Liver abscess in an Internal Medicine Department: a retrospective study

Tiago Judas, João Namora dos Santos

Abstract

Background: Liver abscess (LA) is an uncommon pathology thus a rare cause of hospital admission. Although with a lower mortality, at present, it is still important. Prognosis depends on early diagnosis and correct treatment.

Objectives: Evaluate all patients with LA admitted in an Internal Medicine Department for a period of ten years.

Methods: retrospective, event driven, clinical database analysis. Risk factors, clinical presentation, laboratory findings, imaging studies were verified as well as microbiology tests, pathogen identification, treatment and clinical evolution.

Results: a total of 16 patients with LA were admitted. The most frequent risk factors were biliary and abdominal surgery, alcohol habits and diabetes. Clinical presentation was more frequently acute and common manifestations were fever, chills and right upper quadrant abdominal pain. Most frequent laboratory abnormalities included leukocytosis with neutrophilia, increase on the erythrocyte sedimentation rate and serum C - reactive protein, decrease on albumin and increase on aminotransferases, alkaline phosphatase and gamma glutamyl-transpeptidase. Ultrasound and computed tomography were performed in the majority of patients. Blood cultures, performed in all patients, were positive in five. Serological tests were positive in 3 patients. Needle aspiration was performed in half of the patients, with inconclusive results. Eight patients went through percutaneous catheter drainage. Antibiotics were administered for a mean duration of 33.8 days. There was a good clinical response in 15 patients and one case of recurrence.

Conclusions: the profile of our patients with LA was similar to those referred in the literature, however the pathogen identification was only achieved in half of them. There was a low diagnostic sensitivity with needle aspiration, nevertheless good response to treatment and favorable outcome were noted.

Key words: Liver abscess, pyogenic, amoebic.

INTRODUCTION

Liver abscess (LA) is an uncommon disease in the general population and a rare reason for hospitalization. It is, however, the most common visceral abscess, accounting for 13% of these abscesses.[1-4] LAs are generally classified as either pyogenic or amoebic abscesses, the latter caused by an infection from Entamoeba histolytica. In recent decades, there has been a change in the pathogenesis of pyogenic LAs. While in the past the majority of LAs originated from intra-abdominal infections, such as appendicitis and diverticulitis, currently, with improved regimens of antibiotic therapy and early access to surgical care, the primary infectious focus of most LAs is the biliary tract.[1-5] The advent of more aggressive techniques for the treatment of diseases of the pancreas and biliary tract has also contributed to this etiology.

Medicine Service of the Hospital Garcia de Orta
Article received on the 10th April 2010
Accepted for publication on the 27th July 2011

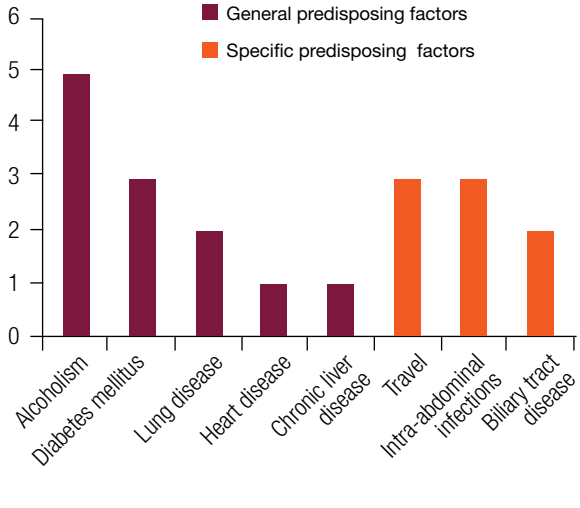
While the vital prognosis improved gradually up until the 1990s, the mortality rate remained steady at between eleven and twenty percent, an aspect that is correlated with the tendency for patients to be older nowadays, with a higher incidence of neoplastic diseases, immunosuppression, and more serious diseases of the biliary tract.[2,3] Since both early diagnosis and correct therapeutic approach are essential, it was decided to conduct a retrospective study of patients with LA hospitalized in the Medicine service over a ten-year period.

