Acta Scientific MEDICAL SCIENCES (ISSN: 2582-0931)

Volume 6 Issue 8 August 2022

Research Article

# Amoebic Liver Abscess in the Department of General Surgery at Somine Hospital DOLO of Mopti, Mopti, Mali

**Bréhima Traoré[1]*, Modibo Coulibaly[2], Oumar Guindo[3], Djibril Traoré[1], Abdoulaye Traoré[5], Kiffery Ibrahim Keita[1], Aly Boubacar Diallo[9], Souleymane Sanogo[7], Alhassane Traoré[4], Mathias Diassana[1], Korotimou Mallé[1], Fodé Mory Keita[1], DK Dembele[1], Dramane Samaké[6] and Yacaria Coulibaly[8]**

[1]*General Surgery Department, Sominé Hospital DOLO in Mopti, Mali*

[2]*Medical Biology Laboratory Service, Sominé DOLO Hospital in Mopti, Mali*

[3]*Public Health Service, Sominé DOLO Hospital in Mopti, Mali*

[4]*Department of General Surgery, CHU Gabriel Touré, Mali*

[5]*Anesthesia/Resuscitation Department and Operating Theatre, Mali*

[6]*Medical Service, Sominé Dolo Hospital in Mopti, Mali*

[7]*Medical Imaging Department of the Luxembourg Mother and Child Hospital in Bamako, Mali*

[8]*Gabriel Touré University, Hospital Pediatric Surgery Department, Mali*

[9]*Sikasso Regional Hospital, General Surgery Department, Mali*

***Corresponding Author:** Bréhima Traoré, General Surgery Department, Sominé Hospital, DOLO in Mopti, Mali.

**DOI:** 10.31080/ASMS.2022.06.1341

**Received:** April 07, 2022

**Published:** July 08, 2022



## Abstract

We performed a 3-year retrospective and prospective study, from January 1, 2017 to December 31, 2019, carried out in the department of general surgery at Somine Hospital DOLO of Mopti. The objective of this study was to determine the frequency and the clinical and paraclinical features of amoebic abscess of the liver in a hospital setting. Subjects were selected based on the results of physical examination, ultrasound, amoebic serology and pus culture. For 7305 admissions, 32 cases of amoebic abscess of the liver were collected, which represents a hospital frequency of 0.4% and an incidence of 10 cases. The average age of subjects was 35 years in adults and 6 years in children. The sex ratio was 3.6. The most common clinical signs were fever (90.6%), hepatomegaly (81.3%) and nausea and/or vomiting (56.3%). The collections objectified by abdominal ultrasound were located in the right lobe in 78.1% of cases and unique in 87.5% of cases. Culture of the collection revealed 6.2% of active liver abscess with the presence of *Entamoeba histolytica*. The diagnosis of uncomplicated amoebic abscess of the faith was retained in 59.4% of cases. Amoebic abscess complicated by peritonitis, right pleurisy and parietal abscess was reported in 40.6% of cases. Among the complications, peritonitis was the most frequent with 46.1% followed by right pleurisy 23.1% and parietal abscess 15.4%. Medical treatment was exclusive in 12.5% of cases, a evacuating puncture under ultrasound guidance was necessary in 9.4% of cases. Surgery was performed in 78.1% of cases. The post-treatment clinical course was favorable from the outset in 90.6% of our patients with total emptiness on ultrasound and secondarily in 9.4% who progressed favorably after a second drainage plus antibiotic therapy. Multidisciplinary management of amoebic abscesses in the liver involving the infectious disease specialist, visceral surgeon, radiologist and biologist improves diagnosis, therapeutic management and patient follow-up.

