Scientific Research Publishing

Journal of Biosciences and Medicines, 2016, 4, 1-5
http://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Estimation and Assessment of Plasma D-Dimer Levels in HIV Patients

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How to cite this paper: Himmat, W.H.H. and Gaufri, N.E.A.M. (2016) Estimation and Assessment of Plasma D-Dimer Levels in HIV Patients. *Journal of Biosciences and Medicines*, **4**, 1-5.
http://dx.doi.org/10.4236/jbm.2016.410001

Received: August 3, 2016
Accepted: September 27, 2016
Published: September 30, 2016

Abstract

Background: The elevation of plasma D-dimer levels is fully described and associated with the increase of the mortality of patients with HIV. The present study was aimed to estimate and assess the plasma D-dimer levels in HIV patient. **Material and Methods:** A case control study done in May 2015. A total of 100 subjects were enrolled in this study; 50 were patients professionally diagnosed by HIV; 25 (50%) were males and 25 (50%) were females; their mean age is 35 years. Further 50 normal healthy individuals as normal control group: their gender and age were matched with patient groups. The platelets poor plasma (PPP) was immediately prepared from citrated blood, then the plasma D-dimer level was measured using (MISPA-i_2 Reagent) Switzerland. Data were analyzed using statistical packing for social sciences program (SPSS) 20. **Results:** The D-dimer levels was significantly higher in patient with HIV compared with the normal healthy control group (Mean and STD 502.2 ± 287.8 vs 251.8 ± 152.7 *P. value* 0.01). **Conclusion:** The D-dimer level was significantly higher in patient with HIV compared with those in normal healthy control group.

Keywords

HIV, AIDS, D-Dimer, Sudan

1. Introduction

HIV is lentivirus (sub group of retrovirus) that causes HIV infection and acquires immunodeficiency syndrome (AIDS) [1] [2]. AIDS is a condition in humans in which progressive failure of the immune system allows life-threating opportunistic infections and cancers to thrive without treatment average survival time after infection with HIV is estimated to be 9 to 11 years depending on the HIV subtype [3]. HIV infects vital cells in the human immune system such as helper T cells (specifically CD4+ T cells), macrophages, and dendritic cells [4]. The infection of HIV leads to low levels of CD4+

Tcells through a number of mechanisms, including pyroptosis of abortively infected T cells [5], direct viral killing of infected cells, and killing of infected CD4+ T cells by CD8 cytotoxic lymphocytes that recognize infected cells [6]. Infection with HIV occurs by the transfer of, blood, semen, vaginal fluid, pre-ejacute, or breast milk. It is a global pandemic [7]. As of 2012 approximately 35.5 million people are living with HIV globally, of these approximately 17.2 million are men, 16.8 million are women and 3.4 million are less than 15 years old [8] [9]. Sub-Saharan Africa has the most serious HIV and AIDS epidemic in the world. In 2013, an estimated 24.7 million people were living with HIV, accounting for 71% of the global total. In the same year, there were an estimated 1.5 million new HIV infections and 1.1 million AIDS-related deaths [10].

As reported in SMART study, the hypercoagulable state was associated with the disease mortality and may be considered as one of causes that lead to death in HIV disease [11]. Several studies confirm the SMART study in fact that the D-dimers has a strong correlated with cardiovascular disease [12]. D-dimer levels forecast the present of thrombosis whatever venous or arterial in all individuals and with those affected by HIV infection [3] [12]-[18]. The mechanism of present hypercoagulability which detected by D-dimer and pathophysiology of HIV were still unclear; even though many researchers reported the endothelial damage and vascular dysfunction [19]-[21].

2. Material and Methods

This is a case control study done in May 2015. A total of 100 subjects were enrolled in this study. 50 were patients professionally diagnosed with HIV, 25 (50%) were males and 25 (50%) were females; their mean age is 35 years. Further 50 normal healthy used as control groups their gender and age was matched with patient groups. This study was approved from Alneelain university ethical committee, the consent was also taken from all participant enrolled in this study before the samples were collected. Then 3 ml of venous blood were collected in a container contains 3.2% trisodium citrate at a ratio of 9:1 as anticoagulant, then platelets poor plasma (PPP) was immediately prepared by centrifuged for 15 minutes at 3000 rpm. The plasma D-dimer levels were measured by using (MISPA-i_2 Reagent) Switzerland. Every patient with a history of thrombosis and liver disease excluded from this study. Data analyzed by statistical packing for social sciences program (SPSS) 20. A value of less than 0.05 was considered significant.

3. Results

The present study showed that the D-dimer level was significant increased in patient with HIV when compared with the normal healthy control group (Mean and STD were 502.2 ± 287.8 vs 251.8 ± 152.7 P. value 0.01) respectively (Table 1).

Table 1. Correlation of D-dimer levels HIV patient versus normal control group.

parameters	subjects	numbers	Means ± SD	P value
D-dimerNg/mg	patient	50	502.2 ± 287.8	0.01
	Control	50	251.8 ± 152.7	

4. Discussion

Haemostatic abnormalities in coagulation factor levels and a hypercoagulable state in HIV-positive individuals have been reported years ago [22]-[24]. Exactly like any other chronic inflammation HIV infection associated with activated coagulation system [25]-[27]. D-dimer test is a common test used to diagnosis the present of thromboembolic disorders; it's defined by a fibrin degradation product, which is the most predictive biomarker of overall mortality in HIV patients [28] [29]. D-dimer also has the probable to recognize subgroups warrant primary prophylaxis or prolonged anticoagulation [30] [31]. To our acquaintance, this is the first study to assess the plasma D-dimerin Sudanese HIV patients. This study revealed that the D-dimer levels were significantlyhigher in HIV patients when compared with normal healthy control group (p value 0.01). This Finding was in concordance with study done in 2009 cited by Jacqueline Neuhaus *et al.* who reported that the higher D-dimer levels was higher in HIV patient when compared with those normal control group [26]. The interesting findings of the current study are also in consistence with several recently studies done in different population in which the authors concluded that the D-dimer levels were significantly higher in patients with acquired immunodeficiency syndrome compared with normal control group [29]-[34].

5. Conclusion

Based on our result, this study concluded that the Sudanese patients with HIV infection have hypercoagulable state.

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