

Child Liver Abscess: Study of 12 Cases in the Pediatric Ward of the District Hospital of Bamako

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Abstract

Hepatic abscess is a suppurative collection developed in a neoformed hepatic cavity as a result of the invasion and multiplication of micro-organisms. The prognosis depends on early diagnosis and rapid treatment. The aim of the study was to determine the clinical, biological, ultrasound and therapeutic characteristics of liver abscesses in children aged between 1 month and 15 years hospitalised in the Paediatrics Ward of the District Hospital in Commune V, Bamako. This was a retrospective descriptive study which took place from January 2017 to December 2020, i.e. a period of 4 years, and a prospective study from January 2019 to December 2020, including all children aged between 1 and 15 years in whom the diagnosis of liver abscess had been confirmed by liver ultrasound. Out of 2756 children hospitalised during the study period from January 2017 to December 2020, i.e. a période of 4 years, 12 patients were diagnosed with liver abscess, i.e. a frequency of 0.43% or 4 cases/1000 admissions, with a female predominance of 58.3%, i.e. a sex ratio of 0.7. The mean age was 57 ± 34 months, with extremes of 16 and 120 months. The main reason for consultation was abdominal pain associated with fever, accounting for 75% of patients. Pus culture was positive for *Staphylococcus Aureus* in one patient (8%). Amebic serology was positive in 33% of patients. Ultrasound revealed a predominance of single abscesses located in the right lobe of the liver in 42% of patients. However, 92% of patients were cured, with an average hospital stay of 12 days, ranging from 2 to 19 days. Liver abscesses uncommon in our context, an early diagnosis and management can improve the prognosis.

Keywords: Children, Abscisse, Liver, Paediatrics, Prognosis.

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INTRODUCTION

Hepatic abscess is a suppurative collection developed in a neoformed hepatic cavity as a result of invasion and multiplication of microorganisms [1]. It is a rare condition in paediatrics, in developed countries, except in specific contexts such as haematogenous spread during septicaemia or immune deficiency. In developing countries [1], it is a serious infection that can lead to life-threatening complications [2]. The diagnosis is made clinically, radiologically (cocoon image) and microbiologically [3]. The clinical diagnosis is based on the FONTAN triad (fever, hepatomegaly and

hepatalgia), supported by ultrasound and confirmed by percutaneous puncture, which enables the causative germ to be isolated by cyto-bacteriological study of the pus. Liver abscesses can be caused by various types of infectious agent, which can be classified as bacterial, parasitic (mainly amoebic) or fungal [4]. Parasitic liver abscesses are mainly seen in invasive amebiasis. The treatment is multidisciplinary, involving antibiotic therapy, often radiological drainage and rarely surgery [5]. The prognosis depends on the patient's condition and how early the diagnosis and treatment are carried out. Given the rarity and seriousness of liver abscesses in

children, and the lack of data on this pathology in our department, the present study was initiated.

PATIENTS AND METHODS

Type of study

This was a retrospective study from January 2017 to December 2018 (2 years) and a prospective study from January 2019 to December 2020 (2 years). Our study was carried out in the paediatrics department of the Commune V district hospital in Bamako. We included all children aged between 1 and 15 years in whom the diagnosis of liver abscess had been confirmed by liver ultrasound. Children hospitalised in the department who did not have a confirmed liver abscess or a usable medical record were not included. We drew up an individual data collection form with a unique registration number and respecting general, clinical, paraclinical, therapeutic and evolutionary data. These data were collected from the records of children admitted to hospital with a discharge diagnosis of "liver abscess". The records of children aged between 1 and 15 years hospitalised between 1 January 2017 and 31 December 2020 for a liver abscess confirmed by ultrasound were analysed. All patients included underwent abdominal ultrasound, blood count, CRP, cytobacteriological and chemical study of the pus and amoebic serology. Blood culture and parasitological examination of the stools could not be carried out because of the anarchic antibiotic therapy and systematic deworming that these children had received prior to admission.

Our data were entered into Microsoft Word 2010 and then analysed using SPSS version 21 software.

For the prospective phase, the enlightened consent was obtained from the parents after presentation of the context and objectives of the study, and the information collected in the files remained confidential.

For the retrospective phase, agreement was obtained from the centre's ethics committee.

RESULTS

Epidemiological data

We conducted a retrospective descriptive study of 2756 children admitted to hospital, 12 of whom had liver abscesses, i.e. a frequency of 0.43% or 4 cases/1000 admissions. Female patients represented 58.3% (7 girls versus 5 boys) with a sex ratio of 0.7. The average age was 57 ± 34 months, with extremes of 16 and 120 months. The age range 1 to 59 months represented 42% and 59 months to 15 years 58%. Most of the patients (75%) came from other communes in the District of Bamako. The majority of mothers (83%) and fathers (42%) did not attend school. Housewives accounted for 75% and 33% of fathers were farmers and traders.