**Keywords:** Amoebic Liver Abscess; Somine DOLO Hospital in Mopti; Type of Treatment; Clinical Course

## Introduction

Amebiasis is a parasitic disease caused by a protozoan called Entamoeba histolytica. The parasite is transmitted via the fecal-oral route, after ingestion they turn into trophozoites, the adhesion properties of which and the secretion of proteolytic enzymes allow the destruction of the cells of the intestinal wall, the formation of abscesses of the sub -mucosa and blood circulation to other organs. Spread is to distant extraintestinal sites, the most common of which is the liver. Disseminated extra-intestinal diseases such as hepatic abscess (HA), pneumonia, purulent pericarditis and even cerebral amebiasis have been described [1,2]. Globally, up to 50 million people are estimated to be affected by E. histolytica, mainly in developing countries, and it is responsible for more than 100,000 deaths per year [3]. In Mali and Africa, the prevalence of this pathology varies from one hospital structure to another [4-7]. The diagnosis is based on clinical arguments including Fontan's triad (painful febrile hepatomegaly) and para clinical arguments including ultrasound imaging and amoebic serology or molecular biology [1]. Treatment depends on the stage of the disease. It can be medical or interventional: echo-guided evacuating puncture and surgery according to Djossou., *et al*. 2003 and is most often accompanied by success [8]. The objective of this study was to determine the frequency of amoebic abscess of the liver (AAF) at the Sominé DOLO Hospital in Mopti (HSD-M), to describe the clinical aspects, diagnoses and to evaluate the clinical course after the processing.

### Patients and Methods

We carried out a retrospective and prospective study by systematic recruitment of all patients admitted for liver abscess whose amoebic origin was confirmed by: the presence of an abscess on abdominal ultrasound, amoebic serology by Enzyme Linked Immunosorben Assay (ELISA) RIDASCREEN Entamoeba histolytica IgG ELISA kit (R-Biopharm AG, Germany); the puncture under ultrasound guidance bringing back a chocolate and odorless pus and the absence of any germ in the culture pus objectifying the presence amoeba or the absence of other germs. Any non-amoebic liver abscess was not included in this study. An abdominal ultrasound in front of any painful and febrile hepatomegaly, amoebic serology and cytobacteriological examination of the abscess were performed systematically to confirm or rule out the amoebic origin. Chest x-ray was requested depending on the clinical context. The treatment was initially non-surgical as first-line in the absence of any sign of complication (rupture or pre-rupture of the abscess), regardless of the number, location and size of the abscess. In the absence of improvement in signs (abdominal pain, fever) or in the presence of a complication after 24 to 72 hours, non-surgical treatment is considered ineffective and an echo-guided evacuating puncture has been combined. Our patients were followed clinically by the temperature curve, the evolution of abdominal pain and hepatomegaly. Paraclinical examinations were ultrasound (once a week, at discharge, at 1.3 and then at 6 months) and the measurement of the sedimentation rate. The data were entered in Excel and analyzed by the Epi-Info software (version 7.0).

## Results

In total, we treated 102 cases of liver abscess including 32 cases of AFA confirmed by abdominal ultrasound, amoebic serology and pus culture. The incidence was 10 cases per year with a consultation frequency of 32/12050 (0.3%) and a hospitalization frequency of 32/7305 (0.4%). In adults, the mean age was 35 ± 10 years. The 31 to 45 age group was in the majority 14/32 (43.8%). In the children the mean age was 6 years ± 5.3 and extremes of 1 to 15 years, see table 1. The sex ratio was 3.6. The liberal professions most affected were farmers and laborers 16/32 (50.0%) and 7/32 (21.9%). Depending on the method of recruitment, 23 cases or 72.0% of patients were received in the emergency room (see Figure 2). Most of our patients had a history of amoebic dysentery 28/32 (87.5%) and gastrointestinal ulcer 9/32 (28.1%) see table 1. Other clinical signs had a frequency of 29/32 (90.6%), 16/32 (50.0%), 14/32 (43.8%), 11/32 (34.4%) and 6/32 (18.8%) respectively for fever, pain in the right hypochondrium, jaundice, anorexia and dehydration see table 1. The right lobe was the most frequent location, 25/32 (78.1%), left lobe 6/32 (18.8%) and the 2 lobes 1/32 (3.1%) see table 1. The abscess was unique in the majority of cases, i.e. 28/32 (87.5%) see figure 4. The mean volume of pus was 455 ± 21.4 $cm^3$ with extremes of 50 to 2000 $cm^3$ Most patients had polynuclear neutrophilic leukocytosis 24/32 (75.0%), eosinophilia 11/32 (34.4% ), lymphocytosis 5/32 (15.6%) see table 1. Anemia was severe in 24 cases (75.0%) and moderate in 8 cases 25.0% see table 1. Pus culture revealed 2/32 (6.3%) active AFF with presence of 'amoeba. The mean titer of amoebic serology was 1/680 with extremes ranging from 1/360 to 1/2560 see figure 3. Unbroken AAF, AAF complicated with peritonitis and AAF ruptured with

