Lipid Profile Changes in Thai HIV and Tuberculosis Co-Infected Patients Receiving Non-Nucleoside Reverse Transcriptase Inhibitors-Based Antiretroviral Therapy

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Objective: *To study and compare the pattern of lipid profile changes in Thai HIV and tuberculosis (TB) co-infected patients after receiving two non-nucleoside reverse transcriptase inhibitors (NNRTIs)-based antiretroviral therapy (ART).*
Material and Method: *From an open label, randomized, comparative trial comparing treatment outcome between HIV and TB co-infected patients receiving nevirapine (NVP) or efavirenz (EFV) combined with stavudine and lamivudine, patient's body mass index (BMI), CD4 cell count, plasma HIV-1 RNA, fasting blood glucose, plasma total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), and triglyceride (TG) were collected at baseline, 24, and 48 weeks of ART.*
Results: *Of the 121 patients included in the present study, mean (SD) age was 36.9 (8.4) years and 66% were male. After 48 weeks of ART, the median (IQR) percentage of TC, LDL-C, HDL-C and TG values were 21.1% (5.4-40.7), 23.5% (-0.8-49.8), 22.7% (0-50) and -1.0% (-34.6-32.2) respectively. The median (IQR) percentage change of the HDL-C value was significantly higher in NVP-based than EFV-based ART (31.9 [9.6-50.0] vs. 12.2 [-8.8-51.2]; p = 0.03). The proportions of patients with high TC (21.5%) and high LDL-C (29.2%) increased and low HDL-C (11.6%) decreased significantly at 48 weeks of ART, compared to baseline (all, p < 0.01). The proportions of patients with high TC, high TG and low HDL-C were significantly higher in the EFV group than in the NVP group (p = 0.03 for high TC, p = 0.01 for high TG and p < 0.01 for low HDL-C).*
Conclusion: *NNRTI-based ART is associated with increases of TC, LDL-C and HDL-C values in Thai HIV and TB co-infected patients. More favorable lipid profile is observed in NVP-based than EFV-based ART.*

Keywords: *Lipid profile change, HIV, Non-nucleoside reverse transcriptase inhibitors, Thai*

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Dyslipidemia has been observed in HIV-infected patients who receive highly active antiretroviral therapy (HAART). The changes in lipid profile differ among antiretroviral regimens. Protease inhibitors (PIs) based regimens are associated with increased levels of total cholesterol (TC), triglycerides (TG) and low density lipoprotein cholesterol (LDL-C)[1-3] while non-nucleoside reverse transcriptase inhibitors (NNRTIs)-based regimens are associated with marked increases of high density lipoprotein cholesterol (HDL-C) and lesser increases of LDL-C and TG[4,5]. The predominant effect of nucleoside analogue reverse transcriptase inhibitors (NRTI) is an increase in the serum TG and stavudine has the most potent hypertriglyceridemic effect in this class[6]. Dyslipidemia may predispose HIV-infected patients to develop coronary heart disease. The incidence of myocardial infarction in HIV-infected patients increases with longer exposure to combined antiretroviral therapy (ART)[7]. Increased exposure to PI is associated with an increased risk of myocardial infarction, which is partly explained by dyslipidemia[8].

In Thailand, the majority of HIV-infected patients receive NNRTI-based ART as the first line antiretroviral regimen. Dyslipidemia after receiving NNRTI-based ART has been reported in Thai HIV-infected children[9] but data is scanty in Thai HIV-infected adult. In the present study, the authors analyzed lipid profile changes of Thai HIV and tuberculosis (TB) co-infected patients who received NNRTI-based ART in a prospective randomized clinical trial named "Efavirenz-Based Versus Nevirapine-Based

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Antiretroviral Therapy Among HIV-Infected Patients Receiving Rifampicin" (the N2R study, Clinical Trials.gov Identifier: NCT00483054)[10]. The aims were to know the pattern of lipid profile changes of Thai HIV and TB co-infected patients after receiving NNRTI-based ART and compare lipid profile changes between nevirapine (NVP)-based and efavirenz (EFV)-based regimens. The results of this prospective longitudinal study in a subset of HIV-infected population can be the preliminary data for further studies about long-term metabolic complications of ART in Thai HIV-infected patients.