MATERIAL AND METHODS

A retrospective and descriptive study was conducted at the Medicine Service of the Hospital Garcia de Orta.

Information was obtained by consulting the department's data base and through an individualized analysis of patient records between January 1997 and December 2007.

Patient information obtained included gender, age, the prevalence of predisposing factors, the form of onset of the disease, symptoms and signs, laboratory tests alterations, the imaging methods required



Prevalence of predisposing factors.

FIG. 1

for diagnosis, the morphological type of the abscess (single or multiple), microbiological and serological exams performed, pathogenic agents identified, treatment carried out, and the clinical evolution, as well as the final diagnoses on the date of discharge. The condition that resulted in hospitalization, as well as any other diseases present in the patient, was encoded.

Data analysis was performed using SPSS 14.0 software for Windows.

RESULTS

From the 1st January 1997 to the 31st December 2007, a total of 21,333 patients were admitted to the Department of Internal Medicine. Only sixteen (0.075%) were hospitalized with a main diagnosis of LA. The group of inpatients was of eleven male and five female patients. Their ages ranged from a maximum of 77 to a minimum of 23 years, with an average age of 54.2 years.

Predisposing factors for the disease were subdivided into general and specific categories, the latter referring to the pathological conditions related to the etiopathogenesis of the LAs. If was found that the most prevalent general predisposing factors in the group being studied were alcoholism (in five patients) and diabetes mellitus (in three patients), followed by chronic pulmonary disease in two patients (one with pulmonary fibrosis and the other with a history of pulmonary tuberculosis), ischemic heart disease in one patient and chronic liver disease in one patient. The predominant specific factors were travel to countries endemic for infection by Entamoeba histolytica, in three patients, previous biliary tract surgeries in two patients (a cholecystectomy twenty years earlier in one case and a choledochoduodenostomy five years earlier in the other), and intra-abdominal infections in three patients (acute pyelonephritis one week earlier, acute gastroenteritis fifteen days earlier, and Klebsiella pneumonia urosepsis). It was also confirmed that none of the patients was infected by the human immunodeficiency virus. (*Fig. 1*).

In terms of clinical presentation, thirteen patients had acute symptoms (less than two weeks prior to hospitalization) and only three presented more indolent symptoms. Regarding the symptoms presented, thirteen patients reported fever, nine experienced abdominal pain localized in the right hypochondrium, eight patients reported general symptoms (asthenia, anorexia, weight loss), eight patients had chills, three patients had nausea, two patients experienced pain radiating from the right shoulder, and one patient had respiratory difficulty. An analysis of the semiological findings detected fever in twelve patients (an average axillary temperature of 38.2ºC), pain on palpation of the right hypochondrium in eleven patients, hepatomegaly in seven patients, pulmonary auscultation revealing reduced vesicular murmur in the right hemithorax in two patients, symptoms compatible with shock in one patient, and pain on palpation of the lower abdominal quadrants in one patient (*Table I*).

With regard to alterations detected in the analytical evaluation, an increased level of

C-reactive protein, an elevated sedimentation rate, as well as a more modest increase in aminotransferase values were found to be constant. Other changes detected in almost all patients were neutrophil leukocytosis, elevated values of gamma glutamyl transpeptidase and alkaline phosphatase, and hypoalbuminaemia. Normocytic anemia and elevated total bilirubin (*Table II*) were noted with less frequency. None of the patients studied showed alterations suggesting liver failure, in particular, prolonged prothrombin time.