right pleurisy represented 23/32, respectively. (71.9%), 6/32 (18.8%) and 3/32 (9.4%) see table 1. Exclusive medical treatment was performed in 3 cases (9.4%), the echo puncture -guided in 4 cases (12.5%), surgery in 25 cases (78.1%) and secondary pleural drainage in 3 cases (9.4%) see table 1. The clinical course was favorable from the start in 90.4%) and secondarily in 9.6% of cases see table 1. The average length of hospital stay was 12 days, the majority of our patients left between 10 and 14 days, i.e. 65.6% see Table 2.

**Figure 1:** Surgical drape and ultrasound image. were no deaths in our series.

**Figure 2:** Distribution of patients according to recruitment method.

**Figure 3:** Proportion of anti-*Entamoeba histolytica* IgG antibody titers in patients.

**Figure 4:** Distribution of patients by number of abscesses.

| Characteristics | Number | Percent |
|---|---|---|
| Sex | | |
| Man | 25 | 78.1 |
| Female | 7 | 21.9 |
| Class of age | | |
| ≤ 15 years | 4 | 12.5 |
| [16-30 years[ | 9 | 28.1 |
| [31-45 years[ | 14 | 43.7 |
| [46-60 years[ | 4 | 12.5 |
| ≥ 60 years | 1 | 3.1 |
| Medical background | | |
| Dysentery | 28 | 87.5 |
| Gastrointestinal ulcer | 9 | 28.1 |
| General Clinical signs | | |
| Fever | 29 | 90.6 |
| Right hypochondrium pain | 16 | 50.0 |
| Jaundice | 14 | 43.8 |
| Anorexia | 11 | 34.4 |
| Dehydration | 6 | 18.8 |
| Localisation | | |
| Right lobe | 25 | 78.1 |
| Left lobe | 6 | 18.8 |
| Mixed | 1 | 3.1 |
| Diagnosis of amoebic liver abscess (ALA) | | |
| Simple unbroken ALA | 23 | 71.8 |
| Ruptured ALA + peritonitis | 6 | 18.8 |
| Ruptured ALF + right pleurisy | 3 | 9.4 |
| Biological parameters | | |
| Negative culture | 30 | 93.7 |
| Positive culture | 2 | 6.3 |
| Polynuclear neutrophilic hyperleukocytosis | 24 | 75.0 |
| Lymphocytosis | 5 | 15.6 |
| Hyper-eosinophilia | 11 | 34.4 |
| Moderate anemia | 20 | 62.5 |
| Severe anemia | 4 | 12.5 |
| Average hemoglobin level | 8 | 25.5 |
| Types of treatment | | |
| Exclusivelly medical | 3 | 9.4 |
| Echo-guided puncture + medical treatment | 4 | 12.5 |
| Surgery + treatment | 25 | 78.1 |
| Treatment used | | |
| Ceftriaxone + Metronidazole | 7 | 21.9 |
| Ceftriaxone + Metronidazole + Gentamycin | 25 | 78.1 |
| Post-treatment clinical course | | |
| From the outset favorable | 29 | 90.4 |
| Favorable after secondary drainage or surgery + Antibiotic | 3 | 9.6 |