Material and Method

In the N2R study, 142 HIV and TB co-infected patients (71 patients per group) were initially enrolled between December 2006 and October 2007 at Bamrasnaradura Infectious Diseases Institute, Ministry of Public Health. All patients were followed-up for 48 weeks after the initiation of ART. The inclusion criteria were as follows: (1) aged 18-60 years (2) active TB diagnosed by clinical features plus acid-fast stain and/or culture positive for *Mycobacterium* tuberculosis, (3) receipt of treatment with a rifampicin-containing anti-TB regimen 4-16 weeks before enrollment, (4) naive to ART and (5) CD4 cell count < 350 cells/mm^3. Exclusion criteria were as follows: (1) aspartate aminotransferase and alanine amino-transferase levels > 5 times the upper limit of normal range, (2) serum creatinine level > 2 mg/dL, (3) receipt of a medication that has drug-drug interactions with NVP or EFV, (4) receipt of immunosuppressive drugs and (5) pregnancy or lactation. All patients received oral lamivudine (150 mg every 12 hours) and oral stavudine (30 mg every 12 hours for those who weighed equal or less than 60 kg and 40 mg every 12 hours for those who weighed > 60 kg). Patients were randomized to receive either EFV 600 mg at bedtime while fasting or NVP 200 mg every 12 hours. Patients who received NVP, the started therapy at a dosage of 200 mg every 24 hours for the first 2 weeks followed by an increase to 200 mg every 12 hours thereafter.

In the present study, which is the sub-study of the N2R study, patients were included if they had remained on randomized treatment for 48 weeks and if three plasma lipid profiles were available at baseline, weeks 24 and 48 of treatment. Demographic data was recorded. Patient's body mass index (BMI), fasting blood glucose, plasma TC, TG, HDL-C, LDL-C, CD4 cell count, and plasma HIV-1 RNA were collected at weeks 0, 24, and 48 of ART. TC, HDL-C, LDL-C and TG values were measured, after 12 hours fast, using an automatic analyzer (Roche Cobas Integra 400 plus, Switzerland). The TC and TG values were measured by enzymatic colorimetric test while the HDL-C and LDL-C values were directly measured by homogeneous enzymatic colorimetric test. The within-run and between-run percentage coefficient of variation of each lipid value measurement by the instrument was less than 5% (user manual's information). The CD4 cell count was measured by flow cytometry using monoclonal antibodies with three colors reagent (TriTest, Beckton Dickinson Biosciences, USA).

Abnormal lipid values were defined according to the US National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) guideline[11], as follow: High TC, TC value equal or more than 240 mg/dL; High LDL-C, LDL-C value equal or more than 160 mg/dL; Low HDL-C, HDL-C value less than 40 mg/dL; high TG, TG value equal or more than 200 mg/dL

Data collected in the present study were analyzed using the Statistical Package for Social Sciences version 15 (SPSS Inc, Chicago, IL). Categorical variables, such as patient's gender were expressed in frequencies and percentages, whereas numerical variables such as patient's age were expressed in means and standard deviation or medians with twenty-fifth and seventy-fifth inter-quartile range. The percentage change of the lipid value from week 0 to 48 of ART was calculated for each patient as [(lipid value at week 48-lipid value at week 0)/lipid value at week 0] x 100. To compare categorical variables or continuous variables between the two treatment groups the authors used the Student's t-test or the Mann-Whitney U test or the Chi-square test. Lipid values at 24 and 48 weeks of ART were compared with baseline lipid values using the paired-samples t-test. The proportion of patients with abnormal lipid values at baseline and 48 weeks of ART were compared by the McNemar test. A p-value < 0.05 was considered to be statistically significant. The N2R study was conducted in accordance with the guidelines of the Helsinki Declaration of 2000 and approved by the ethical review committees for research in human subjects, Ministry of Public Health (document no 121/2006). All patients provided written, informed consent before enrollment.

