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EARLY DIAGNOSIS BY PCR OF HIV1 IN CHILDREN BEFORE 18 MONTHS BORN TO HIV-POSITIVE MOTHERS IN BRAZZAVILLE

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ABSTRACT

Objective: **To contribute for improving the care of children before 18 months, born to HIV mothers by early diagnosis of HIV-1 by RT/PCR.**

Methods: **analytical cross-sectional study carried out at the Ambulatory Treatment Center (ATC) for people living with HIV and at the National Public Health Laboratory of Brazzaville, from January 1, 2010 to 30 June 2018. The study population was made up of pregnant women included in the Prevention of Mother-to-Child Transmission (PMTCT) program and who gave birth to one or more children during that period, their children having the results of the PCR1 available. The tests were statistically significant when the p-value was less than 0.05.**

Results: **Eighty-six children whose mothers were followed by PMTCT program were screened, of which 5 had a positive PCR and 81 negatives, either 5.8% of the residual transmission rate of HIV-1. The most common age group was between 38 and 47 years (70.9%). They were 58.8% unemployed with a 1st level secondary school level (53.2) and 57.8% single. The rate of CD4 was superior to 350 copies in 65.1%, and the viral load was undetectable in 66.3%. Deliveries were performed vaginally in 79.1% and newborn had received 57% of artificial breastfeeding. Among children, boys represented 59.3% with 40.7% girls, either 1,4 of ratio sex. The bivariate analysis between the results of the PCR and the child's weight had not shown any significant difference (p >0.05). The newborns were eutrophic so 97.5% of cases including the 5 positive cases of PCR. Among newborns, 69.5% had their PCR results within 60 days of delivery.**

INTRODUCTION

Mother to child infection with HIV is the most common form of infection to child. In fact, 90% of children infected with HIV worldwide have been contaminated in that way [1]. This is a major preoccupation in Sub-Saharan Africa so 85,62% of new cases are registered [2]. Congo, like other countries in Africa, is not away to that situation, the main treatment of which remains the Prevention of Mother-to-Child Transmission (PMTCT) program, which if well respected makes the viral load undetectable, and the residual risk of transmission less than 1% [3].

The program success of PMTCT requires early care of the pregnant woman and the newborn. The part of the care of the child with the ends proof of a possible contamination in despite well-managed care. The qualitative real-time PCR technique remains the most widely used in the early diagnosis of HIV-1 in children born to HIV-positive mothers [4].

This is a virologic diagnostic method proper so it directly detects HIV-1 in the serum of infected children, unlike serological tests which take into account maternal antibodies present up to the age of 18 months, and responsible for false positives [5].

This study is part of this approach, which aims to contribute to improving the care of pregnant women and their children enrolled in the PMTCT program.

METHODS

It was an analytical cross-sectional study, carried out at the Ambulatory Treatment Center (ATC) for people living with HIV and at the National Public Health Laboratory of Brazzaville, from January 1, 2010 to 30 June 2018. The study population consisted of pregnant women included in the PMTCT program. Those women had given birth to one or more children during this period / Their child had PCR results.

Feeding with a mother's milk substitute was the mode of feeding offered to these mothers. WHO reports that breastfeeding increases infant mortality on the one hand, but believes that breastfeeding increases the risk of mother-to-child transmission of HIV on the other. For this, it promotes protected breastfeeding with the B + option [6]. Regarding the protocol used, a therapy combining two nucleotide reverse transcriptase inhibitors (INTI) and a non-nucleotide reverse transcriptase inhibitors (NNTI). and those, regardless of viral load or CD4 count.

The following qualitative (nationality, profession, education level, marital status, therapeutic protocol, mode of delivery, the state of children, gender, PCR results, and mode of breastfeeding), and quantitative (mothers' age, rate of lymphocyte , CD4 during pregnancy, viral load during pregnancy, birth weight, delay in reporting children's PCR results) were studied. The database was created with Microsoft Excel software version 24. Means were used as the central trend variable. The Ki-square and Fisher test were used to compare the percentages and the t-study test to compare the means. The tests were statistically significant when the p-value was less than 0.05.

RESULTS

Eighty-six children whose mothers were followed in PMTCT program were screened, of which 5 had positive PCR and 81 negatives, either 5,8% residual transmission rate of HIV-1

In this series, the most common age group was between 38 and 47 years (62.8%), with an average age of 39.1 years ± 7.6 years and extremes of 18 and 47 years.

The distribution of infected mothers with

HIV according to socio-demographic characteristics is shown in table 1.

