Original Articles

Comparative Study of Serum Dehydroepiandrosterone Sulfate Levels in HIV-1 Infected and HIV-1-seronegative Royal Thai Army Conscripts

Khunakorn Kana[1], Sutchana Tabprasit[1], Kamonwan Songprasom[1], Thippawan Chuenchitra[1] and Narin Hiransuthikul[2]

[1]Armed Forces Research Institute of Medical Sciences (AFRIMS), [2]Faculty of Medicine, Chulalongkorn University

Background : *Around the past 15 years, there are evidences that the adrenal androgen dehydroepiandrosterone (DHEA) and its sulfoconjugated derivative (DHEA-S) have some roles in immunity against HIV viruses. Determining the true and reliable mean serum DHEA-S level by adjusting related factors (covariates) which can affect serum DHEA-S level is essential for fully understanding natural changes of this hormone in healthy young men and asymptomatic naive HIV-infected young men.* ***Objectives :*** *To determine the serum dehydroepiandrosterone sulfate (DHEA-S) levels in HIV-1 infected Thai military conscripts compare to HIV-1-seronegative Thai military conscripts.* ***Design :*** *Cross-sectional analytic study.* ***Setting :*** *Armed Forces Research Institute of Medical Sciences (AFRIMS), a research center. Research Methodology: We studied left-over serum samples of selected sample population. This study included 72 HIV-1 infected and 199 HIV-1-seronegative serum samples of Royal Thai Army Conscripts in round of induction May 2006. The serum samples were tested for serum dehydroepiandrosterone sulfate levels, hepatitis B surface antigen, anti hepatitis C virus antibody, rapid plasma reagin, and HIV-1 subtypes B, E, and D IgG-Capture enzyme immunoassay.* ***Results :*** *The median serum DHEA-S levels in HIV-1 infected group and HIV-1-seronegative group were 1.23 and 1.42 micrograms/mL, respectively. There was significant difference in serum DHEA-S levels between two groups (p=0.037).* ***Conclusion :*** *Serum DHEA-S levels in asymptomatic HIV-1 infected Thai military conscripts were lower than serum DHEA-S levels in HIV-1-seronegative Thai military conscripts statistical significantly.*

Key Words: ● *Dehydroepiandrosterone* ● *HIV-1* ● *Thai conscript*

RTA Med J 2010;63:71-80.

In Human Immunodeficiency Virus (HIV)-infected patients, the immune systems which are responsible for eradicating HIV viruses are 1) Humoral Mediated Immunity (HMI) and 2) Cell Mediated Immunity (CMI). In addition, the endocrine system also has roles in HIV-infected patients. In patients with HIV, opportunistic infections commonly involve the adrenal glands but rarely occupy enough of the gland to cause adrenal insufficiency. Impaired adrenal reserve without overt symptoms of adrenal insufficiency has been described. Subclinical abnormalities in glucocorticoid dynamics are common. HIV-infected patients usually have normal or even more commonly, elevated basal cortisol levels. HIV-infected patients have decreased basal adrenal androgen levels and impaired adrenal androgen responses to adrenocorticotropic hormone (ACTH) stimulation.[1]

Around the past 15 years, there are evidences that the adrenal androgen dehydroepiandrosterone (DHEA) and its sulfoconjugated derivative (DHEA-S) have some roles in immunity against HIV viruses. The study in murine model found that DHEA can stimulate the

ได้รับต้นฉบับเมื่อ 1 มิถุนายน 2553 ได้ตีพิมพ์เมื่อ 1 มิถุนายน 2553

ต้องการสำเนาต้นฉบับติดต่อ Khunakorn Kana, Armed Froces Research Institute of Medical Sciences (AFRIMS)

interleukin-2 (IL-2) secretion from T lymphocytes. IL-2 is a major cytokine in stimulating CD4 lymphocytes production. The level of change in the cortisol/DHEA ratio could be predictive of progression to AIDS in HIV-infected individuals.[2]

Dehydroepiandrosterone (DHEA) and its sulfoconjugated derivative (DHEA-S) are adrenal androgens secreted by the adrenal cortex. DHEA-S is major form of DHEA in the body. The well-established fact that DHEA and DHEA-S concentrations decrease progressively with age has suggested a preventive role for DHEA and/or DHEA-S in ameliorating the signs and symptoms of the aging process.[3]

Because HIV infection is a blood-borne viral infection, HIV- infected patients may have other blood-borne infections such as hepatitis C virus (HCV) infection, hepatitis B virus (HBV) infection and syphilitic infection.