Imaging studies performed for diagnostic purposes included abdominal ultrasound in thirteen patients and computed tomography (CT) in fourteen patients, with both exams conducted for eleven patients. In terms of the localization of the LA, ten patients presented

TABLE I

Liver abscess clinical presentation

Symptoms		Signs	
Fever	13	High temperature	12
Pain in the right hypochondrium	9	Pain on palpation of the right hypochondrium	11
Chills	6	Hepatomegaly	7
General symptoms	6	Reduced Vesicular Murmur on the right side	2
Nausea	3	Shock	1
Pain in the right shoulder	2	Pain on palpation of the lower quadrants	1
Respiratory difficulty	1		

abscesses in the right lobe of the liver (eight of them being single abscesses), and four patients presented abscesses in the left lobe (three of them being single abscesses). Multiple LAs, with abscesses in both lobes of the liver, were found in two patients. It should be noted that, of the eleven patients who underwent both abdominal ultrasound and CT, the results of both tests were similar in ten patients, while in one case only, the abdominal ultrasound results were normal and LA was only detected by abdominal CT. (*Fig. 2 and 3*)

Despite extensive investigation, an etiological diagnosis could only be established for eight patients, five by blood cultures and in three by serology. It should also be noted that of the nine patients who underwent diagnostic fine needle aspiration, successful isolation was achieved in only three: polymicrobial flora were detected in two cases and non-specific anaerobic agents were detected in the third case.

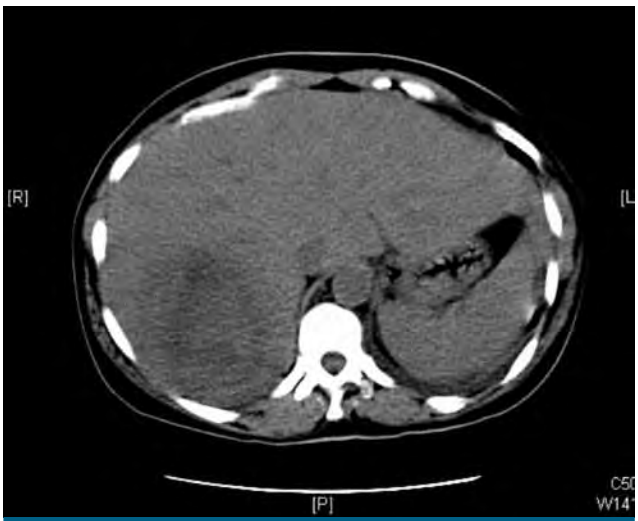
Among the etiological agents identified were Streptococcus milleri in three patients, Entamoeba histolytica in three patients, and Escherichia coli and Klebsiella pneumoniae in one patient each (*Fig. 4*). It should be noted that the three patients with serological diagnoses of amebic etiology had similar epidemiological case histories, two patients having traveled to Angola and one having stayed in Cape Verde, all within the year prior to admission.

Regarding therapeutic methods, drainage was performed in nine patients only, eight percutaneously and in one surgically. Seven patients received medical treatment only. Of the antibiotic regimens used, nine patients were given ceftriaxone and metronidazole, three were treated with piperacillin-tazobactam and metronidazole, one with penicillin G (in accordance with the antibiogram), one patient with metronidazole monotherapy (amebic LA), one with piperacillin--tazobactam and gentamicin, and one initially treated with penicillin and gentamicin whose therapeutic regimen was changed to imipenem and vancomycin due to the failure of the initial antibiotic therapy. Only five patients continued the oral antibiotic treatment following discharge from the hospital (metronidazole in one case, metronidazole in combination with cefuroxime in one case, amoxicillin in one case, amoxicillin and clavulanic acid in combination with clindamycin in one case, and paromomycin in one case). The average treatment time was 33.8 days (from a minimum of sixteen to a maximum of fifty-three days). Apyrexia occurred at around fourteen days, and no relationship between the severity of the disease/therapeutic approach and the time to apyrexia could be established. There were no significant differences