Clinical Data

The main reason for consultation was abdominal pain associated with fever (75% of patients),

followed by abdominal distension and diarrhoea in equal proportions (8%).

Physical signs were dominated by painful hepatomegaly in 58% of cases, followed by abdominal distension in 42%. Nutritional status was considered poor in 9/12 patients (75%) (weight/height ratio ≤ -3 zscore in 1/12, and weight/height ratio between -2 and -3 zscore in 8/12 patients).

Table I: Breakdown of children by age group

Age range (months)	Number	Frequency (%)
1-24	1	8.3
24 -59	4	33.3
>59	7	58.3
Total	12	100.0

Table II: Breakdown of children by reason for consultation

Consultation reason	Number	Frequency (%)
Abdominal pain + fever	9	75.0
Fever	1	8.3
Abdominal distension	1	8.3
Diarrhoea	1	8.3
Overall	12	100.0

Table III: Distribution of children according to abdominal examination results

Results	Number	Frequency (%)
Hepatomegaly+ hepatalgia	5	41.6
Hepatalgia + distension	4	33.3
Abdominal distension	2	16.7
Abdominal defence	1	8.3
Total	12	100.0

Paraclinical data

Biological tests

Hyperleukocytosis with granulocytic predominance was found in 91% of patients, amoebic serology was carried out in all patients and came back positive in 33% of cases. CRP was greater than or equal to 20mg in 25% of cases. Cytobacteriological examination of the pus in all patients revealed a germ in only one of the samples: *Staphylococcus Aureus* (8%).

Table IV: Distribution of children by ECBC result

Pus ECBC	Number	Frequency (%)
Germ not detected	11	91.7
Detected Germ	1	8.3
Total	12	100.0

Table V: Distribution of children according to amoebic serology results

Amoebic serology	Number	Frequency (%)
Negative	8	66.7
Positive	4	33.3
Total	12	100.0

X-ray examinations

Abdominal ultrasound is the key first-line examination in the diagnosis of liver abscess. The location of the abscess was unique in the right lobe in 42% of patients and in the left lobe in 17%. It was multiple in the right lobe in 2 cases and in the left lobe in 2 other cases. The vast majority of our patients (75%) had only one segment of the liver affected, but 3 patients (25%) had two segments. One third of the children had an abscess measuring between 100-150 mm, i.e. 33.3% (4/12 of the children). The macroscopic appearance of the pus after ultrasound-guided puncture was frank pus in 67% of cases and chocolate-coloured pus in 33%.

Table VI: Distribution of children according to the number and location of abscesses

Abscess location	Number	Frequency (%)
Single right lobe	5	41.6
Single left lobe	2	16.6
Multiple right lobe	2	16.6
Multiple left lobe	2	16.6
Caudate lobe	1	8.3
Total	12	100.0

Table VII: Distribution of children by size of abscess

Size of abscess (mm)	Number	Frequency (%)
< 50	1	8.3
50-100	3	25.0
100-150	4	33.3
150-200	3	25.0
>200	1	8.3
Total	12	100.0

Traitement

The treatment consisted of a triple course of probabilistic antibiotics combined with ultrasound-guided evacuation of all the children. The vast majority of patients (83%) received a combination of ceftriaxone, gentamycin and metronidazole, administered intravenously for an average of 10 to 15 days and orally for the remainder of the treatment, which lasted 3 to 6 weeks. The combination of metronidazole, ciprofloxacin and vancomycin was used in 1 patient, and ceftriaxone, metronidazole and ciprofloxacin in 1 patient.

Table VIII: Distribution of children according to antibiotics used

Antibiotics	Number	Frequency (%)
Ceftriaxone-gentamycin-metronidazole.	10	83.3
Metronidazole-ciprofloxacin-vancomycin	1	8.3
Ceftriaxone-Metronidazole-ciprofloxacin.	1	8.3
Total	12	100.0

Outcome

In this study, recovery was achieved in 11/12 patients (92%) with an average hospital stay of 12 days, with extremes of 2 and 19 days. There was only one referral at the request of the parents, and no deaths were recorded. Ultrasound examinations were carried out weekly, and the majority of children had resolved their pus by the time they were discharged. All children were monitored clinically and ultrasonographically until complete recovery.

COMMENT AND DISCUSSION

In this study, the frequency of liver abscesses was 0.43%, i.e. 4 cases/1000 admissions.

This frequency is lower than those found in Senegal 100 cases/100,000 admissions [2], Burkina Faso 0.08% [6], South Africa 25 cases/100,000 [7] and Argentina 35/100,000 [8], and similar to that found in Côte D'Ivoire by Amenankan S *et al.*, i.e. 4 cases per 1,000 admissions [9]. Notre prévalence s'explique par une exposition précoce des enfants aux microbes et aux mauvais états nutritionnels des enfants.