The blood levels of DHEA-S in healthy population are in the range of 100-400 micrograms/deciliter or 3-12 micromoles/liter. DHEA and DHEA-S are transformed into Dihydrotestosterone and 17 β-estradiol at peripheral tissues. In the presence, the control and regulation of the release of adrenal sex steroids are not completely understood. However, it is known that adrenal secretion of DHEA and DHEA-S increases in the children at the age of 6-8 years, and values of circulating DHEA-S peak between the ages of 20 and 30 years. Thereafter, serum levels of DHEA and DHEA-S decrease markedly. At 70 years of age, serum DHEA-S levels are at approximately 20% of their peak values and continue to decrease with age. This 70-95% reduction in the formation DHEA-S by the adrenal glands during the aging process results in a dramatic reduction in the formation of androgens and estrogens in peripheral target tissues. Despite the marked decrease in the release of DHEA as the individual ages, this is not paralleled by a similar decrease in ACTH or cortisol release. The clinical impact of this age-related efficiency in DHEA production is not fully understood but may play an important role in the regulation of immune function and intermediary mechanism, among other aspects of human physiology.[3]

Low endogenous levels of DHEA and/or DHEA-S have been associated with diseases such as lupus[4], cancer, and diabetes. Circulating concentrations of DHEA and DHEA-S resulting from endogenous production or hormone supplementation may also be relevant in psychiatric illness. Drugs such as some central nervous system agents[5], some antihypertensive drugs[6] may significantly increase or decrease circulating concentrations of these adrenal androgens by various mechanisms. The effect of alcohol on DHEA and DHEA-S concentrations, however, has not been studied extensively, and results of studies are conflicting. Nagata reported a trend for increasing serum DHEA -S concentrations with increasing alcohol consumption in post menopausal Japanese women; the model controlled for age and history of hysterectomy (p for trend = 0.01).[7] Cronholm studied the effect of alcohol on DHEA-S concentrations. In this study, ethanol 0.72 g/kg was administered orally to 6 healthy men (ages 24-40) in the morning, and serial samples were obtained through 480 minutes. They found that ethanol decreased DHEA-S concentrations.[8] The majority of studies support the observation that smoking nicotine-containing cigarettes results in elevated concentrations of DHEA and /or DHEA-S by stimulation of release of antidiuretic hormone from posterior pituitary gland and release of ACTH from anterior pituitary gland.[9] Khaw evaluated morning plasma hormone concentrations in 233 elderly women (ages 60-79) and reported that DHEA-S concentrations adjusted for age and BMI were approximately 1.5 times higher in smokers than in people who never smoked ($p \leq 0.001$)[10]. Vermeulen described 1.2 to 1.4 fold higher DHEA-S concentrations in smokers depending on age group[11]. Not all studies concur, however. The results of a study of approximately 1,000 pre and postmenopausal women showed no evidence of a difference or trend

that supported higher DHEA-S concentrations in women smokers.[12] Ortego-Centeno reported that young men smokers (n=15) had lower serum DHEA-S concentrations than 17 nonsmokers ($p \leq 0.05$)[13].

There are evidences that the serum concentrations of DHEA-S are changed in patients with infectious diseases. A study in adult men having syphilis pair-matched with 30 normal men showed that serum DHEA-S levels were significantly reduced in syphilitic men compared with normal men, ($p = 0.0018$).[14] There was evidence that the median DHEA-S level was lower in HIV-infected patients who were coinfected with hepatitis virus C (HCV) compared with HIV-infected patients who were not coinfected with HCV[15]. For hepatitis B virus (HBV) infection, there was no previous study which studied the association between HBV infection and serum DHEA or DHEA-S.

For HIV infection itself, no previous study about association between duration of HIV infection and serum DHEA-S level. Identification of recently infected persons (generally within 6 months of infection) is difficult and has traditionally relied on the prospective testing and longitudinal follow-up of people at risk. A number of methods have been proposed to detect new cases of HIV infection. The methods included HIV-1 p24 antigen test and HIV-1 RNA testing, which has been used to identify recent HIV-1 infection. However, those methods require testing for all HIV-1 seronegative specimens to identify the recent infections. In 2002, Parekh and colleagues described a new assay, the BED-CEIA (HIV-1 subtypes B, E, and D, IgG-Capture enzyme immunoassay), which was shown to have similar sensitivity to multiple HIV-1 subtypes. This laboratory technique can quantitatively measure proportion of Anti-HIV IgG to total IgG in serum. It uses the concept that the newly HIV-infected patients will have low concentrations of Anti-HIV IgG but the long-term HIV-infected patients will have higher concentrations of Anti-HIV IgG. By this test, an optimal normalized optical density (ODn = specimen-OD/Calibrator-OD) cutoff of 0.8 and a seroconversion period of 153 days offered the best combination of sensitivity and specificity for distinguishing between recent and long-term infections.[16]

HIV-infected patients have decreased basal adrenal androgen levels and impaired adrenal androgen responses to adrenocorticotropic hormone (ACTH) stimulation. DHEA has been shown in vitro to inhibit HIV replication; therefore this raised the possibility that the decreased DHEA levels observed in HIV-infected patients might influence the effects of the HIV infection.