**Table 1:** Sociodemographic, clinical and laboratory characteristics of amoebic liver abscess (AAF).

| Length of stay | Number | Percent |
|---|---|---|
| < 10 | 5 | 15.6 |
| 10 to 14 | 20 | 65.6 |
| > 14 | 7 | 21.8 |
| Total | 5 | 100 |

**Table 2**: Length of hospital stay depending on the type of treatment.

## Discussion

We conducted a retro-prospective study from January 2017 to December 2019 on 32 disease-treated patients in the service for AAF. Fontan's triad, abdominal ultrasound, electro chemiluminescent amoebic serology, and pus culture were performed in all patients to confirm the diagnosis of AFA. The average age of our patients was 35 years. The age of our series was lower but comparable to those obtained by Doumbia., *et al*. 2018 [5] and Traoré., *et al*. 2014 [6] who reported a mean age of 37 years and 39 years respectively. A lower mean age of 5.7 was reported by Sacko., *et al*. 2019 [4]. The difference between the last study and the previous two is explained by the fact that the series by Sacko., *et al*. Concerned only children. Halim., *et al*. 2016 [7] found a mean age of 39 years while Ba., *et al*. 2016 [9] found a mean age of 7 years. These results show AFA is found in the pediatric and adult age groups. We found a sex ratio of 3.6; this result was comparable to that obtained by Koumaré., *et al*. 2018 [10] in the department of surgery A of the CHU du Point-G, i.e. 3.7. However, the sex ratio of our series was lower than those obtained by Ba., *et al*. 2016 [9] and Ibara., *et al*. 2000 [11] who respectively reported a sex ratio of 1.36 and 1.53. A larger sex ratio, 5.6, was obtained by Traoré., *et al*. 2014 [6]. With an incidence of 10 patients per year, AAF accounted for 0.43% of hospitalizations in the general surgery department of the HSD-M. This observation shows that AAF remains relevant in

