



Research Article

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Profile of Children Living with HIV Followed up from 2005 to 2016 in the Prevention of Mother-to-Child Transmission (Pmtct) HIV Unit at the University Teaching Hospital (UTH) of Bouake (Côte D'Ivoire)

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Abstract

Introduction

Since 2005, the PMTCT HIV unit at the University Teaching Hospital of Bouaké (Côte d'Ivoire) is catering for the children living with HIV infection.

Objective

To describe the epidemiological, diagnostic, therapeutic characteristics and the progression of children living with HIV at the University Teaching Hospital of Bouaké for the improvement of their prognosis.

Patients and methods

This is a retrospective, descriptive and analytical study conducted from January 2005 to December 2016 in the pediatric department of the University Teaching Hospital of Bouaké. It was conducted on all HIV-positive children who were cared for according to the recommendations of the Ivorian National AIDS Control Program (Côte d'Ivoire).

Results

A total of 418 patients were registered amongst which 220 were boys and 198 girls. The mean age at screening was 8.4 years [2 months-15 years]. Transmission was vertical (100%) and HIV1 was incriminated in 92.8%. The child was at stage C of CDC classification in 46% of the cases. The main opportunistic infections were candidiasis (38.5%) and tuberculosis (17.4%). The ARV treatment (ART) was initiated in 97% of cases and was in 92.2% of first-line treatment. The progression was marked by the stabilization of the virus with 61.7% cases a negative viral load and a positive viral load in 38.3%, lost to follow-up (22%) and death (17.7%). Factors associated with death were death of both parents ($p < 0.001$), opportunistic infections ($p < 0.05$), and advanced clinical stage ($p < 0.01$) at admission.

Conclusion

Mortality and the rate of loss to follow up remain high at the University Teaching Hospital of Bouaké. We suggest the strengthening of the PMTCT program through targeted screening, early case management, and active search for the lost to follow-up

Keywords: Child, HIV, Epidemiology, Diagnosis, Prognosis, Côte d'Ivoire.

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Introduction

Globally, between 2000 and 2017 the number of new HIV infections has fallen by 36% and that of AIDS-related deaths by 38% with some 11.4 million lives saved thanks to the introduction of the antiretroviral therapy [1]. Despite this improvement, HIV infection remains a real public health problem in the world, particularly in sub-Saharan Africa. According to World Health Organization (WHO), of the 36.9 million people living with HIV in 2017 worldwide, including 1.8 million children, 70% came from sub-Saharan Africa. This part of the world recorded during this the same year nearly two-thirds of new infections [1]. In Côte d'Ivoire, HIV prevalence decreased from 12% in 2012 to 2.7% in 2015 in the general population. In the pediatric population, 38,000 children were living with HIV and 29,000 children orphaned or vulnerable due to HIV in 2017. Only 4,000 children are being treated for HIV/AIDS and 2,000 are receiving antiretroviral (ARV) treatment [2,3]. To improve this situation, the Ivorian government has adopted new guidelines in line with the recommendations of the WHO to end HIV/AIDS infection by

2030 [4]. These include the delegation of tasks to nurses and midwives, the introduction of a new content of care and support based on the “Test and Treat” approach, and the increase of sites of prevention of mother-to-child transmission (PMTCT) and management [5,6]. The unit of HIV management and PMTCT of the pediatric department at the University Teaching Hospital of Bouaké since 2005 support children living with HIV/AIDS. How has the PMTCT activity of HIV been conducted? It seemed appropriate to us, eleven years after the initiation of the PMTCT activities in the service to provide a feedback. The objective of the study is to describe the epidemiological, diagnostic, therapeutic characteristics and the progression of children living with HIV at the University Teaching Hospital of Bouaké for the improvement of their prognosis.