Low serum concentrations of DHEA have been correlated with states of decreased immune function in humans, since concentrations are lowest in early childhood, late adulthood, and as HIV disease progresses. DHEA appears to possess immunomodulating effects, perhaps by enhancing the interleukin-2 (IL-2) from activated T cells as demonstrated in a murine model. A decline in DHEA concentrations, particularly when initially less than 2.01 micrograms/L, might also proved to be a predictor of HIV disease progression.[2] Some of the HIV-associated conditions, such as autonomic and endocrine dysfunction, may play a role in the balance of the TH1 and TH2. For example, stimulated spleen cells derived from sympathectomized animals secrete less IL-2 and IFN-gamma[17], characteristic of a TH2 predominant response. In vivo and in vitro data suggest that the adrenal hormone dehydroepiandrosterone and its sulfate (DHEA-S) may counteract the effect of glucocorticoids and favor a TH1 response.[18] Low serum levels of DHEA (evidence of endocrine imbalance) have also been associated with progression to AIDS. Mulder et al determined serum DHEA levels in 41 asymptomatic HIV-1-seropositive subjects, who progressed to AIDS within 5 years after entering a cohort study, in 41 HIV-1-seropositive controls, who remained asymptomatic, and in 41 HIV-1-seronegative controls. They found that DHEA levels in

the progressors about 5 months before the diagnosis of AIDS were lower than the levels in the nonprogressors after the same follow-up. DHEA levels < 7 nanomoles/liter and CD4 lymphocytes < 500 cells/microliter both proved to be independent predictors for disease progression in HIV-1 infected men.[19] Jacobson studied the relationship between serum DHEA and DHEA-S levels and subsequent progression to AIDS in a sample of HIV-infected men from the San Francisco Men's Health Study followed prospectively. They observed an association of subnormal serum DHEA levels with increased risk of progression to AIDS only in patients with CD4 lymphocytes 200-499 cells/microliter (relative hazard = 2.34; 95% confidence interval = 1.18-4.63, p = .01).[20]

Since 1989, Thailand has established HIV surveillance among 60,000 the Royal Thai Army (RTA) military conscripts (mostly aged 21 years old) annually. It is believed to be the nationally representative sample of young Thai men. This ongoing total survey is helpful to be studied for the changes of risk behavioral pattern in this population. Moreover, since 2001, the RTA began recruiting volunteers aged 18-20 years old into the military service. The prevalence of HIV-1 infection among these younger men is a good proxy indicator of the HIV-1 incidence. Determining the true and reliable mean serum DHEA-S level by adjusting related factors (covariates) which can affect serum DHEA-S level is essential for fully understanding natural changes of this hormone in healthy young men and asymptomatic naive HIV-infected young men. These related factors are blood-borne infections and cigarette smoking.

Objectives

Primary Objective

To determine the serum DHEA-S levels in HIV-1 infected Thai military conscripts compare to HIV-1-seronegative Thai military conscripts.

Secondary Objective

To evaluate the associations between status of HCV infection, HBV infection, syphilis, recent HIV-1 infection, and cigarette smoking and the serum DHEA-S levels.

Design

This study was designed as a cross-sectional analytic study.

Methodology

1) Population

Target population:

Thai military conscripts (all are men) aged 18-30 years old.

Sample population:

Thai military conscripts aged 18-30 years old who were newly recruited into the RTA military service in round of induction in May 2006 were the sample population. The total numbers of them were 29,858 men. They were distributedly filled in all forts around the country on date 1st May 2006. All these young Thai men were physically examined and asked for their underlying disease(s) by physicians in the process of recruitment in April 2006 so healthy men were recruited into the RTA. All these new conscripts got HIV-counseling by well-trained military HIV-counselors in the first week after they came in the forts and informed consent for HIV testing were also obtained. About 1 week later, the new conscripts were blood drawn by the military medical personnels. Then the blood from all forts were sent to the Army Institute of Pathology (AIP) in Bangkok for HIV testing. The HIV testing results showed that 160 conscripts were HIV-1 infected. We used some data from project "Risk behavioral pattern of HIV-1 infection in Young Thai Men" which was conducted in this same population by permission from the principal investigator (Dr. Ram Rangsin). These data were age of conscripts, history of cigarette smoking and Anti HCV antibody results. This project can enroll 73 HIV-1 infected cases because the other 87 cases did not want to participate in the project. Then our project enrolled 72 HIV-1 infected cases from the project "Risk behavioral pattern of HIV-

1 infection in Young Thai Men" (1 missing case due to lack of serum specimen). In HIV-1-seronegative arm, total HIV-1-seronegative cases were 29,698. Project "Risk behavioral pattern of HIV-1 infection in young Thai men" enrolled 1,111 cases by systematic sampling. Then our project enrolled 200 cases by systematic sampling.