surgical practice in Mali. Sacko., *et al*. 2019 [4] reported 31 cases of hepatic abscess, i.e. a hospital incidence of 158/100000 admissions while Doumbia., *et al*. 2018 [5], Traoré., *et al*. 2014 [6] respectively reported a prevalence of 2.4%, and 1.3%. Fontan's triad characterized by painful febrile hepatomegaly was the most common clinical sign at 90.6% and 87.5% respectively for fever and painful hepatomegaly. The same trend was observed in the series by Zimogo., *et al*. At the CHU du Point in Bamako (Mali) [12] and Doumbia., *et al*. 2018 [5] at the CHU Gabriel Touré in Bamako (Mali). Elsewhere in Africa Oudou., *et al*. 1999 [13], Dieng., *et al*. 2007 [14] all found Fontan's triad. However, a lower proportion of Fontan's triad, ie 56%, had been reported by Ba., *et al*. In 2016 in Senegal [9]. Regarding the collection, it should be noted the AAF is classically uni focal. In our series we found 87.5% single focal FAA and 12.5% multifocal FAA on ultrasound. Ba., *et al*. 2016 [9] reported a proportion of multifocal AFA of 7.7% while Ibara., *et al*. 2000 [11] found a multifocal collection in 21.0% in their series. We found an average AAF volume of 455 ± 21.34 $cm^3$ with extremes ranging from 50 to 2000 $cm^3$. Oudou., *et al*. 1999 [13] reported a diameter of 20-125 cm and a volume of 80-2500 mL. Our mean volume was greater than that obtained by Koumaré., *et al*. 2018 [10] reported an average volume of 366.5 $cm^3$ with extremes ranging from 36 to 1580 $cm^3$. Ultrasonography, radiography and amoebic serology made it possible to retain the diagnosis of simple unruptured FAA in 71.9% of cases, 18.7% of ruptured FAA complicated by peritonitis and 9.4% of ruptured FAA with right pleurisy. In total, we encountered 9 AAF or 28.1% complicated. Among these 9 complications, 6 were represented by AAF complicated by peritonitis (66.7%) and AAF complicated by right pleurisy. Essomba., *et al*. 2006 [15] in a series on acute abdomen reported 47.0% peritonitis due to ruptured amoebic abscess. The mean titer of serum IgG assayed by Enzyme Linked Immunosorben Assay (ELISA) RIDASCREEN Entamoeba histolytica IgG ELISA kit (R-Biopharm AG, Germany) in our series was 1/680 with extremes ranging from 1/360 to 1/2680. Indeed 12.5% of our patients had a titre ≤ 1/380, 65.6% had a titre between 1/380 to 1/640 and 21.9% had a strong titre between 1/1280 and 1/2560. Nambei., *et al*. 2015 [16] found that out of 1049 patients suspected of FAA, 470 (44.80%) were positive. One hundred and ninety-nine patients (42.34%) had a titre less than or equal to 1/160, 178 patients (38.88%) had a titre varying between 1/320 and 1/640 and 93 patients (19, 78%) had a high titre varying between 1/1280 and 1/2560. Cytobacteriological examination (ECB) of the puncture fluid made it possible to look for superinfection or to distinguish an AAF from a bacterial abscess. This examination came back negative in the majority of our cases 30/32 (93.7%). In 2 cases (6.3%), we found amoebae in the puncture fluid; these 2 cases were associated with a high titer of anti-Entamoeba histolytica IgG. The sterilization of the collection is due to the fact that the amoeba and the pyogens are generally stuck to the wall of living tissues and not in the collection according to Chiche., *et al*. 2008 [17]. We did not find any bacterial germ while Dieng., *et al*. 2007 [14] found 17.5% bacterial infection consisting mainly of *Staphylococcus aureus*, *Escherichia coli* and *Klebsiella pneumoniae*. Ba., *et al*. 2016 [9] reported *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Steptococcus* pneumoniae and *Staphylococcus aureus* as pyogenes found in their series. Guittet., *et al*. In 2004 [18] reported in a retrospective study from 1985 to 2003, 6% of coagulase negative Staphylococcus, 6% of Mycobacterium tuberculosis and 3% of Group D Streptococcus. series a neutrophilic hyperleukocytosis in 24 patients or 75.0%, hypereosinophilia in 11 patients or 34.4% and lymphocytosis in 5 patients or 15.6%. Roger., *et al*. 2006 [19] also found a hyperleukocytosis ranging from 10,200 to 38,000/$mm^3$, mainly caused by polynuclear neutrophils. The characteristic hypereosinophilia of parasitoses is uncommon in AAF, Simon., *et al*. 2009 [20] and Fievet., *et al*. 2012 [21] did not find hypereosinophilia in a multinodular FAA patient in Gabon. The anemia was moderate (7-10 g/dL) in 62.5% of cases, severe (<7 g/dL) in 12.5% of cases and the hemoglobin level was moderate (10-16 g/dL). dL) in 25.0% of cases. Simon., *et al*. 2009 [20] reported a hemoglobin level of 6.4 g/dL suggesting severe anemia. Treatment depending on the size of the abscess and its complications, we adopted exclusive medical treatment in 9.4% of cases, evacuating puncture under ultrasound guidance plus medical treatment in 12.5% of cases and surgical intervention accompanied by medical treatment in 78.1%. N'Goran., *et al*. 2010 [22] in a pediatric series at Yopougon University Hospital, Abidjan (Ivory Coast) also performed medical treatment and puncture under ultrasound guidance. Kouamé., *et al*. 2011 [23] showed that evacuating puncture associated with treatment with metronidazole was statistically more effective compared to metronidazole alone in terms of mean duration of hospitalization 1.3 vs 6.6 days, p = 0.001. Dieng and al., 2007 [14] performed the exclusive treatment in 5.0% of their series, antibiotic therapy plus thoracic drainage using the minimum hepatotomy technique in 82.5% of cases and laparotomy in 10.0% of cases suggesting that the bulk of AAF requires surgery. Surgical means

