

Liver abscess of children in Côte-d'Ivoire: retrospective analysis of a series of 30 cases

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Objective The aim of this study was to report the results of liver abscess management in children.

Patients and methods We conducted a retrospective and descriptive study of 30 cases of liver abscesses collected over 9 years (March 2007 to February 2016). The following variables were studied and results were judged on the clinical and ultrasound follow-up: age, sex, hepatodigestive past history, evolution delay, clinical presentation, size, site, and number of collected pouch, HIV serology, bacteriologic exams, and management modalities.

Results Our series was made up of 18 boys and 12 girls with a mean age of 5.4 years. A past history of bloody saddles was noted in five cases. Fontan's triad combining a painful hepatomegaly with fever was observed in 25 patients. The collection was multiple in seven cases. The right lobe was found to be the most affected in 20 (66.7%) cases. The mean diameter was 11.8 cm with extremes ranging from 4 to 18 cm. The amoebic serology was positive in nine (30%) cases and *Staphylococcus aureus* was found in four cases. Four patients were subjected to an exclusive

medical treatment. An ultrasound-guided evacuating puncture and drainage were carried out, respectively, in five and 17 patients. A laparotomy was carried out in four patients, of which two were after secondary abscess rupture. Mortality was nil. No recurrence was recorded with a mean follow-up of 4.5 years.

Conclusion Liver abscess is not exceptional in the Ivory Coast paediatric hospital environment and constitutes a medicosurgical emergency with a good prognosis whose well-coded management needs to be early. *Ann Pediatr Surg* 14:51–55 © 2018 Annals of Pediatric Surgery.

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Introduction

Liver abscess is defined as a cluster of pus in a newly formed cavity at the expense of the surrounding hepatic tissue, which is destroyed or repressed [1]. It is a relatively frequent affection in underdeveloped countries, in relation to poor hygienic conditions [2]. These abscesses are of amoebic or pyogenic origins [3]. In developed countries, these abscesses are generally rare and occur usually in people having chronic affections such as chronic septic granulomatosis or leukaemia [3]. Evolution can be dotted with complications such as a rupture in the peritoneal or pleural cavity, or skin fistula when management is delayed.

This is about a diagnosis and therapeutic emergency whose well-codified management has benefited from the progress of interventional radiology [4–6]. In our context, late diagnosis, lack of knowledge of clinical presentation and low socioeconomic level can compromise the prognosis of this ailment [7].

In order to appreciate the management of this ailment in the paediatric surgery environment, we conducted this study in which the aim was to describe the epidemiologic, the diagnosis aspects, our therapeutic method and the evolution of liver abscess in children treated in our department.

Patients and methods

Patients

It was a retrospective and descriptive study carried out on all children aged between 0 and 15 years admitted

and treated in our department for liver abscess, from March 2007 to February 2016. Data were collected from duty shift and consultation registers, and from patient's health book.

Methods

Once liver abscess diagnosis was confirmed by an abdominal ultrasound (US), aetiologic laboratory examinations such as hemocultures, amoebic serology and cytobacteriologic examination of the punctured liquid were carried out. Treatment consisted in an antibiotic therapy in all cases. The antibiotic therapy was made up of ceftriaxone at 100 mg/kg, gentamicin at 3 mg/kg, amoxicillin and clavulanic acid at 80 mg/kg and metronidazole at 30 mg/kg. In case the abscess measured more than 10 ml at the US examination, evacuation or drainage puncture was indicated. Drainage was carried out with a Joly's drain. After an US examination for localization, local anaesthesia was induced until the peritoneum, and then an explorative puncture was performed. Thereafter, a short cutaneous incision was made until the aponeurosis with the aid of the edge of a scalpel blade, allowing an easier passage of the drain. The mandrel was then removed and the catheter connected to an aspirating bowel (Figs 1 and 2). In case of peritoneal rupture a laparotomy was carried out.

For each patient, the studied variables were age, sex, area of origin, past history of bloody saddles, evolution delay, clinical presentation (general state, presence of

Fig. 1



Liver abscess drainage on one of our patients.

Fig. 2



Ultrasonographic image of an abscess found in segment VII.

fever, abdominal pain of the right hypochondrium, abdominal mass or arching, hepatomegaly and the presence or not of respiratory signs), biologic (HIV retroviral serology, amoebic serology, C-reactive protein, leucocyte levels, and presence or not of anaemia), size, localization and number of pouch of collection, macroscopic aspect of pus, cytobacteriologic examination of the pus, examination results, realized treatment, and clinical and paraclinical evolution.