Patients and methods

Patients

This is a retrospective, descriptive and analytical study conducted from January 2005 to December 2016 in the pediatric department of the University Teaching Hospital of Bouaké. It enrolled all children aged 0 to 15 years who were followed up at the HIV care unit of the pediatric services. This unit carries out screening, PMTCT and care activities for children living with HIV (CLHIV). The medical and paramedical team during the study period consisted of four physicians, one assistant nurse and two community counselors. Included in the study were all children infected with HIV either on ARV treatment (ART) or not. All children whose medical records were incomplete were not included in the study.

Methods

After counseling, the diagnosis of HIV infection is confirmed in any child with a positive HIV serology after 18 months of age, a positive Polymerase Chain Reaction (PCR) result before the age of 18 months, or born to an HIV positive mother and showing clinical signs of infection according to the WHO classification. Once admitted to the care, a detailed interrogation is carried out specifying the socio-demographic characteristics of the child (age, sex, home, educational level, pathological backgrounds), of the parents (age, level of education, occupation, vital status pathological backgrounds) and/or guardian (age, educational level, occupation, pathological backgrounds). A complete physical examination is conducted to specify the symptomatology and the nutritional status. The assessment of nutritional status was based on weight, height and age. When the Z-score P/T < -2 SD in children under 5 years of age or BMI < -2 SD in children over 5 years of age, this is an acute malnutrition or emaciation. It was a chronic malnutrition or stunting when the Z-score T/A < -2 SD. The diagnosis of opportunistic infections (OIs) was essentially based on clinical and/or paraclinical arguments.

The diagnosis of the pulmonary infections was mainly based on the clinical signs, the radiography and the positive evolution under specific treatment. The existence of tuberculosis contact, a positive intra-dermal tuberculin reaction, and the detection of Koch bacillus (BK) in sputum or gastric aspirate/lavage have helped in the diagnosis of pulmonary or extra-pulmonary tuberculosis. The diagnosis of candidiasis, encephalitis, shingles, recurrent diarrhea and parotitis were made on clinical grounds. The treatment and follow-up of the CLHIV were carried out according to the recommendations of the Ivorian National AIDS Control Program. All the informations were recorded in the respective patient medical file. The data for this study was individual collected on an anonymous survey form. The variables studied were

epidemiological (age, sex, vital status of the parents, antiretroviral prophylaxis for the prevention of the mother-to-child transmission (PMTCT) of HIV and mode of transmission), diagnosis (reasons for admission, nutritional status, diagnostic method used, type of virus, clinical stages, OIs diagnosed during follow-up, T lymphocytes (CD4), therapeutic (Cotrimoxazole prophylaxis (CTM), ARV Treatment); progression or outcome of the children (attendance to the follow-up visits, deaths, lost to follow-up, transfer to another site for follow-up). The evaluation of the clinical and immunological stages was based on the CDC classification [7]. Anonymity and confidentiality were respected by assigning a screening number to each survey sheet. The data was captured and analyzed using Epi Info 7 and Excel 2013 software. The analysis was descriptive and consisted of calculating the frequencies, the averages and the proportions. The Chi-square test was used for the comparison of qualitative variables. The threshold of significance was 5%.

Results

Epidemiological characteristics

A total of 418 patients were enrolled during the study period. There were 220 boys and 198 girls. The child was less than 5 years old in 75.6% of cases with a mean age at screening of 8.4 years [2 months-15 years]. The child was orphaned by at least one parent in 27.3% and at the care of a single parent in 36.2% and a guardian in 22.4%. The mother was housewife in 71.3% (Table I). Transmission was vertical (100%) and HIV1 involved in 92.8% (Table IV).