TABLE II

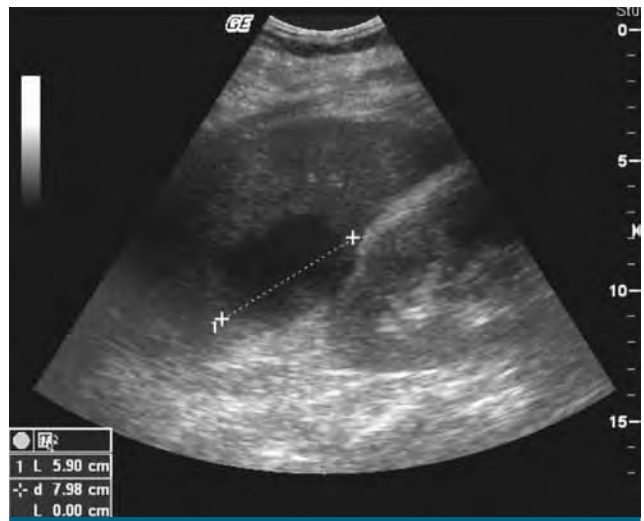
Prevalence of specific laboratory tests alterations

Laboratory alterations	No. Patients	Average values	Reference ranges
Elevated C-reactive protein	16	31,1 mg/dL	< 0,2 mg/dL
Elevated ESR	16	90 mm 1st h	< 31 mm 1st h
Elevated AST	16	67,2 UI/L	< 38 UI/L
Elevated ALT	16	95,8 UI/L	< 40 UI/L
Leukocytosis	15	19.505/mm^3	4.000-11.000 x10^9/L
Neutrophilia	15	16.983/mm^3	1.900-8.000 x10^9/L
Hypoalbuminaemia	15	2,46 g/dL	3,35- 5,30 g/dL
Elevated Gamma-GT	15	211,5 UI/L	< 49 UI/L
Elevated Alkaline Phosphatase	13	205 UI/L	40-129 UI/L
Hyperbilirubinemia	9	1,74 mg/dL	< 1,2 mg/dL
Normocytic Anemia	9	11,2 g/dL	11,5-18 mg/dL



Computed tomography image of liver abscess.

FIG. 2



Abdominal ultrasound image of liver abscess.

FIG. 3

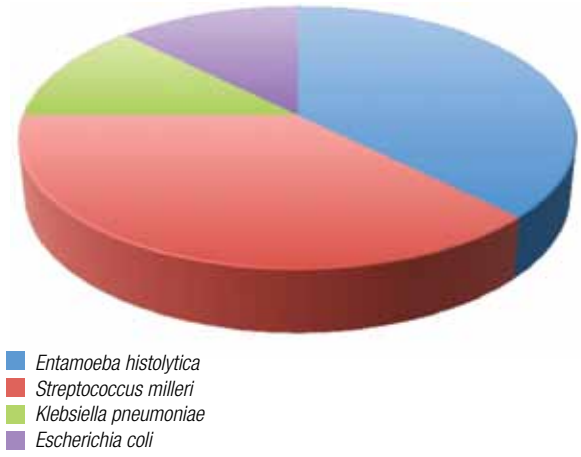
between cases of patients with or without personal case histories of diabetes mellitus or between cases of patients who did or did not undergo drainage for LA. The average hospitalization time was 37 days and the global prognosis was good. The disease was cured in all fifteen patients and recurred in only one patient.

DISCUSSION

The low incidence of patients with LA in the Medicine Service is less than the values reported in published studies, which may be due to a bias in the selection, since only cases admitted to the Medicine service were included, and not other cases of hospitalization for LA in other services. [2,6] In terms of gender distribution, a higher prevalence in males was confirmed (2.2 times higher than in females) as reported in the literature. However, an analysis of distribution by age, when compared with the series consulted, revealed a slightly lower average age, an aspect that must be related to the small population sample.[1,2,6]