2) Study procedure

We studied left-over serum samples of selected sample population. This study included 72 serum samples of HIV-1 infected conscripts and 199 serum samples of HIV-1-seronegative conscripts (1 missing case due to lack of serum specimen) as described above. The identification number was assigned to each serum sample by an officer who was responsible for data base of HIV-1 surveillance program in the RTA military conscripts at AFRIMS. The investigators can not link to the name of conscripts.

Laboratory evaluation

Anti HIV-1 antibody test with confirmation by Western Blot results from AIP laboratory were used in analyses.

We tested the selected left-over serum samples which were stored in -40 ^{O}C freezer at AFRIMS for:

- serum DHEA-S levels using enzyme immunoassay (Immuno-Biological Laboratories, Inc.)
- IgG captured BED-EIA using Calypte® enzyme immunoassay to identify recent HIV-1 infection (within 153 days after seroconversion).[16]
- HBs antigen
- VDRL (RPR)

3) Data collection

All data were kept in data software. Data in hard copies were kept in locker responsible by the principal investigator. The left-over serums were transfered to laboratory with only identification numbers. No labeling of individual data was on the serum tubes (anonymous).

Statistical analyses

SPSS program version 11.5 for windows was used for data analyses. Chi-square or Fisher's Exact Test was applied to compare differences in proportions for categorical variables. Student t-test was used to compare differences among continuous variables. P-values for all tests were two-sided, with a value <0.05 considered statistically significant.

Results

Demographic characteristics of HIV-1 infected and HIV-1-seronegative group are shown in table 1.

The mean (SD) age of HIV-1 infected group and HIV-1-seronegative group were 20.0 (5.8) and 18.8 (6.4) years, respectively. There was no statistically significant difference in age between groups. There was no statistically significant difference in cigarette smoking habits between groups.

Prevalence of HBV infection was higher in HIV-1 infected group (18.1%) than in HIV-1-seronegative group (6.5%) statistical significantly.

Prevalence of HCV infection in HIV-1 infected group was 6.9% whereas the prevalence in HIV-1-seronegative group was 7.0%. here was no significant difference between groups. Syphilis was detected in only 1 case in this study.

Serum DHEA-S levels in HIV-1 infected group and HIV-1-seronegative group are shown in figure 1.

The mean (SD) serum DHEA-S levels in HIV-1 infected group was 1.45 (0.84) mcg/ml and mean (SD) serum DHEA-S levels in HIV-1-seronegative group was 1.71 (1.17) mcg/mL. The median serum DHEA-S levels in HIV-1 infected group and HIV-1-seronegative group was 1.23 mcg/ml and 1.42 mcg/mL, respectively.

When we explored the outliers, we found that there were 10 cases who had serum DHEA-S levels above 4.0 mcg/mL. 8 of these 10 cases were current smokers (5 cases were regular current smokers, the left 3 cases were non-regular current smokers). The others were 1 past smoker and 1 non-smoker.

From histogram of serum DHEA-S levels data, the distribution of them was not normal. So we changed

Table 1: Demographic characteristics of HIV-1 infected and HIV-1-seronegative group

	HIV-1 infected group (n=72)	HIV-1-seronegative group (n=199)	p-value
Mean age in yrs (SD)	20.0 (5.8)	18.8 (6.4)	0.15
Cigarette smoking[a]			
-current smoker	54 (76.1%)	127 (63.8%)	0.17
-past smoker	7 (9.9%)	24 (12.1%)	
-never	9 (12.7%)	47 (23.6%)	
-missing case(s)	2 (1.3%)	1 (0.5%)	
HBV infection[a]	13 (18.1%)	13 (6.5%)	0.004
HCV infection[a]	5 (6.9%)	14 (7.0%)	0.979
Syphilis[a]	1 (1.4%)	0	0.096

[a]represents to number of cases (%)

