

Amoebic Liver Abscess in a Hospital Setting in Bamako, Mali

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Abstract

Through a descriptive study with retrospective data collection, the authors described the current epidemiological, clinical, paraclinical, and therapeutic characteristics of amoebic liver abscess in a hospital setting in Bamako. Over a 16-year period, 35 cases were recorded, 17 of which had secondary infections. Bacterial superinfection occurred in 12 HIV-infected patients and 5 non-HIV cases. The sex ratio (M/F) was 2.88. The main physical signs noted were tenderness on percussion (100%), hepatomegaly (94.28%), fever (82.85%), conjunctival pallor (37.14%), jaundice (34.28%), and right-sided pleural effusion syndrome (28.57%). The pleural fluid infected was most often chocolate-colored (70%). HIV serology was positive in 34.28% of cases. Amoebic serology was positive in 100% of cases. Liver ultrasound revealed hepatomegaly with a single abscess (68.57%) or multiple abscesses (31.42%), particularly in HIV-positive patients. The combination of a nitroimidazole and other bactericidal antibiotics successfully treated 12 cases with secondary bacterial infections (34.28%). The in-hospital mortality rate was 5.71%.

Keywords

Amoebic Abscess, Ultrasound, Serology, Hepatomegaly

1. Introduction

Amoebiasis is a widespread disease that is endemic to warm regions of the globe, where it poses a public health problem. It affects 480 million people worldwide. Ten percent (10%) of those infected develop the invasive intestinal or extraintestinal form of the disease, which is responsible for 40,000 to 110,000 deaths annually [1]. The national prevalence of amoebiasis in Iran is 1%, compared to Ghana (39.8%), South Africa (27%), and Türkiye (2.5%) [2]. In intertropical Africa, its prevalence ranges from 1% to 2% of the general population [3]. Liver amoebiasis reportedly affects 1 to 20% of people with invasive amoebiasis, rising to as high as 25% in Southeast Asia [4]. It causes 1.9% of hospitalizations in Abidjan [5] and 2.4% of hospitalizations at Gabriel Touré University Hospital in Bamako [6]. Its global prevalence is estimated at 50 million infections per year [7]. Its incidence in endemic areas such as Vietnam is 21 cases per 100,000 inhabitants. In industrialized countries, cases have been reported among immigrants and travelers returning from endemic areas [7], with an incidence ranging from 1 to 15 per 100,000 per year, according to the authors [5]. Only three studies have examined amoebiasis in hospital settings in Mali, the most recent of which were conducted in 1989 and 2018 in Bamako [6] [8] [9]. Liver amoebiasis remains common despite improved hygiene conditions in urban areas and the widespread availability of tissue-penetrating amoebicides. It seems appropriate to study the epidemiological, clinical, paraclinical, therapeutic, and prognostic characteristics of amoebic abscesses in the liver, particularly in the era of HIV/AIDS.

2. Patients and Methods

We conducted a retrospective observational study. The study population consisted of all patients hospitalized in the Internal Medicine and Infectious Diseases departments at Point G University Hospital, and the Gastroenterology department at Gabriel TOURE University Hospital, from 2007 to 2022 [Table 1]. The inclusion criteria were the combination of clinical signs consisting of tender febrile hepatomegaly or painful right hypochondrium with fever, along with the following paraclinical signs: a liver ultrasound image suggestive of an abscess and a positive amoebic serological test.

A secondary infection with liver amoebiasis was suspected in patients who had experienced clinical failure following properly administered treatment with a nitroimidazole despite a positive amoebic serological test, and in whom symptoms improved after the addition of other classes of antibiotics.

All patients were interviewed to determine their history of clinical and laboratory-confirmed dysentery, jaundice, alcohol or tobacco use, and hygiene conditions. Physical examination was performed to check for tender hepatomegaly, fever, and other signs of infection.

Imaging included abdominal ultrasound and a frontal chest X-ray. Hematological and serological testing included a complete blood count and serological tests for amoebiasis and HIV. Amoebic serology was performed using the latex agglu-

tinuation technique (Fumouze Diagnostic Laboratory). The technique involved mixing 20 µl of blood serum with colored latex particles coated with *Entamoeba histolytica* antigen on a slide. The detection of specific antibodies in the serum is characterized by red agglutination formation [9] [10]. CD4 lymphocyte counts were performed in patients with HIV infection. Alpha-fetoprotein levels were also measured in some patients. The pus obtained from pleural and ultrasound-guided liver punctures underwent cytological and bacteriological examination at the bacteriology laboratory of the Point G University Hospital Center.

