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Seroprevalence of HIV, HBV Infections and HIV / HBV Coinfection in Polytransfused Adult Sickle-Cell Disease: Case of Center of Mixed Medicine and SS Anemiaof Kinshasa

Idriss M. Mwanaut[1], Berry I. Bongenya[1,2], Divine Chuga[1,2], Jean-Yves D. Kabasele[1], Elvis T. Kateba1, Médard O. Okonda[1], Simplice K. Mukoka[1], Christian K. Tshibumbu[1], Ben I. Bulanda[1,2], Erick N. Kamangu[1,3*]

[1]*Research Group "Focus HIV/AIDS", Kinshasa-DRC*

[2]*Faculty of Medicine, Bel Campus Technological University (UTBC), Kinshasa-DRC*

[3]*Service of Molecular Biochemistry, Department of Basic Sciences, Faculty of Medicine, University of Kinshasa (UNIKIN), Kinshasa-DRC*

Corresponding Author:** ***Erick N. Kamangu, *Research Group "Focus HIV/AIDS", Kinshasa-DRC, Service of Molecular Biochemistry, Department of Basic Sciences, Faculty of Medicine, University of Kinshasa (UNIKIN), Kinshasa-DRC,* ***Email:*** *erick.kamangu@unikin.ac.cd*

Abstract

Introduction: *Sickle cell disease is a hereditary hemoglobin abnormality that is fairly prevalent in the world. It is very present in sub-Saharan Africa where it constitutes a real public health problem. It is mainly manifested by vaso-occlusive and/or haemolytic crises and often requires transfusion therapy.*

Objective: *To establish a prevalence of HIV, HBV, and HIV / HBV coinfection in polytransfused adult homozygous sickle cell patients followed at theCenter of Mixed Medicine and SS Anemia(CMMSSA)of Kinshasa, DRC.*

Methods: *A retrospective study was conducted at the CMMSSA between January 2006 and June 2017, to determine, in homozygous adult polytransfused sickle cell patients, the number of confirmed cases of HIV infection, at HBV, but also the number of cases where the HIV/HBV coinfection was noted.*

Results: *The sample consisted of 180 patients. The age ranged from 18 to 50 years with a median of 29 years. The most represented age group was 18 to 23 years of age (48.33%). The male sex was less represented (35.55%), the sex ratio was 0.6 (men/women). Patients diagnosed by electrophoresis of hemoglobin and who received a minimum of 2 blood transfusions during the study period were included. HIV seroprevalence was 8.33%; that of HBV was 2.77% and that of HIV/HBV coinfection was 2.22%.*

Conclusion: *The seroprevalence of HIV in the polytransfused adult sickle cell population of theCenter of Mixed Medicine and SS Anemia (CMMSSA) of Kinshasa is 8.33%; that of HBV is 2.77% and that of HIV/HBV co-infection is 2.22%, for the interval from 2006 to 2017.*

Keywords: *Coinfection, Sickle Cell Disease, Transfusion Safety, HIV, HBV, Blood Products, Kinshasa.*

1. Introduction

Sickle cell disease is an inherited disorder of hemoglobin transmitted by the autosomal recessive mode; it is due to a single point mutation of the β globin gene located on chromosome 11 at the 6thcodon of exon I (GAG → GTG), with the consequent replacement of glutamic acid present in hemoglobin A by a valine (hemoglobin S: Hb S) [1]. According to the World Health Organization (WHO), nearly 5% of the world's population carries this genetic anomaly [2]. In Africa, it is more prevalent south of the Sahara with prevalence's ranging between 10 and 40%; some authors speak of one birth in 65 [3-6]. It is mainly manifested by vaso-occlusive or haemolytic crises and requires a recurrent transfusion therapy. Control measures for Labile Blood Products (LBP) have become increasingly sophisticated in industrialized countries; however, this problem remains unresolved in developing countries where residual transmission of some infectious agents, including viruses transmitted by the bloodstream, is still observed [7].

