD, Wang RT, Xu XS. Pyogenic liver abscesses associated with nonmetastatic colorectal cancers: an increasing problem in Eastern Asia. World journal of gastroenterology: WJG. 2012 Jun 6;18(23):2948.
17. Levy MM, Evans LE, Rhodes A. The surviving sepsis campaign bundle: 2018 update. Intensive care medicine. 2018 Jun;44(6):925-8.
18. Olivera MA, Kershenobich D. Pyogenic liver abscess. Curr Treat Options Gastroenterol. 1999 Mar 1;2(2):86-90.
19. Cerwenka H. Pyogenic liver abscess: differences in etiology and treatment in Southeast Asia and Central Europe. World journal of gastroenterology: WJG. 2010 May 5;16(20):2458.
20. 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 and liver. 2011 Jun;5(2):221.
21. Cai YL, Xiong XZ, Lu J, Cheng Y, Yang C, Lin YX, Zhang J, Cheng NS. Percutaneous needle aspiration versus catheter drainage in the management of liver abscess: a systematic review and meta-analysis. Hpb. 2015 Mar 1;17(3):195-201.
22. Mangukiya DO, Darshan JR, Kanani VK, Gupta ST. A prospective series case study of pyogenic liver abscess: recent trands in etiology and

management. Indian Journal of Surgery. 2012 Oct;74(5):385-90.
23. Dull JS, Topa L, Balgha V, Pap A. Non-surgical treatment of biliary liver abscesses: efficacy of endoscopic drainage and local antibiotic lavage with nasobiliary catheter. Gastrointestinal endoscopy. 2000 Jan 1; 51(1):55-9.
24. Margute,T. G., Ferreira P. C., Almeida I. M. M. ., Denardin C., Silva T. Q. M. da, Margute T. G., Maione M. S., Rossato A. R., & Santos I. F. dos. Use of tricyclic antidepressants in trigeminal neuralgia. Journal of Medical Research and Health Sciences. 2022; 5(5): 2008–2012.
25. Verlenden III WL, Frey CF. Management of liver abscess. The American Journal of Surgery. 1980 Jul 1;140(1):53-9.
26. Chu KM, Fan ST, Lai EC, Lo CM, Wong J. Pyogenic liver abscess: an audit of experience over the past decade. Archives of surgery. 1996 Feb 1;131(2):148-52.
27. Pang TC, Fung T, Samra J, Hugh TJ, Smith RC. Pyogenic liver abscess: an audit of 10 years' experience. World journal of gastroenterology: WJG. 2011 Mar 3;17(12):1622.
28. Liu L, Chen W, Lu X, Zhang K, Zhu C. Pyogenic liver abscess: a retrospective study of 105 cases in an emergency department from East China. The Journal of Emergency Medicine. 2017 Apr 1;52(4):409-16.