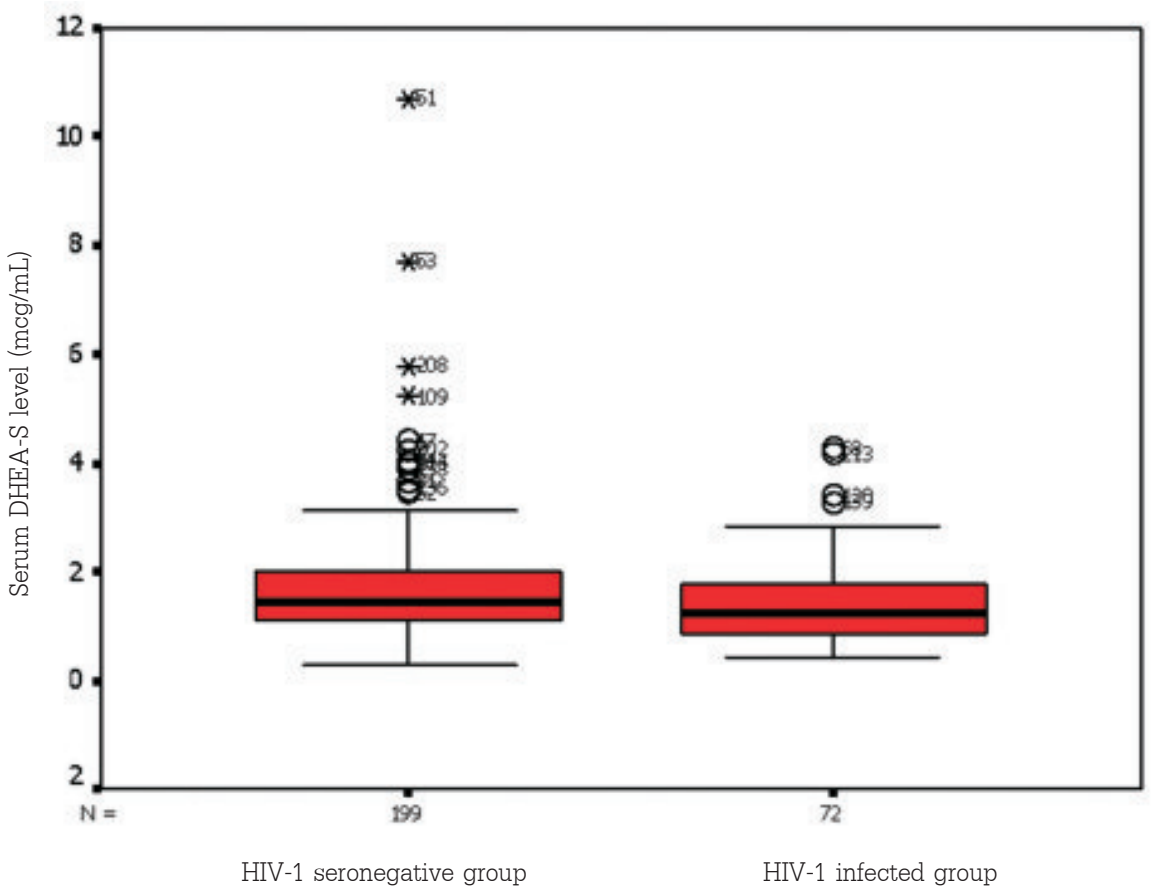

Figure 1: Box plot of serum DHEA-S levels in both groups

them into logarithm10. Then we tested difference between groups with independent 2 samples t-test. The results showed that the difference was statistically significant (p = 0.037).

The results of IgG captured BED-EIA showed that 15% of HIV-1 infected group (11 from 72 cases) were recently infected with HIV-1. The range of serum DHEA-S levels in this subgroup of recently infected cases was 0.43-4.27 mcg/mL.

Serum DHEA-S levels in each status are shown in table 2.

Discusion

The present research was a study of determining the serum DHEA-S levels in HIV-1 infected Thai military conscripts in comparison with HIV-1-seronegative infected Thai military conscripts.

This study was designed to control factors affecting on serum DHEA-S levels, i.e. age and cigarette smoking. The strong point of this study is sampling because the military conscripts came from all provinces around the country by lottery sampling. Then the archived serum samples were systematically sampling in this study.

This study explored the associations between status of HCV infection, HBV infection, syphilis infection, recent HIV-1 infection, and cigarette smoking and the serum DHEA-S levels in young Thai men.

Although the total number of HIV-infected cases in round May 2006 was 160, but the project "Risk behavioral pattern of HIV-1 infection in Young Thai Men" can enroll only 73 case. The other 87 cases who did not participate in the "Risk behavioral pattern of HIV-1 infection in Young Thai Men" project due to any reasons must be concerned.