Results

Among the 142 patients, 21 patients were excluded because of death (8 patients), lost to follow-up (10 patients), transferred out (1 patient), missed lipid

profile's data at week 48 (1 patient), and change NNRTI to PI based regimen (1 patient). NVP was switched to EFV because of NVP allergy in three patients at weeks 6, 12 and 34. EFV was switched to NVP due to EFV allergy in one patient at week 6. No patients took lipid-lowering drugs during the 48 weeks of the present study. Among the remaining 121 patients, 80 (66%) patients were male, the mean (SD) age was 36.9 (8.4) years, the median (IQR) CD4 cell count was 44 (23-96) cells/mm^3 and the mean (SD) BMI was 20.2 (4.3) kg/m^2. At baseline, the mean (SD) TC, LDL-C, HDL-C and TG values were 164.5 (31.2) mg/dL, 108.1 (24.5) mg/dL, 47.2 (16.7) mg/dL and 140.6 (56.9) mg/dL respectively. Two (1.4%) patients, five (3.5%) patients, 50 (35.2%) patients and 19 (13.4%) patients had high TC, high LDL-C, low HDL-C and high TG respectively. The baseline characteristics of patients stratified by treatment group are shown in Table 1. There were no difference in baseline characteristics and lipid profile between the NVP group and the EFV group ($p > 0.05$).

At 48 weeks of ART, the patients' mean (SD) BMI was 23.3 (5.1) kg/m^2, mean (SD) fasting blood glucose was 98.1 (19.2) mg/dL, median (IQR) CD4 cell count increased to 235 (150-340) cells/mm^3 and 110 patients (91%) had less than 50 copies/ml of plasma HIV-1 RNA. The mean TC and LDL-C values increased continuously over 48 weeks of ART. The mean HDL-C value increased at 24 weeks then decreased to slightly less than the week 24 value at 48 weeks of ART (for all changes, $p < 0.01$). The mean TG value significantly decreased ($p < 0.01$) at 24 weeks of ART then increased to the comparable mean baseline value at 48 weeks of ART ($p = 0.98$, Fig. 1). The mean (SD) lipid values and the median (IQR) percentage change from baseline of lipid values at 48 weeks of ART were 202.2 (44.8) mg/dL; 21.1% (5.4-40.7) for TC, 135.1 (40.0) mg/dL; 23.5% (-0.8-49.8) for LDL-C, 56.8 (16.1) mg/dL; 22.7% (0-50) for HDL-C and 140.4 (77.9) mg/dL; and -1.0% (-34.6-32.2) for TG. Compared to baseline, there were significant increases in the proportions of patients with high TC (1.7% vs. 21.5%, $p < 0.01$) and high LDL-C (1.7% vs. 29.2%, $p < 0.01$) and the significant decrease of patients with low HDL-C (33.1% vs. 11.6%, $p < 0.01$) at 48 weeks of ART. The proportion of patients with high TG at 48 weeks of ART was higher than at baseline but the difference was not statistically significant (14.9% vs. 18.2%, $p = 0.59$).

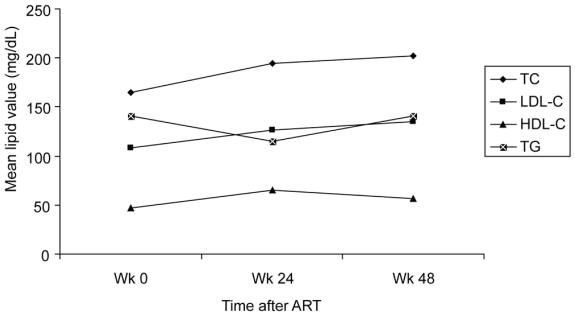

Fig. 1 Lipid profile changes after 24 and 48 weeks of NNRTI based ART

Compared between men (80 cases) and women (41 cases), there was no significant difference of each mean (SD) lipid value at baseline. At 48 weeks of ART, each mean (SD) lipid value in men and women was also not significantly different except the mean (SD) TG value was higher in men than women significantly (Table 2).