Diagnostic aspects

The reasons for the child's admission to care are described in Table II. According to the CDC classification, 46% were at a clinical stage C. The HIV-positive child had a normal nutritional status in 56.1% of cases. The prevalence of malnutrition was 43.9%, of which 28.3% were chronic malnutrition and 15.6% acute ones. During follow-up, 184 children (44%) had OIs. The main OIs diagnosed were candidiasis (38.5%), pulmonary tuberculosis (17.4%) and recurrent pneumonia (15.8%) (Table III). CD4 T cell count done in 280 children out of 418 on admission showed no immunodeficiency in 11.8%, moderate immunodeficiency in 31.8% and severe immunodeficiency in 56.3% of cases. Of the 274 children who did the viral load test, 12.3% (35/274) had a very high viral load (> 100,000 copies/μl). The distribution of the children according to their clinical stage and the viral load is specified in Table III

Therapeutic aspects and progression

With regard to the therapeutic characteristics, only 9.5% of children had received antiretroviral prophylaxis in PMTCT. 99% of children had received CTM prophylaxis. ART was initiated in 168 children (53%). The average age of children at the start of ART was 57.9 months. More than 78.6% had been on ART after the age of 18 months. The average duration of ART was 32.2 months. Therapeutic protocols included 2 Nucleoside Reverse Transcriptase Inhibitors (NRTIs) + 1 Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI) in 90.5% of cases, 3 NRTIs (5.9%) and 2 NRTI + 1 boosted Protease inhibitors (3.6%). The progression was marked by a regular monitoring in 42.1% of cases (175/418) with an undetectable viral load in 61.7% (108/175) & detectable in 38.3% (67/175), 22% lost to follow-up (92/418) and 18.2% of children were transferred to other care centers (76/418). Fatality was 17.7% (75/418). The factors associated with death were either the death of both parents ($p < 0.001$), the opportunistic infections ($p = 0.001$) and or the advanced clinical stage ($p < 0.0001$) at admission. (Table V).

Variables	Numbers	Percentage
Sex		
Male	220	52.6
Female	198	47.6
Age		
0-5 years	148	35.4
6-10 years	168	40.2
10-15 years	102	24.4
Vital status of parents		
Father and mother alive	178	42.6
Father or mother dead	140	33.5
Father and mother dead	100	23.9
Activity of the mother		
Household	260	62.2
Trader	132	31.6
Student	10	2.4
Worker	16	3.8

Table I: Epidemiological Characteristics (n = 418)

Grounds for Admission*	Numbers	Percentage
Fever	118	22.3
Systematic screening **	102	19.3
Cough and breathing difficulties	87	16.4
Prurigo	67	12.7
Lost of weight	54	10.2
Diarrhea	32	6
Oral and cutaneous candidiasis	21	4
Convulsions/coma	18	3.4
Generalized lymphadenopathies	12	2.2
Otitis	10	1.9
Parotitis	8	1.6

Table II: Grounds for Admission

* A child could have one or more signs at a time

** Child detected at the end of the PMTCT follow-up or during a positive HIV test of the mother or the brother

Opportunistic infections	Numbers	Percentage
Oral candidiasis	71	38.5
Pulmonary tuberculosis	32	17.4
Recurrent pneumonia	29	15.8
Persistent diarrhea	19	10.3
Shingles	19	10.3
Parotitis	8	4.3
Encephalitis	3	1.7
Extra-pulmonary tuberculosis	3	1.7

Table III: Distribution of cases of opportunistic infections at admission (n = 184)

Variables	Numbers	Percentage
Type of HIV (n = 418)		
HIV 1	388	92.8
HIV 2	30	7.2
Clinical stages (n = 418)		
Category A	80	19
Category B	146	35
Category C	192	46
immune stage (% CD4) (n = 280)		
Without immunodeficiency (> 25%)	33	11.8
Moderate immune deficiency (15-25%)	89	31.8
Severe immune deficiency (<15%)	158	56.4
Viral load (n = 274)		
<1000	43	15.8
1000-10 000	57	21
10 000-100 000	139	50.9
>100 000	35	12.3

Table IV: Type of HIV, Clinical Stage and Viral Load

Parameters	Evolutionary modality		Odd ratio	p-value
	Living	Deceased		
Sex				
Male	92	42	0.87 [0.5- 1.5]	0,61
Female	83	33		
Age				
≤5 years	53	27	0.77 [0.43-1.36]	0.37
>5 years	122	48		
Vital status of parents				
1 or 2 living parents	152	40	5.7 [3.07-10.86]	<0.0001
Deceased parents	23	35		
Opportunistic infections				
Yes	139	45	2.5 [1.42-4.64]	0.001
No	36	30		
Clinical stage				
Stage A	72	8	14.6 [7.44-28.7]	<0.0001
Stage B	85	20		
Stage C	18	47		