are currently the last resort in the treatment of liver abscesses and are reserved for complications only, namely: rupture of the abscess in the peritoneum, the pleural cavity, the pericardium or fistulization of it in a viscera. hollow or to the skin. The laparoscopic surgery occupies a large place in the management. Conventional surgery was only performed in less than 12% according to the different series Badouil., *et al*. [24], Shi., *et al*. [25] and Djoussou., *et al*. [8]. In our series, it was performed in 25 patients, i.e. 78.1% (including 6 peritonitis by rupture of abscess). Our result (78.1%) is higher than that of Djossou [8] in France which reported a surgical intervention proportion of 10%. When diagnosed and treated early, AFA always progresses favorably. In our series, the clinical outcome was favorable from the outset in 29 patients, i.e. 90.6% with total emptiness on ultrasound, and secondarily in 3 patients, i.e. 9.4% who developed favorably after a second drainage plus antibiotic therapy. drain was removed on average 10 days after ultrasound control.

We noted a persistence of AAF in 3 cases, i.e. a failure rate of 9.4%. Our results are comparable to those obtained by Dieng M., *et al*. 2009 [26] who reported a favorable evolution from the outset. in 47.5% of their series and secondarily in 37.5% after drainage and antibiotic therapy. However, the failure rate reported by Dieng was higher than ours, at 15.0%. Clinical healing precedes the disappearance of anatomical lesions which may persist for a few months Ben., *et al*. 2009 [27], Ryszard., *et al*. 2002 [28]. When amebiasis is diagnosed early, mortality is less than 1% [29]. However, no deaths were recorded in our study. On the other hand, Shi., *et al*. 2016 [25] and Czerwionka., *et al*. 2016 [29] reported respectively 15.0% and 13.7% of mortality linked to the AAF. The early management of AFA by a multidisciplinary team improves the patient's vital prognosis.

## Conclusion

The early management of AFA by a multidisciplinary team improves its diagnosis, therapeutic management and patient follow-up while avoiding complications and reducing mortality associated with this disease.

## Bibliography

1. Kantor M., *et al*. "Entamoeba Histolytica: Updates in Clinical Manifestation, Pathogenesis, and Vaccine Development". *Canadian Journal of Gastroenterology and Hepatology* (2018): 4601420.
2. Rashidul H., *et al*. "Amebiasis". *The New England Journal of Medicine* 348.16 (2003): 1565-1573.
3. Tracy E Bercu., *et al*. "Amebic colitis: new insights into pathogenesis and treatment". *Current Gastroenterology Reports* 9.5 (2007): 429-433.
4. K Sacko., *et al*. "Les abcès hépatiques dans le département de pédiatrie du chu gabrieltouré de Bamako, Mali. une étude de 31 cas". *Journal of Medicine and Health Science* 20.4 (2019): 71-75.
5. Doumbia K épouseSamaké., *et al*. "l'abcès amibiens du foie : aspects cliniques et évolutifs au CHU Gabriel Touré de Bamako". *Mali Médical* 33.4 (2018): 23-25.
6. A Traoré., *et al*. "Abcès amibien du foie en chirurgie générale du CHU Gabriel Toure, Bamako, Mali". *Mali Médical* 29.4 (2014): 5-9.
7. A Halim., *et al*. "Aspects actuels de l'amibiase hépatique à Dakar. A propos de 48 observations". *Journal Africain d'Hépato-Gastroentérologie* 10 (2016): 170-175.
8. Djoussou F., *et al*. "Abcès amibien du foie, Analyse de 20 observations et proposition d'un algorythmethérapeutique". *La Revue de Médecine Interne* 24 (2003): 97-101.
9. A Ba., *et al*. "Particularités des abcès du foie chez l'enfant au Sénégal : description d'une série de 26 cas. Particularities of liver abscesses in children in Senegal: Description of a series of 26 cases". *Archives de Pédiatrie* 23.5 (2016): 491-496.
10. Koumaré S., *et al*. "Aspects diagnostiques et thérapeutiques des abcès amibiens du foie dans le service de chirurgie "A " du CHU du Point "G". *Mali Médical* 33.1 (2018): 1-5.
11. JR Ibara., *et al*. "Abcès du foie a germes pyogenes aspects cliniques, morphologiques et etiologiques à propos de 38 cas". *Médecine d'Afrique Noire* 47.2 (2000) : 92-96.
12. Zimogo ZS., *et al*. "Abcès amibiens du foie : expérience tropicale d'une pathologie peu observée en Europe". *Journal de Chirurgie Viscéral* 145.3 (2008): 300.
13. Oudou Njoya., *et al*. "Abcès amibien du foie à Yaoundé. Cahiers d'études et de recherches francophones". *Santé* 9.2 (1999) : 119-122.
14. A Essomba., *et al*. "Les abdomens aigus d'étiologie parasitaire : analyse d'une série rétrospective de 135 casAcute abdomens of parasiticorigin: retrospectiveanalysis of 135 cases". *Annales de Chirurgie* 131.3 (2006): 194-197.