With regards to the factors considered to be general predisposing factors in the occurrence of LA, alcoholism (five patients) and diabetes mellitus (three patients) stood out. Both the association with diabetes mellitus and the seriousness of this disease are known, even though the current study did not confirm them.[7] Considering the specific predisposing factors for LA, over the years, as already discussed, there has been a reduction in the number of cases of intra-abdominal suppuration and an increased incidence of biliary tract pathology. In the population studied, excluding the three patients with an epidemiological history of infection by Entamoeba histolytica, there was a similar prevalence of patients with previous intra-abdominal infections (three patients) and patients with biliary tract disease (two patients). However, it is important to note that it was impossible to establish a direct temporal relationship with LA in any of the cases of biliary tract disease. Among the most common analytical changes reported, the elevation of alkaline phosphatase is the most frequently occurring alteration (70%).[3,4] This was the case in the population studied, in addition to the practically constant alterations of elevated sedimentation speed, elevated C-reactive protein, and elevated of aminotransferases, and hypoalbuminaemia values. The presence of normocytic-normochromic anemia and hyperbilirubinemia was less prevalent.

Imaging tests, according to most authors, are the most reliable methods for the diagnosis of LA.[3,4] In this study, abdominal ultrasound and computed tomography (CT), both of which have good sensitivity for diagnosis of LA, were the imaging methods of choice. It should be noted that in eleven patients, the initial study was performed by abdominal ultrasound with CT and that in only one case did the CT furnish additional information. In the other ten cases the findings were similar. The right lobe of the liver, given



Etiological agents identified.

FIG. 4

its volume and irrigation, is the most frequent location of LA, which was also observed in this study.[3,4] Likewise it was found that, just as in other series, the majority of LAs were single.[3,4,8] No relationship could be established between the presence of bacteremia and the incidence of multiple LAs.

As regards the etiological study, in only half of the cases (eight patients) was it possible to isolate a specific etiological agent, the majority via blood cultures. The most prevalent pyogenic agent in this study was Streptococcus milleri (three patients), which is commonly referenced in the literature as less common and often associated with LA of hematogenous origins, requiring an investigation of other infectious locations. According to various series, aerobic gram-negative enteric bacilli and enterococci are the most frequent agents of LA originating in biliary tract disease, and more recent studies highlight the frequency of LA caused by Klebsiella pneumoniae.[6,9] On the other hand, in LAs originating from infections of the pelvis or other intra-abdominal sites, the existence of mixed flora, including anaerobic (namely Bacillus fragilis) and aerobic bacteria, is common.[3,4,6,9] In this sense, the high number of polymicrobial abscesses raises the question of safety in the recommendation of antibiotic therapy following the identification of an agent by culture.[8] In the current series of patients Escherichia coli was isolated in just one case and Klebsiella pneumoniae in one other. The low diagnostic sensitivity of the fine needle aspirations performed, which provided additional information in only three cases, but without isolating the agent, is also worth noting. It should be emphasized that routine microbiological exams are not conducted for anaerobic bacteria, which certainly was a factor in the diagnostic results of the fine needle aspirations. For this reason a broader-spectrum antibiotic coverage against anaerobic, gram-positive, and enterobacterial agents was necessary. A diagnosis of amebic LA is fundamentally serological, as serum antibodies are detected in 92-97% of these patients.

Most patients were treated with ceftriaxone combined with metronidazole. There are no rigid indications for antibiotic treatment of LA in the literature, although initial treatment with broad spectrum antibiotics that include coverage for anaerobic agents, gram-negative bacilli, and gram-positive cocci is recommended, bearing in mind that the most probable origin of the infection is the biliary tract, the colon, or the pelvis.[3,4]

Traditionally, the treatment of LAs should include drainage of the abscess (surgical or percutaneous), in association with antibiotic therapy. Several factors may point to the need for surgical drainage instead of percutaneous drainage: the presence of multiple abscesses of various sizes, viscous content that could clog the catheter, the existence of associated disease requiring surgery (such as biliary tract disease), and the absence of a clinical response to percutaneous drainage in four to seven days.[3,10-12] Standalone antibiotic therapy is defendable, but preferably reserved for patients with small abscesses where drainage is impossible or high risk.[4] In our series, drainage of the LA was associated with antibiotic therapy in only 9 cases (aspirative in eight patients and surgical in one patient), without observing any differences in the clinical evolution between the two approaches. The response to therapy was entirely favorable. The average duration of antibiotic therapy, which according to several studies should last for four to six weeks, was adequate for this series, but it should be noted that the patients who were given a shorter course of intravenous antibiotics completed their treatment with outpatient oral therapy. LA with amebic etiology is preferably treated with antimicrobial medicines, the mostly frequently used of which is metronidazole for a time period varying from seven to ten days. Aspirative drainage is not commonly recommended and should