Data analysis

Data were entered into an EpiData (version 3.1) database and analyzed using SPSS software (version 12.0). Yates' test and the chi-square test were used to compare qualitative variables. Student's t-test was used for quantitative variables. The significance threshold was set at $p < 0.05$. The chi-square test was used to assess associations, with a significance level of $p < 0.05$.

Ethical considerations

To conduct the study, we obtained authorization from the administrative and legal authorities of the Point G University Hospital Center (UHC), in accordance with existing agreements between the UHC and our university.

3. Results

Overall Results

In total, 7664 patients were hospitalized, of whom 2912 were HIV-positive (37.99%). All cases of hepatic abscess are referred from peripheral hospitals where initial care was provided.

Table 1. Hospitalisation department of patients admitted for liver abscess.

Hospitalization service	Liver Abscess: N (%)	Amoebic Abscess: N (%)
Internal Medicine		
CHU du Point G	26 (48.94)	15 (37.14%)
Hepato-Gastro-Enterology		
CHU Gabriel Touré	9 (25.53%)	8 (2.57%)
Infectious diseases		
CHU du Point G	12 (25.53%)	12*(34.29%)
Total	47 (100%)	35 (100%)

12*: HIV-infected patients [HIV₁ (11 cases) and HIV₂ (1 case)].

We identified 47 cases of liver abscess, including 35 cases of amoebic origin (74.46%) [Table 1], of which 17 cases had a secondary bacterial infection (48.57%). Secondary bacterial infection was noted in 12 cases with HIV (34.28%). The patients included in our study were identified from the hospitalization records of the recruitment sites, as shown in Table 1. The proportion of referrals

from peripheral health centers was higher in 2012, with 7 cases (20%) [Table 2]. HIV infection was diagnosed in 12 patients. Amoebic abscess accounted for 0.45% of hospitalizations. The hospital frequency of amoebic abscess was 34.28% (12 cases) among HIV-infected individuals and 65.71% (23 cases) among HIV-negative patients. There was no statistically significant difference between the two groups ($p = 0.78$). Amoebic liver abscesses in HIV-infected individuals showed superinfection in all 12 cases, compared to 5 cases among HIV-negative patients. These patients were suspected of having bacterial superinfection. The antibiotics administered alongside nitroimidazoles (tinidazole or metronidazole) were ceftriaxone or ciprofloxacin.

Table 2. Cases of amoebic liver abscess according to years of diagnosis.

Years	Number	Percentage (%)
2007	5	14.29
2008	5	14.29
2009	3	08.60
2010	5	14.29
2012	7	20.00
2013	1	02.9
2014	1	02.9
2015	0	00.00
2016	3	8.60
2017	1	02.9
2018	2	5.70
2019	1	02.9
2020	0	00.00
2021	0	00.00
2021	0	00.00
2022	1	02.85
TOTAL	35	100

In socio-demographic terms

Our sample consisted of 26 men and 9 women. The sex ratio (M/F) was 2.88. The most represented age group was 21 to 40 years old (52.63%). Civil servants (31.42%) and housewives (22.85%) were the most represented groups.

Clinically

The clinical data included functional and physical findings, as well as medical history. These are presented in Table 3.

Table 3. Clinical characteristics of patients with amoebic abscesses.

Clinical characteristics	N	%
Clinical and Laboratory History of Amoebic Dysentery	9	25.71
History of jaundice	8	22.85
History of hepatic pain	4	11.42
Alcohol use	10	28.57
Tobacco use	14	40.00
Functional signs		
▪ Fever	23	65.71
▪ Abdominal heaviness	23	65.71
▪ Diffuse abdominal pain	9	25.71
▪ Cough	5	14.28
Physical signs		
▪ Fever	29	82.85
▪ Tenderness to percussion	35	100
▪ Hepatomegaly	33	94.28
▪ Persistent cough	7	20.00
▪ Right-sided pleurisy	10	28.57
▪ Clinical jaundice	12	34.28
▪ Conjunctival pallor	13	37.14

Paraclinical data

Amoebic serology and HIV serology were performed in 35 patients. CD4 lymphocyte counts were performed in the 12 HIV-positive cases (HIV-1 = 11 cases; HIV-2 = 1 case). Pus cultures (pleural and hepatic) were negative in all cases where they were performed (26 cases). Complete blood counts varied. Laboratory results are shown in **Table 4**.