From data in the study by Kandathil et al, median DHA-S level in the normal healthy individuals was 170 mcg/dL whereas mean DHEA-S level was 207 mcg/

Table 2: Serum DHEA-S levels in each status

Characteristics		n	Median	Minimum	Maximum	p-value	
HIV	non infect	199	1.42	0.28	10.7		
	infect	72	1.23	0.4	4.27		
smoke	current	181	1.38	0.38	10.7	0.247	Kruskal-Wallis test
	past	31	1.24	0.4	4.4		
	never	56	1.52	0.28	4.04		
HBV	non infect	245	1.37	0.28	10.7	0.623	Mann-Whitney U test
	infect	26	1.48	0.4	4.18		
HCV	non infect	252	1.40	0.28	10.7	0.254	Mann-Whitney U t-test
	infect	19	1.26	0.48	5.79		
RPR	negative	270	1.38	0.28	10.7	-	
	positive	1	1.21				

Table 3: Serum DHEA-S levels in related studies

Population studied	Serum DHEA-S level	Reference
16 asymptomatic treatment-naive HIV-infected individuals ,30 normal healthy individuals (24 men and 6 women; median age 35 years; range 22 to 58)	Mean(SD) = 83.5(52) mcg/dL, Median = 79 mcg/dL Mean(SD) = 207(123) mcg/dL, Median = 170 mcg/dL	Kandathil et al, 2005[21]
137 HIV-infected patients (104 men and 33 women; median age 39.1 years for women and 41.8 years for men), not study in normal healthy individual	Median = 202.7 mcg/dL	Mauboussin et al, 2004[15]
91 normal healthy German men ,aged 20-24 years, not study in HIV-infected individuals	Median = 88-1,017 mcg/mL	Friedrich N et al, 2008[22]

dL. In our study, we found that mean difference was only 26 mcg/dL (171-145). The study by Kandathil et al was conducted in India where subtype C of HIV-1 is the predominant strain.[23] Whereas in Thailand, the predominant subtype is subtype E.[24]

To answer primary question, we did univariable analysis. We found that there was significant difference between serum DHEA-S levels in HIV-1 infected and HIV-1- seronegative groups.

We concluded that serum DHEA-S level in HIV-1 infected Thai military conscripts was higher than serum DHEA-S level in HIV-1-seronegative Thai military conscripts statistical significantly.

For secondary research question, we did not find effect of HCV infection or HBV infection on serum DHEA-S levels. This may be caused by low number of HCV-infected cases and HBV-infected cases.

Although no significant difference in serum DHEA-S levels between smokers and non-smokers was demonstrated in this study, but majority of cases who had serum DHEA-S level above 4.0 mcg/mL were current smokers.

Limitation

In the present study, we had no data of CD4 lymphocytes count because after the HIV-1 infected conscripts knew their serum HIV testing results, they would go to see physicians individually as they needed. Then they would be blood drawn for CD4 lymphocytes count.

Conclusion

In conclusion, the findings from the present study showed that there was evidence that serum DHEA-S levels in asymptomatic HIV-1 infected Thai military conscripts were lower than serum DHEA-S levels in HIV-1-seronegative Thai military conscripts statistically significant.

Recommendations

Further study should be done to follow-up HIV disease progression, CD4 lymphocytes count, serum DHEA-S levels, clinical status and survival of the HIV-infected conscripts with cooperation with the physicians who cared them.

Conflict of Interests

None declared.

Acknowledgements

This research was successfully accomplished under advice of Dr. Narin Hiransuthikul and Colonel Dr. Thippawan Chuenchitra who kindly served as the author's academic advisors. Their meaningful advices and great support were deeply appreciated.

My appreciation also went to all the military conscripts and to Captain Sutchana Tabprasit and Mrs. Kamolwan Songprasom who did laboratory tests.

