Cortisol Response to Cold Pressor Stress in HIV+ IDUs is Related to Depression

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Introduction

Cortisol levels have consistently been related to depression in several populations. The cortisol response to stress, however, has not been as extensively explored, nor has the possible interactions of depression, stress, and cortisol. We previously showed that cortisol response to stress was related to cognitive function in HIV+ injecting drug users (IDUs; Ownby et al. 2006). In this analysis, we evaluated the relation of HIV and IDU status and depressive symptoms to cortisol response to cold pressor stress.

Method

Participants: Men and women within the age range of 18 to 50 years were enrolled for this study. The study was conducted under a protocol approved by the University of Miami Human Subjects Research Office.

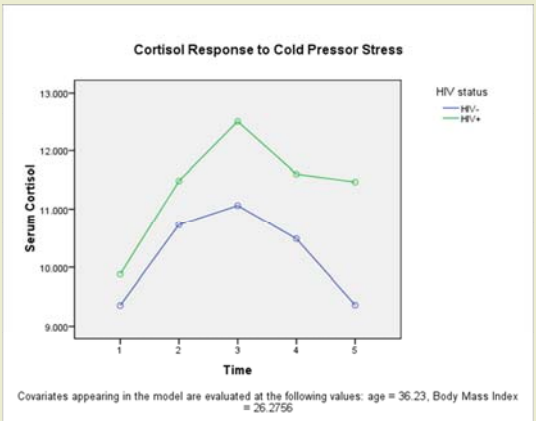
Drug Use Inclusion and Exclusion Criteria: Men and women in IDU groups were required to have used injected drugs, i.e., heroin and/or cocaine, at least 6 times in a one-year period. All participants were interviewed using the Structured Clinical Interview for DSM-IV Axis I Diagnosis (SCID) through which a diagnosis of dependence or abuse on a particular substance was made.

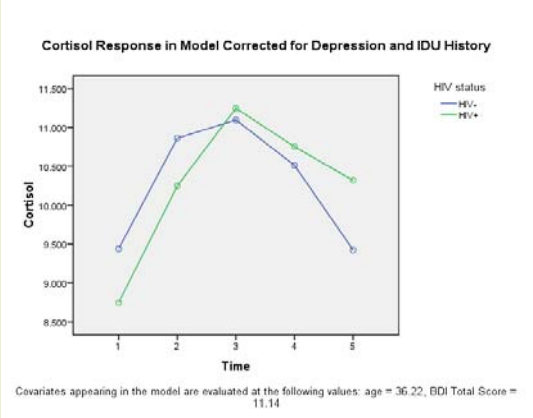
HIV-1 Infection Inclusion and Exclusion Criteria: HIV-1-positive participants were required to bring evidence of their serostatus to the study. Additionally, their peripheral plasma viral load was determined using PCR amplicor method (Roche Diagnostics; at the Clinical Immunology Laboratory in the Department of Medicine, the University of Miami School of Medicine). HIV-1-positive participants were free of any AIDS-defining infections at the time of the study. Verification of HIV-1 seronegative status was not done as part of this study.

Cold pressor stress: The cold pressor challenge was performed between 8:00 am and 11:00 am. On arrival, an indwelling venous catheter for drawing blood was placed in the antecubital vein of each participant. After 20-minutes of rest in a reclined position, a 9-ml sample of blood was drawn in a tube containing EDTA to determine participants' baseline level of cortisol. The cold pressor challenge was then administered. Participants placed their entire hand in an ice-water mixture (3 parts ice and 1 part water) for 2 minutes. Following completion of the cold pressor challenge, 4 additional blood samples were collected at 10, 15, 30, and 50 minutes after baseline.

Data Analysis: Data were analyzed in a repeated measures analysis of covariance that included potential confounders such as age and gender. Total score on the Beck Depression Inventory (BDI) was included as a covariate to evaluate its relation to cortisol response.

Results





Source	Sum of Squares	df	Mean Square	*F*	*p*
Intercept	7306.143	1	7306.14	41.66	0.00
HIV Status	0.004	1	0.00	0.00	1.00
Gender	395.59	1	395.59	2.26	0.13
IDU History	1333.933	1	1333.93	7.61	0.01
Age	28.933	1	28.93	0.17	0.69
BDI	1144.917	1	1144.92	6.53	0.01
Error	61550.3	351	175.36		

Discussion

Results showed that the HIV-related changes in cortisol stress response may at least in part have been due to depression and IDU history. These results show that symptoms of mood are related to cortisol stress response after taking HIV infection and a history of injecting drug use into account. Depression in HIV-infected individuals may thus be related to biological markers of stress and stress management activities in HIV+ individuals may be useful in reducing symptoms of depression.

Acknowledgment

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Reference

Ownby RL, Waldrop-Valverde D, Kumar A, Mack A, Fernandez JB, González L, González P, Kumar M (2006). Cortisol mediates HIV-1 cognitive deficits among injecting drug abusers. ***American Journal of Infectious Disease*****, 2, 74-79.**