be reserved for specific cases, namely in abscesses with imminent risk of rupture, lack of response to antibiotic therapy, and to rule out other diagnoses.

According to different case studies, mortality due to LA is still significant at around fifteen percent, although it did not occur in any cases of the present study.[2,3]

CONCLUSIONS

Analyzing patients with LA admitted to the Department of Internal Medicine over a ten-year period, it was found that LAs were responsible for a small percentage of the total hospitalizations, and as such, provided a reduced sample and all the constraints inherent to it. However, the profile of patients studied presented similar characteristics to the series of LA patients in various published studies, including the clinical and imaging aspects and laboratory alterations. The relatively low percentages of both fine needle aspirations performed and pathogenic agents identified are notable. On the other hand, a favorable clinical evaluation was observed in almost all the patients, as well as the absence of mortality. The high degree of clinical suspicion, early access to imaging exams with good sensitivity for diagnosing LA, and appropriate treatment justify the overall good results achieved. ■

References

1. Kaplan GG, Gregson ST, Read RC, Laupland KB. Population-based study of the epidemiology of and risk factors for pyogenic liver abscess. Clin Gastroenterol Hepatol 2004; 2(11): 1032-1038.

2. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: ten years experience in a UK centre. QJM 2002; 95 (12): 797-802.

3. Baron MJ, Kasper DL. Intraabdominal infections and abscesses. In Fauci AS, Kasper DL, Longo DL, Braunwald E, Hauser SL, Jameson JL, Loscalzo J eds. Harrison's Principles of Internal Medicine. McGraw-Hill 2008; 121: 807-813.

4. Johansen EC, Madoff LC. Liver abscess. In Mandell GL, Bennett JE, Dolin R eds. Mandell, Douglas and Bennett's Principles and Practice of Infectious diseases. Philadelphia: Elsevier Churchill Livingstone 2005; 69: 951-955.

5. Pereira A., Neves J. Abcessos hepáticos piogénicos – A propósito de um Caso Clínico. Estudo retrospectivo do serviço de doenças infecciosas do Hospital de Santa Maria de 1993-2003. Med Interna 2004; 11 (3): 139-142.

6. Chan KS, Chen CM, Cheng KC et al. Pyogenic liver abscess : a retrospective analysis of 107 patients during a 3 – year period. Jpn J Inf Dis 2005; 58 (6): 366-368.

7. Thomsen RW, Jepsen P, Sorensen HT. Diabetes mellitus and pyogenic liver abscess: risk and prognosis. Clin Infect Dis 2007; 44(9): 1194-1201.

8. Ferreira S, Barros R, Santos M et al. Abcesso hepático piogénico- casuística de 19 anos. J Port Gastroenterol 2007, 14(3): 128-133.

9. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends on etiology and mortality. Clin Infect Dis 2004; 39 (11): 1654-1659.

10. Liew KVS, Lau TC, Ho CH et al. Pyogenic Liver Abscess – A Tropical Centre's Experience in Management with Review of Current Literature. Singapore Med J 2000; 41 (10): 489-492.

11. Branum GD, Tyson GS, Branum MA, Meyers WC. Hepatic Abscess. Changes in Etiology, Diagnosis and Management. Ann. Surg 1990; 212(6) 655-662.

12. Yu SC, Ho SS, Lau WY et al. Treatment of pyogenic liver abscess: prospective randomized comparison of catheter drainage and needle aspiration. Hepatology 2004; 39(4): 932-938.