The evolution was considered as favourable based on clinical data (amelioration of general state, pain regression, hepatomegaly and abdominal arching), on biological data (reduction of infectious syndrome and serology negativation) and on US data (vacuity of the abscess pouch residual collection <5 cm). The evolution was appreciable at day 5, day 15, 1 month and at 3 months after therapy. The mean follow-up delay was 4.5 years (range: 6 months to 6 years).

Results

Epidemiologic data

During 9 years, 30 cases of liver abscess on 7518 hospitalized patients were collected; thus, there was a prevalence of four cases for 1000 admissions. We observed a male predominance (sex ratio: 1.5). The mean age was 5.4 years, and the majority of children were younger than 5 years. Patient's epidemiologic characteristics are presented in Table 1.

Clinical data

No chronic pathology was found in the 30 patients. A past history of diarrhoea was found in 15 patients. The diarrhoea was banal in 10 patients and bloody saddles were seen in five patients; automedication comprising unprecise antibiotics was administered to 18 patients. The mean admission delay was 19.9 days with extremes ranging from 5 to 12 days. A proportion of 33.3% of patients had consulted between 7 and 14 days (Table 2).

The main reason for admission was fever ($n=29$), diffuse abdominal pain ($n=25$), right hypochondrial pain ($n=18$) and the presence of an abdominal mass ($n=10$).

Physical signs found were fever ($n=29$) (96.7%), hepatomegaly ($n=25$) (83.3%), abdominal distension ($n=18$) (60%), a general state alteration ($n=6$) (20%), respiratory signs ($n=7$) (23.3%) and teguments and

Table 1 Epidemiologic characteristics of our patients

Characteristics	<i>n</i> (%)
Age bracket (years)	
0–5	17 (56.66)
5–10	10 (33.33)
10–15	3 (10)
Sex	
Female	12 (40)
Male	18 (60)
Year of hospitalization	
2007	2 (06.66)
2008	4 (13.33)
2009	3 (10)
2010	3 (10)
2011	3 (10)
2012	3 (10)
2013	2 (06.66)
2014	3 (10)
2015	3 (10)
2016	4 (13.33)
Geographic origin	
Urban periphery	10 (33.33)
Urban	15 (50)
Rural	5 (16.66)
Fields/comorbidity	
Anaemia	28 (93.33)
Malnutrition	12 (40)
Recent abdominal trauma	2 (6.66)

Table 2 Patients' location relating to admission time limit

Admission time limit (days)	N= 30 [n (%)]
1–7	3 (10)
7–14	10 (33.3)
14–21	6 (20)
21–28	3 (10)
28–35	8 (26,7)
Total	30 (100)

conjunctival pallor ($n=20$) (66.7%). Fontan's triad elements (fever, right hypochondrium pain and hepatomegaly) were present in 25 (83.3%) patients.

Paraclinical data

On hemogram test in 28 patients, hyperleukocytosis was seen in 26 patients and hypochromic microcytic anaemia in all patients and thrombocytopaenia was seen in seven patients. On evaluation of C-reactive protein in 28 patients, it was found to be positive in 25 (89.3%) patients with a mean of 127 mg/l (extremes range: 5–235 mg/l). HIV serology was negative in all patients. Amoebic serology was positive in nine of 28 (32.1%) patients. Hepatic US was performed in all patients (Table 3). US-guided evacuating puncture ($n=5$) and US-guided drainage ($n=17$) revealed yellowish liquid in 18 (69.2%) patients and chocolate-like liquid in eight (30.8%) patients. On pus bacteriologic examination of 26 patients, *Staphylococcus aureus* was isolated four times and *Escherichia coli* was isolated once. The other cultures were negative ($n=21$).

Therapeutic data

Treatment was medicosurgical. Medical treatment was systematic in all patients. It consisted of triple antibiotic therapy comprising ceftriaxone, metronidazole and gentamicin in five patients. A biantibiotic therapy comprising ceftriaxone and metronidazole was carried out in 17 patients and biantibiotic therapy comprising amoxicillin clavulanic acid and metronidazole was carried out in eight patients. Exclusive medical treatment was carried out in four patients. It was associated to an US-guided evacuating puncture in five patients and an US-guided drainage puncture in 17 patients with a mean delay of 4 days (extremes range: 3–7 days). In the four other patients, a surgical drainage of the liver abscess was performed in two cases and was decided from the beginning, and, in the two other cases, drainage was carried out after a secondary abscess rupture. The mean delay in intravenous antibiotic therapy was 10.9 days (range: 5–16 days), with an oral relay in all patients. The mean delay in the oral relay was 28 days (range: 16–60 days).