Table V: Factors associated with death (n = 255)

Discussion

The objective of this study was to describe the epidemiological, diagnostic, therapeutic characteristics and the progression of children living with HIV in the pediatric department of the University Teaching Hospital of Bouaké in Côte d'Ivoire. The study found that HIV affects both boys and girls at a sex ratio (M / F) of 1:1. The mean age at screening was 8.4 years [2 months-15 years]. The transmission was vertical (100%) and HIV1 was involved in 92.8% of cases. The affected child was at stage C of the CDC in 46% of the cases. The main opportunistic infections were candidiasis (21%) and tuberculosis (9.6%). When ARV treatment was initiated (97%), it was a first-line treatment in 92.2% and included 2 NRTI + 1 NNRTI in 90.5% of cases. The active files were 175 patients with 22% lost-to follow up rate and a fatality rate of 17.7%. However, these results need to be mitigated. Indeed it is a retrospective study with all that this entails as a selection bias. In addition, it is a monocentric study carried out in a hospital environment and those results cannot be representative of all the health centers in the Gbêkè region. Another difficulty is the lack of psychosocial support for the patients and their parents. Furthermore, due to the limitations of the technical platform required for certain conditions coupled with financial difficulties of the parents, the diagnosis of opportunistic infections has often been based on clinical and or para-clinical arguments. Despite these limitations, this study raises various points of discussion at the epidemiological, diagnostic, therapeutic and progression levels.

Epidemiological aspects

This study shows that HIV infection affects both boys and girls (sex ratio = 1.1). The link between sex and HIV varies from one study to another. Authors like Sagbo et al. in Benin in 2009 [8], Diack Mbaye et al. in Senegal in 2005 [9], Atakouma et al. In Togo in 2007 [10] reported a male predominance. While d'Almeida et al. in Benin in 2013 reported a female predominance [11]. These differences can be attributed to a methodological bias related to the monocentric and hospital nature of these studies. The majority of children are over 5 years old at admission (64.6%) with an average age of 8.4 years. In addition, the transmission is vertical in 100% of cases. These results reflect the inadequacies existing in services of mother-to-child transmission of HIV prevention (PMTCT) in resource-limited settings and the various missed opportunities for early HIV diagnosis and early postnatal care. Indeed, a high proportion of children infected with HIV does not enter the path of early HIV care and are diagnosed at an advanced age when the initiation of ARV treatment is too late [12]. Also, the absence of any prophylaxis, about 30 to 40% of mothers transmits the virus to their child [9]. Routine testing of women of childbearing age, expectant parents, and any pregnant woman with unknown serology should be encouraged and strengthened. HIV infection has a profound impact on the lives of children socially. The study reveals that 57.4% of children are orphans. This rate is high compared to those found in Benin (33.3%) in 2013 by Almeida et al. [11] and in Brazzaville in 2003 (39%) by M'pamba et al. [14]. These children are thus dependent on other members of their family (22.4%) with the risk of stigmatization and irregular follow-up hindering proper care.

Diagnostic aspects

In diagnostic terms, the study found that 46% of children admitted to clinical care belong to the stage C of the CDC classification. The child is infected with HIV1 in 92.8% and HIV2 in 7.2%. No case of HIV-2 & HIV-2 co-infection was identified. D'Almeida et al. in Benin [11] reported in their study that HIV1 was involved in 100% of cases. In Senegal, HIV 1 and HIV-2 were incriminated in 96% and 4% respectively [9]. In Togo, in addition to HIV1 and HIV2, the authors reported in 2.78% of cases HIV-1&2 co-infection [10]. Delayed diagnosis leads to delayed manage-