Table 1

Sociodemographic characteristics of mothers

	Effective	Percentage
Pupil/ student	11	12.9
Military	1	1.2
Small business	10	11.8
Small job	13	15.3
Unemployed	51	58.8
Educational level		
literate	3	3.9
Primary	9	10.4
Secondary I	46	53.2
Secondary II	25	28.6
Higher studies	3	3.9
Marital status		
Single	50	57.8
Divorced	6	7.2
Married	10	12
Free union	15	17
Widow	5	6

More than half of them were unemployed (58.8%) with a 1st level secondary education (53.2%), and most of them single. The serological status and the viral load are shown in table 2. The CD4 count was greater than 350 copies in 65.1%, and the viral load was undetectable in 66.3%. In those mothers, the average viral load of 325.000, on the other hand, a positive serology indicated the completion of a new PCR. The deliveries took place by the vaginal route in 79.1% of cases, the newborns had benefited from artificial breastfeeding in 57% of cases as shown in table 2.

Table 2

Distribution of mothers according to CD4 count, Viral load, delivery mode and breastfeeding methods

	Effective	Percentage
CD4 count		
≤ 350	30	34.9
> 350	56	65.1
Viral load		
Undetectable	57	66.3
Detectable	29	33.7
Delivery mode		
Vaginal	68	79.1
Caesarean	18	20.9
Breastfeeding methods		
Maternal	32	37.2
Artificial	49	57
Mixed	5	5.8

Among children, boys represented 59.3% against 40.7% girls, either 1.4 of sex ratio.

The multivariate analysis of the PCR results and the clinical characteristics had not shown any significant difference (table 3). The newborns were eutrophic in 97.5% of cases including the 5 cases of positive PCR. On the other hand, the positivity of the PCR in relation to CD4 account levels and the viral load of the mothers had shown a statistically significant difference reported in table 3.

Table 3

Association between the result of PCR 1 and the weight of the children at birth, the CD4 count, the viral load, and the therapeutic protocol of their mothers

	PCR 1		
	Negative	**Positive**	
	(N=81)	**(N=5)**	p
Mother's CD4 (µI cells)			**<0,05**
Mean ± SD	400.1 ± 282.4	362.4 ± 182.7	
Min – Max	97 - 1123	194 - 563	
Mother's CV (copies / ml)			<0.05
Mean ± SD	15674.4 ± 105374.1	325538 ± 5889.1	
Mini – Max	0 - 930000	200 - 1360090	
Child's weight (kg)			0.1
Mean ± SD	2.9 ± 0.5	2.7 ± 0.4	
Mini – Max	1.2 – 3.9	2.1 – 3.3	
Mother's Protocol n (%)			<0.05
AZT + 3tc +NVP	67 (82.7)	5 (100)	
FTC+TDF+NVP	14 (17.3)	0 (0.0)	

Most newborns had their PCR results within 60 days of delivery. This had been observed in children who received breastfeeding, as well as those born in a eutrophic state (table 4)

Table 4

Breastfeeding mode and clinical status of the newborn according to the delay of PCR results

	Delays of PCR results (days) Mean ± SD	p
Breastfeeding mode		<0.05
Maternal	**119 ± 21**	
Mixed	47 ± 10	
Artificial	67 ± 68	
Clinical State		<0.05
Eutrophic state	**89 ±15**	
Low birth weight	39 ± 0	

DISCUSSION

The study time allowed us to obtain a sample significant statistic. The different criteria for inclusion of the population had been established in order to avoid bias in the interpretation of the results.

The residual transmission rate of HIV was higher than those reported in Western literature which are less than 1% [3]. Our frequency is closed to that reported from Linguissi [5] in Burkina Faso which reports a rate of 6.28% among children born to mothers followed for HIV-1. This difference observed with the West, would be linked to the low coverage of counseling / testing services, PMTCT, and care, but also the low availability and accessibility of ARV [6]. The socio-professional profile was the same as those reported in the literature in sub-Saharan Africa, the environment being the same. In Burkina Faso, a country of west Africa, the age groups between 26 and 30 were the most represented [7].

The CD4 count in the literature would not have any influence on the transmission of HIV from mother to child [8, 9] as in our series. however, it appears from the analysis of our results that the children who haves a positive PCR result were born to mothers who had a downward trend in CD4 count (362.40 cells / μ1 + 182.72).

Then children with a negative PCR result (400 cells / μ1 + 282.43). This trend had no statistically negative difference. the persistence of the viral load is often the consequence of poor adherence of treatment or a probable resistance to the various proposed molecules [8].

Mothers with positive PCR results were on therapeutic protocol (AZT/3TC/NVP), and as well as that having had children with a negative PCR result.

RT / used as a diagnostic technique, is one of the most reliable and standardized tests for screening for HIV infection. it has been used by several authors in the context of early infant diagnosis [5, 8]. The mean time from birth to PCR diagnosis of HIV was longer in children with a positive result.

CONCLUSION

RT/PCR diagnosis allows to quickly know the virologic status of the child and early therapeutic management of the child, which improves care and reduces the mortality rate and infant mortality. Special emphasis should be placed on counseling pregnant women.

Efforts remain to be made by all stakeholders in the maternal and childcare of compulsory screening, this in order to reduce the duration of systematic treatment of children born to seropositive mothers. for this, the practice of RT/PCR should be popularized in all centers that practice PMTCT.

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