Evolution

Evolution was satisfactory in all cases (Table 4). Observed complications were parietal suppuration in a patient in need of local care with daily dressing with Dakin and a secondary abscess rupture in the peritoneal cavity in two patients in need of laparotomy for surgical drainage. The mean hospitalization delay was 15.5 days,

Table 3 Ultrasound characteristics of the hepatic abscess

Characteristics	n (%)
Abscess number	
Unique	23 (76.7)
Multiple	7 (23.3)
Affected lobe	
Right	20 (66.7)
Left	4 (13.3)
2 lobes	6 (20)
Affected segment	
Segment II	2 (6.7)
Segment III	5 (16.7)
Segment IV	9 (30)
Segment V	2 (6.7)
Segment VI	5 (16.7)
Segment VII	8 (26.7)
Segment VIII	18 (60)
Diameter of the abscess	
5–9 cm	4 (13.3)
10–14 cm	20 (66.7)
≥ 15 cm	6 (20)

Table 4 Clinical and paraclinical development

Development	5 days of treatment	15 days of treatment	1 month of treatment	3 months of treatment
Clinical				
No pain	25	30	30	30
No fever	28	30	30	30
Biology				
Normocytosis	18	28	30	30
Normal CRP	16	25	30	30
Hepatic ultrasound				
≤ 5 cm	26	30	30	30
≤ 3 cm	18	25	30	30
Drying up of the abscess	10	21	28	30

CRP, c-reactive protein.

ranging from 4 to 30 days. No death was recorded and no recurrence occurred with a mean follow-up of 4.5 years (range: 6 months to 6 years).

Discussion

Amoebiasis is a disease transmitted through orofecal means and is endemic in tropical countries [8]. Hepatic localization is not rare in tropical environment [9,10] as well as its occurrence in children [5]. Indeed, one of the most important African paediatric series has been reported in Senegal with a prevalence of 100 cases per 100 000 admissions [4]. Our study revealed a prevalence of four cases per 1000 admissions. In developed countries, liver abscess is rare and occurs generally on conditions likely to produce debility such as septic chronic granulomatosis or leukaemia [11]. The age at occurrence in those countries are generally late with a mean of around 10 years [12,13]. In tropical countries, liver abscess is related to a lack of hygiene [4,7]. It is therefore a faecal peril disease. This explains why all our patients were HIV AIDS immunocompetent. The retrospective nature of our study was its weakness. We could not look for chronic septic granulomatosis, acute leukaemia, congenital immunity deficit and Papillon-Lefèvre syndrome cases, which, however, remains the principal fostering factors of liver abscesses in developed countries [11]. In tropical environment, the

latest mean age at occurrence was 8 years in Brazil [2], and the youngest in Burkina Faso was 5.7 years [14]. In our series the mean age was 5.4 years, with a high frequency during the first 5 years of life (17 cases). The precociousness occurrence of the ailment in the young child in our context could be attributed to an early contact with the pathogenic agent in a precarious hygienic environment. The male predominance observed in our study was also observed in the literature [2,4,8,13]. According to some authors [8,15], children from poor and rural localities were the most affected. However, according to Baa *et al.* [4], this was not the case; the majority of their patients were from urban and suburb areas. In our series only five patients were from rural areas. In our study anaemia and malnutrition were observed, respectively, in 28 and 12 children. These two factors were reported by other authors [16,17]. In South Africa [12] and India [18], protein-caloric malnutrition was observed, respectively, in 56 and 27.8% of the children having liver abscess. In our study, a recent abdominal trauma was recorded in two children. According to Sharma and Kumar [16], abdominal trauma is a risk factor for occurrence of liver abscess either by direct lesion or by favouring a microorganism proliferation in the abdomen. Even though there exists a correlation between liver abscess and intestinal parasitosis [13,14], it has not been proven in our study because of the retrospective nature of our study.

Noncomplicated clinical presentation of liver abscess is generally associated with fever, abdominal pain and abdominal mass [4,18]. This presentation is more acute in case of septicaemia or ruptured abscess [16]. Fontan's triad, which is characteristic of liver abscess, was found in 25 children of our series. Some authors underlined the high diagnostic orientation value of this triad [6,15] hence the necessity for clinician to carry out his research with a careful physical examination.