In a study conducted in Yaoundé, Cameroon in 2013 on 108 homozygous poly transfused sickle cell patients, followed over a period of 5 months, 7 contracted viral hepatitis B [8]. This is the same situation observed in the Central African Republic (CAR) in 2014, in a study carried out on a cohort of 98 homozygous sickle cell children poly transfused at the Bangui

Pediatric Complex, where 6 (6.12%) had been infected with HIV [9]. The objective of this study is to evaluate the prevalence of HIV and HBV infections and HIV/HBV co-infection in poly transfused adult homozygous sickle cell patients, followed at the Center of Mixed Medicine and SS Anemia (CMMSSA) of Kinshasa, during the period from January 2006 to June 2017; this, in the optics make an inventory on the observation of the principles of transfusion security, in order to improve their assumption of responsibility.

2. Methods

2.1. Place of Study

This is a study that was conducted at the Center of Mixed Medicine and SS Anemia (CMMSSA) of Kinshasa, DRC.

2.2. Type of Study

This was a retrospective study of patients with poly transfused homozygous sickle cell patients, followed at the CMMSSA in Kinshasa from January 2006 to June 2017.

2.3. Study Population

Homozygous sickle cell patients over the age of 18 and followed at the CMMSSA from January 2006 to June 2017 constituted the study population.

2.4. Inclusion Criteria

The records of all homozygous sickle cell patients diagnosed by electrophoresis of hemoglobin and who received a minimum of 2 blood transfusions from January 2006 to June 2017, were included for the study. Only patients with no history of infectious diseases were included. According to the national program on blood security, all patients should be tested prior transfusion.

2.5. Criteria of Non-Inclusion

Records of all heterozygous sickle cell patients, records of all patients who received only one blood transfusion during the study period, records of all sickle cell patients who had no information relating to them with electrophoresis of hemoglobin and records of homozygous sickle cell disease with HIV and HBV prior to CMMSSA blood transfusion were not included in this study.

2.6. Parameters of Interest

Parameters of interest were age, sex, electrophoresis of hemoglobin, number of blood transfusions received and serologic control of HIV and HBV of the patient.

3. Results

One hundred and eighty (180) homozygous sickle cell patients diagnosed by electrophoresis of hemoglobin and receiving a minimum of 2 blood transfusions during the study period were selected.

3.1. Sex Ratio

Sixty-four (64) patients, or 35.55%, were men, and 116 (64.44%) women, a sex ratio of 0.6 (men/women).

3.2. Age Groups

The age of the patients ranged from 18 to 50 years; the median age was 29 years old. The most represented age group was 18 to 23 years old with 87 patients (48.33%).

3.3. Marital Status

One hundred seventy-two (172) patients, or 95.55%, were single; 5 (2.77%) married; 2 (1.11%) divorced and 1 (0.55%) widowed.

3.4. HIV Seroprevalence

Fifteen (15) patients, or 8.33%, contracted HIV between January 2006 and June 2017, following a blood transfusion at the CMMSSA.

3.5. Seroprevalence of HBV

Five (5) patients, or 2.77%, contracted HBV between January 2006 and June 2017 following a blood transfusion at the CMMSSA.

3.6. Seroprevalence of HIV/HBV Co-Infection

Four (4) patients, 2.22%, had acquired HIV and HBV between January 2006 and June 2017 following a blood transfusion at the CMMSSA.

4. Discussion

The objective of this study was to establish the seroprevalence of HIV, HBV and HIV/HBV co-infection in the homozygous adult poly transfused sickle cell population at the CMMSSA in Kinshasa.

One hundred and eighty (180) patients were selected for the study, including 64 (35.55%) men; the sex ratio between men and women was 0.6. This male/female proportion is described in several studies carried out in the DRC or elsewhere. This is the case of the Ateba N.G. study, conducted in 2017 in Yaoundé, Cameroon, on 195 homozygous sickle cell patients with the aim of exploring glomerular function; 71 patients (36.41%) were men [10]. There is also Natacha E.M., who has published a study on oral manifestations in homozygous children and adolescents with sickle cell disease in Yaoundé; 126 patients were included among whom 61 boys (48.41%) [11]. The 2017

demographic data for the city of Yaounde, one of the most populated in Cameroon, estimates the rate of masculinity at 113 men per 100 women [12,13]. The data from the Ateba N.G. and Natacha E.M. studies showed that the male sex is less affected by sickle cell disease than the female sex, do not agree with the demographic realities of the city of Yaoundé which has more men than women. The present study counted 64 men (35.55%); this corroborates with data from the Beaume G. study, conducted at the Pediatric Department of the Monkole Hospital Center (MHC) in Kinshasa, DRC; he counted 45 patients, including 15 boys (33.33%) [14]. these are studies carried out in Kinshasa, with the same demographic realities. The resemblance of the sex ratio is therefore justified; in November 2015, the Ministries of Planning and Public Health, published a report of 41.4% of men in Kinshasa, with an estimated population of 11.6 million [15,16]. The transmission of sickle cell disease is not related to sex [17].

