

Risk Assessment of Venous Thrombotic Disease in Hospitalized Advanced HIV Patients in a Resource-Limited Setting

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Abstract

HIV infection is known to be a factor associated with cardiovascular disease. The objective of this work is to draw the attention of clinicians working in a resource-limited environment to the risk run by these patients in hospitalization in order to be able to prevent and ensure early and adequate management allowing the reduction of thrombotic risk and its complications. This is a descriptive cross-sectional study from January 2022 to May 2023, all patients hospitalized for advanced HIV disease were assessed by the Padua score supported by the D-dimer test. The data was collected in strict confidentiality. Out of a total of 400 hospitalized patients 40 were identified as being at being at risk of developing venous thromboembolic disease (VTE). The average age was 33, 6 years, 28 patients were female (70%). Coma (37,5%) and dyspnea (30%) were the main reasons for consultation. Cellular immunosuppression was severe ($CD4 < 200 \text{ mm}^3$) in 95% of patients disseminated tuberculosis (50%), pneumocystosis carini pneumonia (25%), sepsis (12,5%), neuromeningeal cryptococcosis (7,5%) and Kaposi's sarcoma (5%) were the main associated opportunistic conditions. 28 (70%) patients were naïve to antiretrovirals and 12 (30%) had been on retroviral treatment for six months. 12 (30%) patients died, 8 (20%) patients progressed well, and 20 (50%) were lost sight of for lack of financing.

Keywords: Venous thromboembolic, Advanced HIV, Dibindi General Reference Hospital, Padua score, D-dimers test.**Copyright © 2023 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Venous thromboembolic disease (VTE) and HIV/AIDS are major public health problems. VTE is found with an incidence two to ten times higher in HIV-infected patients compared to the general population [1]. A part from the prothrombotic state due to HIV, several intricate mechanisms (the virus, antiretroviral treatment, accelerated aging) have emerged as hypotheses of thromboembolic disease in HIV-infected subjects. Given the increase in cases of advanced HIV patients in hospital who remain bedridden for several days and the inability to perform Doppler ultrasound and thoracic CT angiography, it seemed logical to us assess the risk of developing VTE in advanced HIV patients hospitalized by Padua score supported by the d-dimer test while excluding covid 19 infection.

PATIENTS AND METHODS

Type of Study and Population

This is a descriptive prospective cross-sectional study from January 12, 2022 to March

31, 2023, carried out in advanced stage HIV disease management department of the Dibindi General Reference Hospital in the Democratic Republic of the Congo. It concerned patients hospitalized for advanced HIV regardless of age and sex, and who have benefited from an assessment by the Padua score and a D-dimer and covid 19 examination.

Data Collection and Ethical Consideration

The data were collected on collection sheets from hospital records, with anonymous numbers and in strict confidentiality. The variables measured were sex, age, and reason for consultation, associated opportunistic infection, and the duration of immobility, explosive to ARVs, CD4 count, viral load and treatment outcome.

The Padua Score

The Padua score is a clinical decision rule for assessing the risk of venous thromboembolism in hospitalized patients and the indication for thrombolism

in hospitalized patients and the indication for thromboprophylaxis (See Table 1).

D-dimer Analysis

The D-dimers rapid test is an immunoassay designed for the quantitative determination of D-dimers concentration in whole blood and plasma. This test can be used as an aid in the evaluation of patients with suspected venous thrombosis or patients suspected venous thrombosis or d' pulmonary embolism. He as a large negative predictive value, in other word a normal result allows the exclusion of the diagnostics of deep vein thrombosis and pulmonary embolism. On the other hand, if the level of D-dimers proves to be high, if the level of d-dimers proves to be high, there is a suspicion of the presence of a lact.

RESULTS

From January 12, 2022 to May 31, 2023, out of 400 patients hospitalized in the advanced HIV care unit of the HGR Dibindi, 40 patients were identified as at high risk of developing VTE by the Padoue score and dosage of the D- dimers. 28 patients were female and 12 male. The average age was 33,6 years with extremes of 12 and 55 years. Clinically, coma (37,5%),

dyspnea(30%) and cough(25%) were the main reasons for consultation. Disseminated tuberculosis(50%), pneumocystis carini pneumonia(25%), sepsis(12,5%), neuromeninged cryptococcosis(7,5%) and Kaposi's sarcoma(2%) were the main opportunistic conditions associated. The duration of immobility was greater than 7 days in 75% of cases. 28(70%) patients were naïve to antiretroviral while 12(30%) were on treatment interruption for a period ranging from 3 to 6 months. Immunologically, cellular immunosuppression was severe($CD4 < 200/mm^3$) in 38 patients, the average viral load was 350.400 copies/ml were at WHO stage 4 and 12 patients at stage 3. The history was dominated by tuberculosis(70%), heart failure(12,5%), diabetes mellitus(10%), and arterial hypertension(7,5%). The anticoagulant treatment started in the first 48 hours was responsible for 20% of the cures. Whereas that started on the seventh day of hospitalization was not successful. 12(30%) patients died under treatment, while 20(50%) patients died under treatment, while 20(50%) patients were lost to follow-up due to lack of financial means. The treatment consisted of low molecular weight heparin, combined with a factor X_a inhibitor.