Twenty-six patients had right-sided pleurisy (74.28%). The pleural fluid was transudative with a predominance of neutrophils and was sterile in all cases. The color of the pleural fluid was citrine yellow in 3 of the 10 cases (30%) and brown in 7 cases (70%).

The chest X-ray revealed blunting of the right costophrenic angle in 10 cases (47.37%), elevation of the right hemidiaphragm (9 cases: 2, 3.68%), and a fluid-air image within a dense opacity suggestive of a right lung abscess.

Hepatic ultrasound noted hepatomegaly associated with a single or multiple abscesses in 35 cases. Eleven other patients had multiple abscesses (≥ 2 abscesses). These abscesses were located in the right lobe in 8 patients (72.72%), in the left lobe in 1 patient (9.09%), and in both lobes in 2 patients (3 abscesses in each lobe) (**Table 4**). Abscess aspiration performed in 18 patients revealed brown pus.

Gram staining and culture of pus samples taken from the liver (18 cases) and the pleura (10 cases) showed no growth.

Table 4. Paraclinical findings observed in patients with amoebic abscesses.

Laboratory Results	N	%
o CD4 count (cells/mm ³)	12	100
- CD4 < 200	4	33.33
- CD4 between 200 and 350	6	50
- CD4 > 350	2	16.67
o Blood count		
▪ Microcytic hypochromic non-regenerative anemia with elevated neutrophils and ESR	17	48.57
▪ Normocytic normochromic regenerative anemia with elevated neutrophils and ESR	2	5.71
▪ Normal complete blood count (CBC) with neutrophilic leukocytosis and elevated ESR	15	42.85
▪ Normal complete blood count	1	2.85
Liver Ultrasound Results	N	%
▪ Hepatomegaly	35	100
▪ Localization of liver abscesses		
- Right lobe	26	74.28
- Left lobe	7	20.00
- Two lobes	2	5.71
▪ Single abscesses	24	68.57
▪ Multiple abscesses	11	31.42

In terms of treatment and outcomes

The average duration of treatment was 7 days $\pm$ 3. Nitroimidazoles alone were used to treat 23 patients (65.71%). These included tinidazole (42.03% of cases) and metronidazole (23.68% of cases). A combination of nitroimidazoles with another class of bactericidal antibiotics was used for the 12 patients (34.28%) with HIV, and the treatment lasted longer than 10 days in 75% of these cases. Other antibacterials were associated with nitroimidazole for 5 cases of amoebic abscess, none infected by HIV.

Complete remission was achieved in 33 patients (94.28%). Surgical drainage was combined with medical treatment in 1 HIV-negative patient (5.26%). A complication involving peritonitis associated with an abscess in the right lung was observed in 1 HIV-positive patient.

The average length of hospital stay was 8 $\pm$ 3 days, ranging from 5 to 14 days. The in-hospital mortality rate was 5.71% (2 cases). The cause of death was related to heart failure in one case and, in the other, to an advanced form of hepatocellular carcinoma with an alpha-fetoprotein level exceeding 500 ng/ml.

4. Discussion

Study limitations

This is a retrospective study characterized by a lack of clinical and epidemio-

logical data, as is typical of studies of this type. Our work has limitations due to the small sample size and the lack of microbiological information.

At the epidemiological and demographic level

Amoebic abscess was a major cause of liver abscesses in this series. No statistically significant difference was observed between the group of HIV-infected patients and the group of non-infected patients ($p = 0.78$). The hospitalization rate is higher in Cotonou (1.6%), Dakar (1% - 2%), and Abidjan (1.9%) [1] [11] [12]. The incidence of invasive amebiasis among people with HIV is 6.1% in Taiwan region, India [7].

The excessive morbidity among men observed in this series has also been noted in Abidjan [12], Dakar [11], and Bordeaux [13]. It is 10 times more common in men and rare in children [14]. The frequent occurrence of the disease among lower socioeconomic groups is commonly reported, contrasting with our results, which reveal a predominance of civil servants (28.95%) who have a relatively higher standard of living. These are individuals who, during their professional careers, were frequently exposed to the risk of ingesting *E. histolytica* parasitic cysts. Alcohol intoxication could adversely contribute to the progression of liver damage. Opinions on this role vary among authors. Its prevalence ranges from 20.5% [15] to 26% [1] according to some authors, while others report rates ranging from 12.6% [12] to 38.1% [7].

Clinical Aspects

The main physical signs observed were hepatic fist percussion tenderness, hepatomegaly, fever [6], and a persistent cough. A cough associated with dyspnea was observed in 18.42% of cases in the Congo [14]. The main signs observed in this study are commonly reported [6] [7] [9] [11] [13] [14] [16].