Health published a report of 41.4% of men in Kinshasa, with an estimated population of 11.6 million [15, 16]. The transmission of sickle cell disease is not related to sex [17]. The age of the patients was in the range of 18 to 50 years. The most represented age group was 18 to 23 years old with 87 patients (48.33%) followed by those aged 24 to 29 with 38 patients (21.11%). These data are super imposable to those of Diop S., in its epidemiological study on homozygous sickle cell disease after the age of 20; in a cohort of 108 patients followed at Dakar University Hospital, he found that the age group of 20 to 29 years would be the most affected by sickle cell crises and therefore blood transfusion, followed by that of 30 to 39 years [18].

Fifteen patients (8.33%) had contracted HIV; 5 patients (2.77%) had HBV and the HIV/HBV co-infection was found in 4 patients (2.22%). These data are similar to those of Gody J.C., in his study on the occurrence of HIV and HBV in a cohort of 98 children aged 18 months to 18 years, transfused at Bangui Pediatric Complex in the Central African Republic (CAR); he found, after transfusions, an HIV prevalence of 6.06% (N = 6), that of HIV/HBV co-infection was 1.01% (N = 1) and that of HBV was 14.14% (N = 14) [9]. There is also the study of Malam A.B., on the post-transfusion infectious risk at the National Hospital of Niamey in Niger, carried out in 2016 on a cohort of 202 sickle cell patients aged 1 to 65 years; the sero prevalence of HIV was 2.9% and that of HBV was 3.8% [19]. What needs to be emphasized here is that a seronegative patient initially becomes infected with HIV, HBV, or both, after being transfused for some benefit at first. This confirms the fact that the management of LLP in developing countries is still a problem [7]. Taking into account the local context of the DRC, considerable efforts should be made to secure blood transfusion, for these patients were tested negative for infectious diseases before transfusion according to the national program. This is in line with the conclusion of the Bulanda B.I. documentary review published in 2018, based on data from 20 years of research on HBV and HCV infections in the Democratic Republic of Congo (from 1997 to 2017); where he highlighted the relevance of the issue of transfusion safety in the DRC [20].

Table1. *Characteristics of the homozygous adult polytransfusedsickle cell population*

AGE RANGE (YEARS)	MEN	WOMEN	TOTAL
18-23	27 (42.18%)	60 (51.72%)	87 (48.33%)
24-29	13 (20.31%)	25 (21.55%)	38 (21.11%)
30-35	17 (26.56%)	13 (11.2%)	30 (16.7%)
36-41	5 (7.81%)	11 (9.48%)	16 (8.9%)
42-47	1 (1.56%)	5 (4.31%)	6 (3.33%)
48-53	1 (1.56%)	2 (1.72%)	3 (1.7%)
Total	**64 (100%)**	**116 (100%)**	**180 (100%)**
MARITAL STATUS	**MEN**	**WOMEN**	**TOTAL**
Singles	60 (93.75%)	112 (96.55%)	172 (95.55%)
Married	3 (4.68%)	2 (1.72%)	5 (2.77%)
Divorced	0 (0%)	2 (1.72%)	2 (1.11%)
Widowers	1 (1.56%)	0 (0%)	1 (0.55%)
Total	**64 (100%)**	**116 (100%)**	**180 (100%)**
Positive HIV	7 (10.9%)	8 (6.9%)	15 (8.33%)
Positive HBV	4 (6.25%)	1 (0.86%)	5 (2.77%)
HIV/HBV coinfection	3 (4.68%)	1 (0.86%)	4 (2.22%)

5. CONCLUSION

The seroprevalence of HIV in the poly transfused adult sickle cell anemic population of the Center of Mixed Medicine and SS Anemia (CMMSSA) of Kinshasa was 8.33%; that of HBV was 2.77% and that of HIV/HBV co-infection was 2.22% for the interval from 2006 to 2017.

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