ment with the risk of malnutrition and opportunistic infections [11]. In this study, 43.9% of children were malnourished. This malnutrition was chronic in 28.3% and acute in 15.6%. In 2011, Jesson et al. reported that 42% of HIV-positive children were malnourished in West and Central Africa [15]. A higher frequency (60.2%) was reported by Mwadianvita et al. in 2014 in Congo [16]. These results confirm the close link between malnutrition and HIV/AIDS infection. Malnutrition is a factor of poor prognosis in children living with HIV. It aggravates the disease, increases the morbidity and decreases the chances of survival of the immune-compromised child. The study reveals that 44% of children followed during the period had an OI. The main OIs diagnosed were candidiasis (21%), pulmonary tuberculosis (9.6%) and recurrent pneumonia (8.5%). On a global scale, the distribution of these OIs remains varied. Diack Mbaye et al. reported as major OIs: cutaneous-phanian infection infections (64%), oropharyngeal candidiasis (38%) and infectious diarrhea (36%) [9]. In Algeria over a period from 1997 to 2007, Muffock et al. found chronic diarrhea (60.78%), pulmonary infections (41.17%) and tuberculosis (11.76%) [17]. Two (2) factors explain the occurrence of opportunistic diseases in an HIV-infected person: an immune system rendered deficient by the virus, and the presence of pathogens in the environment [18]. In this study, of the 280 children who were tested for a CD4 count, 56.4% (158/280) on admission had a severe immunodeficiency.

Therapeutic aspects and progression

Therapeutically, only 9.5% of children received antiretroviral prophylaxis as part of the PMTCT. This low rate could be explained by the difficulties in the serological follow-up of the children in PMTCT. It is especially the non-respect of the appointments by the mothers, the refusal of the parents, the fear of the stigmatization and the denial of the disease in the African socio-cultural context. Kouakou et al. in 2016, from the Obstetrics & Gynecology Department of the University Teaching Hospital of Bouaké, reported 63% success rate of PCR and a lost to follow-up at 12 months of 100% in the context of PMTCT [19]. The average age of children in the study at the start of ARV treatment was 57.9 months. More than 68.6% had been put on ART after the age of 18 months, which shows the delay in diagnosis and ART, contrary to the recommendations of WHO [20]. The progression of children living with HIV infection in the study reveals that 42.1% are alive (175/418) and are still being followed up; 22% are lost to follow-up (92/418); 18.2% were transferred to other services (76/418) and 17.7% died (75/418). These results are comparable to those of other African authors. Indeed, D'almeida et al. in Benin reported 54% of children alive, 23% of lost to follow-up, 5% of children transferred and 18% of dead [11]. Diack Mbaye et al. in Senegal reported 65.3% of the cases alive and 18% fatality [9]. Mouffok et al. in Algeria also reported a fatality rate of 29.41% and 31.37% lost to follow-up [17]. The large number of lost to follow-up (22%) and deaths (17.7%) is worrying. Difficulties to access care for economic reasons, the death of a parent, especially that of the mother, and the lack of information from the substitute family could explain the large number of deaths [9]. The death of a biological parent promotes the dislocation and family precariousness. This situation makes the child vulnerable and requires an ongoing psychosocial support; this is not always the case in resource-limited countries like ours. In our context, the strengthening of the early detection by PCR, the use of the "test and treat" strategy and the early access to ARV treatment for all children living with HIV are essential to reduce the morbidity and the mortality associated with HIV/AIDS at the University Teaching Hospital of Bouaké. In addition, it would be important to enroll the child living with HIV and his family in a care setting that meets the needs of prevention, treatment and especially psychosocial support [21].

Conclusion

This study reveals difficulties in the care of children living with HIV at CHU Bouaké. This is mainly the delay in diagnosis and initiation of antiretroviral treatment, the lack of psychosocial support, the large number of lost to follow-up and death. In order to improve the prognosis of these children, we recommend the strengthening of the PMTCT program, the effective application of the "Test and treat" strategy and the improvement of the retention rate.

Conflict of interest : none

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