Compared between NVP-based and EFV-based ART, there were significantly higher of the

Table 1. Baseline characteristics of 121 HIV infected patients receiving NNRTI-based ART

Characteristics	Nevirapine (n = 56)	Efavirenz (n = 65)	p-value
Male, No. (%)	38 (67.9)	42 (64.6)	0.71
Age, years, mean (SD)	38.4 (9.5)	35.5 (7.2)	0.06
BMI, kg/m^2, mean (SD)	20.8 (5.4)	19.6 (3.0)	0.10
CD4 count, cells/mm^3, mean (SD)	77 (74)	65 (63)	0.36
CD4 count, cells/mm^3, median (IQR)	45 (26-105)	42 (20-92)	0.30
Plasma HIV-1 RNA level, copies/mL, mean (SD)	552,200 (339,552)	680,035 (364,859)	0.05
TC, mg/dL, mean (SD)	162.3 (30.6)	166.4 (31.8)	0.48
LDL-C, mg/dL, mean (SD)	106.0 (22.8)	109.8 (25.9)	0.40
HDL-C, mg/dL, mean (SD)	47.1 (15.8)	47.2 (17.5)	0.99
TG, mg/dL, mean (SD)	136.8 (52.2)	143.9 (60.8)	0.50
Fasting blood glucose, mg/dL, mean (SD)	86.2 (16.3)	92.2 (24.3)	0.12

mean (SD) LDL-C and TG values in the EFV group than in the NVP group (142.4 [42.6] mg/dL vs. 127.5 [35.5] mg/dL; p = 0.04 for LDL-C, 155.9 [91.8] mg/dL vs. 122.5 [53.0] mg/dL; p = 0.01 for TG) and significantly higher of the mean (SD) HDL-C value in the NVP group than in the EFV group (61.4 [16.6] mg/dL vs. 52.8 [14.6] mg/dL; p < 0.01) at 48 weeks of ART. The mean (SD) TC value in the EFV group was higher than the mean (SD) TC value in the NVP group but the difference was not statistically significant (207.9 [51.1] mg/dL vs. 195.6 [35.5] mg/dL; p = 0.12, Fig. 2). The median (IQR) percentage change of the HDL-C value was significantly higher in the NVP group than in the EFV group (31.9% [9.6-50.0] vs. 12.2% [-8.8-51.2]; p = 0.03). The median (IQR) percentage change of the TG value in the NVP group was -6.8% (-37.6-27.4) while the median (IQR) percentage change of the TG value in the EFV group was 11.9% (-29.4-41.5); p = 0.04). The median (IQR) percentage change of TC and LDL-C values were higher in the EFV group than in the NVP group but the differences were not statistically significant (27.3 [3.3-43.4] vs. 20.7 [5.6-37.1]; p = 0.54 for TC, 31.2 [0.1-67.9] vs. 18.5 [-1.6-42.9]; p = 0.20 for LDL-C, Fig. 3).

At 48 weeks of ART, the proportion of patients with high TC, high TG and low HDL-C were significantly higher in the EFV group than in the NVP group (29.2% vs. 12.5%; p = 0.03 for high TC, 20.0% vs. 1.8%; p < 0.01 for low HDL-C, 26.2% vs. 8.9%; p = 0.01 for high TG). The proportion of patients with high LDL-C was higher in the EFV group than in the NVP group but the difference was not statistically significant. (36.9% vs. 21.4%; p = 0.06, Table 3).

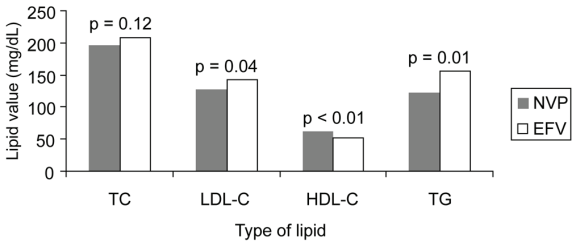

Fig. 2 Mean plasma lipid concentrations at 48 weeks of NNRTI-based ART, compared between NVP and EFV