Table 1: Padoue Score

Risk factors	Scoring
Active cancer	3
History of VTE	3
Reduced mobility	3
Thrombophilia	3
Recent trauma or surgery(< 1 month)	2
Age ≥ 70 years	1
Heart of respiratory failure	1
Myocardial infarction or ischemic strokes	1
Obesity(BMI ≥ 30)	1
Hormonal therapy	1
Interpretation	
High risk-need prophylaxie	≥ 4 scoring
Low risk	≤ 3 scoring

Table 2: General data of study patients (n=40)

Variables	Overall(n=36)
Age (years), mean SD	33,6(±12)
Sex(n)%	
Female	28(70%)
Male	12(30%)
Associated opportunistic infections	
Disseminated tuberculosis	20(50%)
Pneumocystosis carini pneumonia	10(25%)
Neuromeningeal cryptococcosis	3(7,5%)
Severe sepsis	5(12,5%)
Kaposi's sarcoma	1(2%)
Immobility period	
Less than 7 days	10(25%)
More than 7 days	30(75%)
Exposure to antiretroviral treatment	

Naive to antiretroviral therapy	28(70%)
Interruption of antiretroviral treatment(ART),duration of 0 to 3 months	3(7,5%)
Interruption of antiretroviral treatment(ART),duration of 3 to 6 months	9(22,5%)
CD4 count	
Less than 200/mm ³	38(95%)
Greater than 200/mm ³	2(5%)
Viral load mean	350 400 copies/ml
Who clinical stage	
Stage 3	12(30%)
Stage 4	28(70%)
The antecedents	
Tuberculosis	28(70%)
Heart failure	5(12,5%)
Diabetes mellitus	4(10%)
Arterial hypertension	3(7,5%)
State of patients	
healed	8(20%)
death	12(30%)
Lost view	20(50%)

Table 3: Modified Padua score

Risk factors	Scoring
WHO stage 3 and 4 HIV	4
Active cancer	3
History of VTE	3
Reduced mobility	3
Thrombophilia	3
Recent trauma or surgery(< 1 month)	2
Age ≥ 70 years	1
Heart of respiratory failure	1
Myocardial infarction or ischemic strokes	1
Obesity(BMI ≥ 30)	1
Hormonal therapy	1
Interpretation	
High risk-need prophylaxie	≥ 4 scoring
Low risk	≤ 3 scoring

DISCUSSION

From January 12, 2022 to May 31, 2023 we assessed the risk of developing VTE in advanced HIV patients with severe opportunistic infection, using the Padoue score and the D-dimers test. 40 patients out of a total of 400 hospitalized for Advanced HIV were identified as at risk. Coma (37,5%) and dyspnea(30%) were the main reasons for consultation. Disseminated tuberculosis (50%), pneumocystis carini pneumonia (25%), cryptococcosis (7,5%) and Kaposi's sarcoma(2,5%) were the main associated opportunistic conditions. Other series have revealed a large number of patients infected with mycobacterium tuberculosis, a bacterium capable of inducing the synthesis of anticardiolipin antibodies and the production of cytokines causing a state of hypercoagulability [7, 8], in addition the comatose state caused by the tuberculosis and meningeal cryptococcosis cause immobility with risk of VTE [8]. 95% of patients had a CD4 count < 200 cells/mm³, 70% were naïve to ARV, while 30% were on interruption of antiretroviral treatment, the average viral

load was 350.400 copies/ml. The same observation was made by Dembele *et al.*, in Brazzaville [7], and Frederic Nogbou in Abidjan [9], These factors mentioned above increase a state of hypercoagulability, an immune imbalance, hemostasis disorders and a prolonged inflammatory state [10]. The death rate is 30% despite treatment, Dembele found similar resultants in Brazzaville [7], and the probable cause would be severe cellular immunosuppression and severity of opportunistic infection [7, 9].

CONCLUSION

This work shows the high risk that advanced HIV patients face in hospitalization, because of HIV itself, opportunistic infections and the resulting state of immobility. Thus, in an environment with limited resources, the use Padua score and D-dimers test enables early detection and application of antithrombotic prophylactic measures. Our study highlights the need to include the D-dimers test in the list of mandatory medical examinations for all advanced

HIV patients with reduced mobility and to add low molecular weight heparin and factor X_a inhibitor to the list of drugs for the management of advanced HIV.

State of current knowledge on the subject

- Higher incidence of VTE in hospitalization in underdeveloped countries
- Cardiovascular manifestations, a major issue of non-communicable diseases constituting a threat with a higher risk in HIV-infected subjects than in the general population.

Contribution for our study to knowledge

- Additional data on VTE in cases of advanced HIV in central Africa and especially in the DRC
- The addition of WHO stage 3 and 4 HIV in the risk factors of the Padoue score with the rating 4 (Modified padoue score: table 3).
- Advocate for the standardization of the modified Padoue score, the use of the D-dimers test in advanced HIV patients with reduced mobility, and the addition of low molecular weight heparin and factor X_a inhibitor in the list of drugs for the management of advanced HIV.

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