Our prevalence can be explained by children's early exposure to microbes and their poor nutritional status. In our series, 58.3% of patients were female (7 girls versus 5 boys), with a sex ratio of 0.7. A similar study carried out in India found a female predominance (19 girls versus 15 boys) [6]. In contrast, male predominance was found in several studies, notably in Senegal, Burkina Faso, New Caledonia, Argentina and Côte d'Ivoire [2, 6, 10, 8, 9], and by Sacko K *et al.*, [11].

The majority of children were over 59 months of age (7/12 patients, i.e. 58%), i.e. an estimated mean age of 57 ± 34 months, with extremes of 16 and 120 months. This result is similar to those found by Sacko K *et al.*, who reported a mean age of 5.68 years [11], which is due to the early exposure of children to germs. Similar results have been reported by other studies in Argentina, New Caledonia, Senegal, Burkina Faso and Côte d'Ivoire, with an average age of 5, 6, 7.2, 8 and 5.4 years respectively [8, 10, 2, 6, 9].

The main reason for consultation was abdominal pain associated with fever in 9/12 patients (75%). This result is similar to those found by Sacko K *et al.*, who found that abdominal pain and fever dominated the reasons for consultation, with 54.80% and 12.90% respectively [11]. These same signs were found in several studies, notably in Burkina Faso, Argentina and New Caledonia [6, 8, 10]. In a study carried out in Senegal, the main reason for consultation was fever, followed by abdominal pain in the right hypochondrium. This result may be explained by the symptoms of abscess reported by other authors.

On physical examination, painful hepatomegaly was found in 5/12 patients (42%), which

together with fever constitutes the symptomatic triad of liver abscesses [5]. Malnutrition was associated in 75% of cases (9/12 patients) and remains the main factor identified by other authors [6, 12]. This result may be explained by the fact that malnutrition itself leads to organ failure associated with an immune deficiency which favours susceptibility to infections localised in the liver [13].

Amebic serology was positive in 4/12 patients (33%). The cytobacteriological study of the pus was positive in only one case, and allowed the isolation of *Staphylococcus aureus*. In our series, liver abscesses were of amoebic origin in 4/12 children (33%) and of bacterial origin in 8/12 children (67%). This result is in line with the literature, where pyogens dominate the aetiology of liver abscesses in children [2, 10]. In the literature, *Staphylococcus aureus* is the most frequent cause of liver abscesses in children [14, 15]. The rest of the work-up revealed hyperleukocytosis in 91%, and a positive CRP (greater than 20) in 25%. These same biological signs were found in several studies, including a Taiwanese study in 2013 (leukocytosis 53%, elevated C-reactive protein) [16] and the study by Sacko *et al.*, [11]. Ultrasound is the key first-line examination in the diagnosis of liver abscess, given its sensitivity, low cost, accessibility and non-invasiveness. It was carried out systematically in all our patients and enabled the diagnosis to be made by specifying the number, size and topography of the lesion. It showed a predominance of single abscesses localised in the right lobe in 5/12 patients (42%), single in the left lobe in 2/12 patients (17%). The abscess was multiple in the right and left lobes in 4/12 of the children (33% each). It was located in the caudate lobe in only one child (8% of cases). Nearly a quarter of children (25%) had two affected segments. This remains the most common location in many studies [8, 11]. The greater volume of the right lobe, the relative importance of its vascularisation and the imperfect mixing in the portal vein of flows from the superior mesenteric vein and the splenic vein, with one flowing electively to the right lobe and the other to the left lobe, are thought to explain this preferential localisation [17, 18]. Treatment was based on triple antibiotic therapy combined with ultrasound-guided evacuation puncture in all children. The antibiotic combination most commonly used was ceftriaxone-gentamycin-metronidazole in 10/12 of the children (83%), administered intravenously for an average of 10 to 15 days depending on the work-up and clinical course, followed by oral therapy for the remainder of the treatment. In the literature, the germs most often implicated are enterobacteria and anaerobes. In the study by Sacko K *et al.*, the antibiotics most commonly used were ceftriaxone, metronidazole and amoxicillin [11]; this could be explained by the desire to cover the germs generally responsible for liver abscesses and by their broad spectrum of action. In our study, 11/12 children (92%) were cured, with an average hospital stay of 12 days, ranging from 2 to 19 days. This result is similar to

that of Sacko K *et al.*, who found an average duration of 14.55 days, with extremes of 5 to 35 days.

The sooner the diagnosis is made and appropriate treatment instituted, the more favourable the outcome.

CONCLUSION

Despite its low frequency, hepatic abscess remains a topical condition in paediatric hospitals. In our context, the main associated risk factor is malnutrition. Its prevention requires improved living conditions and access to primary healthcare.

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