References

1. The McGraw-Hill Companies. Lange Endocrine Physiology: Chapter 26. AIDS_Endocrinopathies. (online). 2008. Available from : http://www.accessmedicine.com (2008, November 6).
2. Christeff, N, Gherbi, N, and Mammes, O. Serum cortisol and DHEA concentrations during HIV infection. Psychoneuroendocrinology 1997;22(Suppl.1):S11-S18.
3. The McGraw-Hill Companies. Lange Endocrine Physiology: Chapter 6. Adrenal Gland, (online). 2008. Available from: http://www.accessmedicine.com (2008,November 6).
4. Hedman M, Nilsson E, DeLaTorre B. Low sulpho-conjugated steroid hormone levels in Systemic Lupus Erythematosus (SLE). Clin Exp Rheumatol 1989;7:583-88.
5. Tollefson GD, Haus E, Garvey AJ, Evans MJ, Tuason VB. 24 hour urinary dehydroepiandrosterone sulfate in unipolar depression treated with cognitive and/or pharmacotherapy. Ann Clin Psychiatry 1990;2:39-45.
6. Beer NA, Jakubowicz DJ, Beer RM, Nestler JE. Disparate effects of insulin reduction with diltiazem on serum dehydroepiandrosterone sulfate levels in obese hypertensive men and women. J Clin Endocrinol Metab 1994;79,4:1077-81.
7. Nagata C, Kabuto M, Takatsuka N, Shimizu H. Associations of alcohol, height, and reproductive factors with serum hormone concentrations in postmenopausal Japanese women: steroid hormones in Japanese postmenopausal women. Breast Cancer Res Treat 1997;44,3:235-41.
8. Cronholm T, Sjovall J. Effect of ethanol metabolism on redox state of steroids sulphates in man. Eur J Biochem 1970; 13:124-31.
9. Salek FS, Bigos KL, Kroboth PD. The influence of hormones and pharmaceutical agents on DHEA and DHEA-S: a review of clinical studies. J Clin Pharmacol 2002;42: 247-66.
10. Khaw KT, Chir MBB, Tazuke S, Barrett-Connor E. Cigarette smoking and levels of adrenal androgens in postmenopausal women. N Engl J Med 1988;26:1705-09.
11. Vermeulen A, Kaufman JM, Giagulli VA. Influence of some biological indexes on sex hormone-binding globulin and androgen levels in aging and obese males. J Clin Endocrinol Metab 1996;81,5:1821-6.
12. Key TJ, Pike MC, Baron JA, Moore JW, Wang DY, Thomas BS, et al. Cigarette smoking and steroid hormones in women. J Steroid Biochem Molec Biol 1991;39,4A:529-34.
13. Ortego-Centeno N, Munoz-Torres M, Hernandez-Quero J, Jurado-Duce A. Effect of tobacco consumption on bone mineral density in healthy young males. Calcif Tissue Int. 60(1997):496-500.
14. Parker CR Jr., Schuster, MW. Effects of syphilis infection on adrenocortical function in men. Proc Soc Exp Biol Med 1991;197,2:165-7.
15. Mauboussin JM, Mahamat A, Peyriere H, Rouanet I, Fabbro-Peray P, Daures JP, et al. Low plasma levels of dehydroepiandrosterone sulphate in HIV-positive patients coinfected with hepatitis C virus. HIV Med 2004;5,3:151-7.
16. Parekh BS, Kennedy MS, Dobbs T, Pau CP, Byers R, Green T, et al. Quantitative detection of increasing HIV type 1 antibodies after seroconversion: a simple assay for detecting recent HIV infection and estimating incidence.AIDS Res Hum Retroviruses. 18(2002):295-307.
17. Clerici M, Shearer GM. A TH1 to TH2 switch is a critical step in the etiology of HIV infection. Immunol Today 1993;14:107-11.
18. Clerici M, Bevilacqua M, Vago T, Villa ML. An immunoendocrinological hypothesis of HIV infection. Lancet 1994;343:1552-3.
19. Mulder JW, JosFrissen PH, Krijnen P, Endert E, Wolf FD, Goudsmit, J, et al. Dehydroepiandrosterone as predictor for progression to AIDS in asymptomatic human immunodeficiency virus-infected men. J Infect Dis 1992;165: 413-8.
20. Jacobson MA, Fissaro RE, Galmarini M, Lang W. Decreased serum dehydroepiandrosterone is associated with an increased progression of human immunodeficiency virus infection in men with CD4 cell counts of 200-499. J Infect Dis 1991;164:864-8.
21. Kandathil AJ, Kannangai R, David S, Selvakumar R, Job V, Abraham OC, et al. Human Immunodeficiency Virus Infection and Levels of Dehydroepiandrosterone Sulfate in Plasma Among Indians. Clin Diagn Lab Immunol 2005;12,9:1117-8.
22. Friedrich N, Völzke1 H, Rosskopf D, Steveling A, Krebs A, Nauck M, et al. Reference Ranges for Serum Dehydroepiandrosterone Sulfate and Testosterone in Adult Men. J Androl 2008;29(6):610-7.

23. Ramalingam S, Kannangai R, Vijayakumar TS., Mathai D, Abraham OC, Subramanian S, et. al. Subtypes and cytokine profiles of HIV infected individuals from south India. Indian J Med Res 2005;121:226-34.

24. Wirachsilp P, Kantakamalakul W, Foongladda S. Surveillance of subtype and genetic variation of the circulating strains of HIV-1 in Thailand. Southeast Asian J Trop Med Public Health 2007;5:814-27.