The classic FONTAN triad was more frequently observed compared to the Benin series in 1991 (71.4%), the Senegalese series (44.1%), the Bordeaux series (55%), and the Malian series at Gabriel Toure University Hospital (87.5%) [1] [6] [11] [13]. The other clinical forms reported in the literature were primarily icteric forms, forms with pleural effusion, and cases associated with portal hypertension [4]. LODHI *et al.* reported a 32% incidence of the icteric form in Pakistan [17].

The clinical presentation of HIV-positive patients in this study is characterized by a bedridden state, multiple foci, and slow progression despite appropriate treatment, as well as a high risk of bacterial superinfection.

The only recorded progressive complication was peritonitis, which is lower than the rates typically observed in Africa (10% to 15%) [1]. A form associated with progressive hepatitis C has been described in Bamako in a 71-year-old local resident, according to the literature [5]. Nkoumou-Okomé *et al.* reported, in an area where amoebiasis and tuberculosis are endemic, a combination of liver amoebiasis and pulmonary amoebiasis with pulmonary tuberculosis in two 34-year-old individuals, one of whom was an alcoholic [18]. None of the cases in our study presented with any comorbidities.

Paraclinical investigations

The inflammatory syndrome is of great diagnostic value but has low specificity

[13]. Neutrophilic polycytosis and an elevated erythrocyte sedimentation rate are classic findings. The same findings were observed in India, with 92.3% of patients exhibiting hyperleukocytosis and 85.4% having an elevated erythrocyte sedimentation rate [7]. Diallo *et al.* in Dakar report an increase in neutrophilic leukocytosis in 13 cases (%) and anemia in 14 cases (%) [16]. The erythrocyte sedimentation rate was elevated in all patients within the total study population who underwent the test [7].

Amoebic serology is positive in most reported cases [13]. It is positive in all cases in our study. It may be negative in cases of true invasive amebiasis during the first week of the disease [8]. It is therefore important to repeat the serology if the condition is suspected. In our context, it must be considered that the ease of initiating antibacterial antibiotic treatment, given the limited technical facilities, can lead to significant delays in establishing an accurate etiological diagnosis.

Ultrasound helps in the detection of liver abscesses and the assessment of their progression [13]. Abscesses were identified in all patients, with varying locations. Abscesses in the right lobe and unifocal abscesses were more common. This predominance of the right lobe has been reported [6] [11] [13] [19]. Unifocal abscesses are cited by several authors, including DIA (79.41%), DJOSSOU (85%), and IBARA (63.10%) [11] [13] [19]. A double abscess (2 cases) and a quadruple abscess (1 case) were observed in Bordeaux. This study identified a double abscess in the right lobe (8 cases), a triple abscess (2 cases) in the right lobe, and one case in the left lobe. In the Senegalese series, the abscesses were solitary in 90% of cases and multiple in 10%, with 85% of the cases being amoebic abscesses [16].

DJOSSOU *et al.* also reported elevation of the right hemidiaphragm and reactive pleural effusion in 20% of cases [13]. NJOYA *et al.* report a 10.54% incidence of pleuropulmonary involvement [3]. These findings are consistent with those of certain authors who found that the most common complications are pleuropulmonary [4]. Secondary infections and multifocal abscesses are predominant among HIV-positive patients [8].

Therapeutic and outcome aspects

Average treatment duration with the various nitroimidazole compounds at the same dose (2 g/day) was 7 days $\pm$ 3 days, respectively. These results confirm those obtained in Bamako in 1990, where a cure was achieved over an average period of 6 $\pm$ 3 days [9]. Surgical drainage was justified in this study due to the onset of peritonitis following abscess rupture in one case and, in the second case, due to an imminent risk of rupture of an abscess that was already causing compression. Based on the literature [4], surgical treatment appeared to be of limited benefit. The use of additional antibacterial antibiotics, as noted in our study in the context of suspected bacterial superinfection, was also reported in a Senegalese series [16].

5. Conclusion

Amoebiasis liver abscess can occur at any age, regardless of socioeconomic category or origin. Alcohol intoxication and immunosuppression, particularly in the

context of HIV/AIDS, negatively affect the course of the disease. Its prognosis depends on how early treatment is initiated, even though nitroimidazoles are effective against the parasite responsible.

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Authors' Contributions

All authors contributed to the drafting and critical revision of this manuscript. All authors have read and approved the final version.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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