15. WS Nambei. "Anticorps IgG anti-Entamoeba histolytica chez des patients présentant un abcès amibien du foie à Bangui, République Centrafricaine". *Rev. CAMES SANTE* 3.2 (2015): 23-27.

16. L Chiche., *et al*. "Abcès à pyogènes du foie. Diagnostic et prise en charge Pyogenic-liver abscess: Diagnosis and management". *Gastroentérologie Clinique et Biologique* 32.12 (2008): 1077-1091.

17. V Guittet., *et al*. "Les abcès hépatiques de l'enfant : étude rétrospective de 33 cas observés en Nouvelle-Calédonie de 1985 à 2003Hepatic abscesses in childhood: retrospective study about 33 cases observed in New-Caledoniabetween 1985 and 2003". *Archives de Pédiatrie* 11.9 (2004) : 1046-1053.

18. R Lebeau., *et al*. "Abcès amibien du foie au chu de Bouaké : étude diagnostique et thérapeutique à propos de 46 cas". *Mali Médical* 21.3 (2006) : 10-14.

19. Simon N., *et al*. "Une hépatopathiemultinodulairefébrile en zone tropicale". *Médecine Tropicale* 69.6 (2009): 603-605.

20. L Fievet., *et al*. "Abcès hépatique chez l'enfant : à propos d'un cas". *Archives de Pédiatrie* 19.5 (2012): 497-500.

21. N'goranK., *et al*. "Prise en charge multidisciplinaire des abcès amibiens du foie au CHU de Yopougon, Abidjan-Cote d'ivoire". *Pan Africain Medical Journal* 25.7 (2011): 11.

22. N Kouamé., *et al*. "Ponction échoguidée plus métronidazole versus métronidazole seul dans la prise en charge des abcès amibiens collectés de l'enfant". *Journal Africain d'Hépato-Gastroentérologie* 5.205 (2011).

23. Badouil Dabo G. "Abcès à pyogènes: à propos de 19 cas et revue de la littérature". *Le Bulletin de la Société de Pathologie Exotique* 106 (2013): 334-359.

24. Shi S., *et al*. "Unique characteristics of pyogenic liver abscess of biliary origin". *Surgery* 159.5 (2016): 1316-1324.

25. M Dieng., *et al*. "Traitement des abcès du foie : l'expérience d'un service de chirurgie Générale". *Médecine d'Afrique Noire* 54.10 (2007): 513-519.

26. Ben Abdallah R., *et al*. "Abcès amibien du foie authentifié par PCR chez un resort issant indien". *Rev Tun Infectiol* 3.2 (2009): 41-43.

27. Ryszard J. "Clinical manifestation and ultrasonography guide aspiration of amoebic Liver absess in St Walburge'sHospitol, Nyango". *Tanzania Tropical Doctor* 32 (2002): 92-93.

28. Czerwonko ME., *et al*. "Pyogenic liver absess: current statuts and predictive factors recurrence and mortality of first episodes". *HPB* 18.12 (2016): 1023-1030.