การศึกษาเปรียบเทียบระดับของดีฮัยโดรอีพิแอนโดรสเตอโรนซัลเฟตในเลือดของชายไทยที่ได้รับการคัดเลือกเข้าเป็นพลทหารกองประจำการกองทัพบกที่ติดเชื้อและไม่ติดเชื้อเอชไอวี-1

คุณากร คณา[1], สุชชนา แทบประสิทธิ์[1], กมลวรรณ สองประสม[1], ทิพย์วรรณ ชื่นจิตร[1] และ นรินทร์ หิรัญสุทธิกุล[2]

[1]สถาบันวิจัยวิทยาศาสตร์การแพทย์ทหาร, [2]คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

บทคัดย่อ: *ในช่วงเวลาประมาณ 15 ปีที่ผ่านมานี้ นักวิจัยเริ่มพบว่าฮอร์โมนดีฮัยโดรอีพิแอนโดรสเตอโรน (DHEA) และดีฮัยโดรอีพิแอนโดรสเตอโรนซัลเฟต (DHEA-S) ซึ่งเป็นฮอร์โมนเพศชาย (androgen) ที่ถูกสร้างโดยต่อมหมวกไต มีบทบาททางด้านภูมิต้านทานของร่างกายมนุษย์ในการที่จะตอบโต้เชื้อเอชไอวี การศึกษาระดับของ DHEA-S ในเลือดของพลทหารกองประจำการที่มีสุขภาพแข็งแรงเปรียบเทียบกับระดับของฮอร์โมนดังกล่าวในพลทหารกองประจำการที่ติดเชื้อเอชไอวี-1แต่ยังไม่แสดงอาการ ร่วมกับความสัมพันธ์ของระดับฮอร์โมนกับปัจจัยต่างๆ ที่เกี่ยวข้อง ได้แก่การติดเชื้อโรคที่มักเกิดร่วมกับการติดเชื้อเอชไอวี-1 โดยควบคุมตัวแปรที่มีอิทธิพลต่อระดับของ DHEA-S ในเลือด จะเป็นประโยชน์ในการที่จะได้ทราบระดับของฮอร์โมนนี้ที่เชื่อถือได้ อันจะนำไปสู่การศึกษาวิจัยในอนาคตที่อาจจะนำระดับของ DHEA-S ในเลือดมาใช้ในการพยากรณ์โรคเอดส์ต่อไป* ***วัตถุประสงค์:*** *เพื่อศึกษาถึงค่าเฉลี่ยของระดับฮอร์โมน Dehydroepiandrosterone Sulfate (DHEA-S) ในเลือดของพลทหารฯ ที่ติดเชื้อเอชไอวี-1 เปรียบเทียบกับพลทหารฯที่ไม่ติดเชื้อเอชไอวี-1* ***รูปแบบการศึกษา:*** *การศึกษาเชิงวิเคราะห์ ณ จุดเวลาใดเวลาหนึ่ง* ***สถานที่ทำการวิจัย:*** *สถาบันวิจัยวิทยาศาสตร์การแพทย์ทหาร กรุงเทพมหานคร วิธีการศึกษา: ทำการศึกษาระดับของฮอร์โมน DHEA-S, ภาวะการติดเชื้อไวรัสตับอักเสบชนิด บีและซี การติดเชื้อซิฟิลิส ในเลือดของชายไทยที่ได้รับการคัดเลือกเข้าเป็นพลทหารกองประจำการกองทัพบก ผลัดพฤษภาคม 2549 จำแนกเป็นผู้ที่ติดเชื้อ เอชไอวีแต่ยังไม่แสดงอาการจำนวน 72 ราย และผู้ที่ไม่ติดเชื้อเอชไอวีจำนวน 199 ราย นำมาวิเคราะห์ร่วมกับข้อมูลเกี่ยวกับการสูบบุหรี่และระยะเวลาของการติดเชื้อเอชไอวี* ***ผลการศึกษา:*** *ค่ามัธยฐานของระดับฮอร์โมน DHEA-S ในเลือดของกลุ่มที่ติดเชื้อเอชไอวี และกลุ่มที่ไม่ติดเชื้อเอชไอวี เท่ากับ 1.23 ไมโครกรัม/มิลลิลิตร และ 1.42 ไมโครกรัม/มิลลิลิตร ตามลำดับ เมื่อทำการวิเคราะห์โดยใช้สถิติทดสอบ t-test พบว่าระดับฮอร์โมน DHEA-S ในเลือดของกลุ่มที่ติดเชื้อเอชไอวีต่ำกว่ากลุ่มที่ไม่ติดเชื้อเอชไอวีอย่างมีนัยสำคัญทางสถิติ (p=0.037)* ***สรุป:*** *ระดับฮอร์โมน DHEA-S ในเลือดของพลทหารฯ ที่ติดเชื้อเอชไอวี-1 ต่ำกว่าในพลทหารฯที่ไม่ติดเชื้อเอชไอวี-1อย่างมีนัยสำคัญทางสถิติ*

คำสำคัญ: ● *ดีฮัยโดรอีพิแอนโดรสเตอโรน* ● *เอชไอวี-1 พลทหารกองประจำการ*

เวชสารแพทย์ทหารบก 2553;63:71-80.