The accuracy of abdominal scan has not been determined in our series. According to Baa *et al.* [4], the scan keeps its importance especially in the presupposed phase when US comes out to be normal. Abdominal US is an examination that is easy to use, very sensible and nonirradiating. It was therefore carried out systematically in all patients and confirmed the diagnosis. It is an examination that specifies the localization, number and size of the abscess that make it possible to carry out percutaneous punctures and to follow the evolution of the treatment [18,19]. It has permit in our series to note the single aspect of lesions in the majority of cases (23 patients), an often large size with a mean diameter of 11.8 cm found preferentially in the right lobe of the liver (20 cases). These data are in accordance with those described in the literature [18,19].

The identification of the germ responsible for the abscess is an essential step for a better therapeutic care. Germ isolation can be carried out from the pus or by repeated hemocultures when febrile peaks occur [1]. Amoebic aetiology is more frequent in adults in contrary to children in whom pyogenic germs are most incriminated [11,20]. Amoebic serology is very sensitive (>94%) and specific (>95%) for the immunologic diagnosis of

visceral amoebiasis [2,8]. A negative amoebic serology was in favour of a pyogenic origin [8,11]. In our study, amoebic serology was evaluated in 28 patients and was positive in nine cases, thus confirming the amoebic origin of the liver abscess in these children and pyogenic aetiology in the other children. This bacterial predominance has been reported in the literature [2,4,8,13,21]. Hepatic amoebiasis, first extraintestinal localization of invasive amoebic infection [16], is always secondary to an intestinal amoebiasis, even unnoticed. The existence of bloody saddles is not specific to it. In our study, only four children had past history of bloody saddles. Other biologic anomalies that were observed in our series were hyperleucocytosis in 26 patients, elevation of C-reactive protein in 28 patients and microcytic hypochromic anaemia in all children. This has also been described in the literature [1,11].

Hepatic abscess treatment still raises much controversy as to the desirability of antibiotic therapy alone as well as the choice of antibiotics or the place of drainage or percutaneous evacuating puncture in relation to surgery [16]. The management of our patients was essentially based on antibiotic therapy and the evacuating puncture or US-guided percutaneous drainage. Evacuating puncture or percutaneous drainage allowed to appreciate the macroscopic aspect of the pus and carry out the cyto-bacteriological examination. The yellowish colour of the pus was the most frequent. The chocolate aspect of the pus would be in favour of an amoebic aetiology [5,7]. In our series *S. aureus* was isolated from pus culture of four patients and *E. coli* in one patient. The negativity of the amoebic serology and the result of the cyto-bacteriological examination brought us to withhold the pyogenic origin of the abscess in 21 other patients. In Guittet *et al.* [8], pus culture from five patients allowed us to isolate *S. aureus* two times and *E. coli* once. According to the literature *S. aureus* is the most common cause of liver abscess in children in both industrialized and developing countries [4,8].

Medical treatment was systematic and immediate each time the diagnosis of liver abscess was evoked. It consists in the association of metronidazole with ceftriaxone and gentamicin in five patients or of metronidazole with ceftriaxone in 17 patients or metronidazole and amoxicillin clavulanic acid in eight patients. The mean delay of intravenous antibiotic therapy was 10.9 days (5–16 days) with an oral relay in all patients. Medical treatment was exclusive in four patients. It was associated to an US-guided evacuating puncture in five patients and to an US-guided draining puncture in 17 patients. In the four other patients, a surgical drainage of the abscess was carried out. With this therapeutic protocol, the evolution was favourable. Similar results were reported in Senegal and New Caledonia [4,8]. However, a mortality rate of 5.5–11% has been reported in the literature [18]. The mortality rate was nul in our series. Surgery is not a treatment of first intention for liver abscess; its indication is limited to ruptured abscess with generalize peritonitis. This was the case of two patients in our series. In case of ruptured abscess in the

peritoneal cavity, coelioscopy with washing could be a good indication. Until complete resolution of the abscess, in all cases, an US surveillance is necessary.

Conclusion

Liver abscess is a frequent ailment in our environment. Positive diagnosis is easy and bacterial origin are predominant. It is a medicosurgical emergency. A multidisciplinary care allows to have good results. It is an orofecal transmission disease related to a lack of hygiene, prevention necessarily passes through the cleaning of our environment.

Conflicts of interest

There are no conflicts of interest.

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