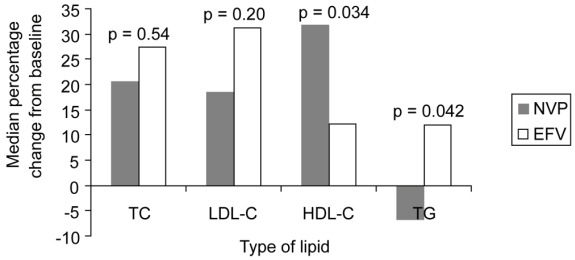

Fig. 3 Median precentage change from baseline of lipid values after 48 weeks of NNRTI-based ART, compared between NVP and EFV

Table 2. Plasma lipid concentrations at baseline and 48 weeks of NNRTI- based ART compared between men and women

Lipid profiles	Baseline			48 weeks of ART		
	Men (n = 80)	Women (n = 41)	p-value	Men (n = 80)	Women (n = 41)	p-value
TC, mg/dL, mean (SD)	161.5 (28.9)	171.6 (39.8)	0.87	200.0 (44.6)	208.5 (45.1)	0.27
LDL-C, mg/dL, mean (SD)	105.6 (22.4)	112.7 (33.9)	0.14	132.6 (38.8)	141.2 (42.2)	0.26
HDL-C, mg/dL, mean (SD)	46.4 (17.8)	48.2 (17.6)	0.56	55.1 (16.1)	60.1 (15.6)	0.11
TG, mg/dL, mean (SD)	143.0 (54.6)	134.4 (53.7)	0.38	150.6 (80.5)	120.5 (69.2)	0.04

Table 3. Compared proportion of the patients with abnormal lipid value at week 48 of ART between NVP-based and EFV-based regimens

Type of abnormal lipid value	NVP-based regimen (n = 56)	EFV-based regimen (n = 65)	Odds ratio (95% CI)	p-value
High TC	7 (12.5%)	19 (29.2%)	0.35 (0.14-0.91)	0.03
High LDL-C	12 (21.4%)	24 (36.9%)	0.45 (0.20-1.00)	0.06
Low HDL-C	1 (1.8%)	13 (20.0%)	0.07 (0.01-0.59)	<0.01
High TG	5 (8.9%)	17 (26.2%)	0.28 (0.10-0.83)	0.01

Discussion

In the present prospective study of TB and HIV co-infected patients who received NNRTIs-based ART, the authors found the normal range of mean lipid values with a low proportion of patients with high TC, high LDL-C and about one-third of patients with low HDL-C at baseline. After 48 weeks of ART, the mean TC, LDL-C and HDL-C values increased significantly while the mean TG value was unchanged. The proportions of patients with high TC and high LDL-C increased to 21.5% and 29.2% respectively. These findings are compatible to the previous studies in other countries[12-14].

In a randomized control trial of NNRTI-based ART (didanosine plus lamivudine plus either NVP or EFV) in 140 TB and HIV co-infected patients from India, the mean TC, LDL-C and HDL-C levels were low whereas the TG level was in the normal range at baseline. After one year of treatment, the mean TC, LDL-C and HDL-C levels increased by 54, 30 and 21 mg/dL respectively while the mean TG level was comparable to baseline[12]. The study from rural Uganda which is a prospective cohort study of 374 advanced HIV infected patients initiating NVP (98%) or EFV (2%) based ART (stavudine plus lamivudine as NRTI backbone) showed the TC, LDL-C and HDL-C levels increased by a median of 23%, 51% and 61% respectively while the TG level decreased by a median of 13% during 2 years of treatment[13]. In both studies above, despite increases of the TC and LDL-C values, the mean TC and LDL-C value at the end of the studies were within normal range while in the present study the mean TC and LDL-C values at 48 weeks of ART were borderline high according to the NCEP classification[11]. The low socioeconomic status of the study population in Uganda and lack of stavudine in antiretroviral regimens of the study in India may be the reason for the lower mean lipid values. In the Swiss HIV cohort study, which is a prospective cohort study of 1065 HIV infected patients starting HAART after April 2000, the HDL-C level increased and the TG level decreased with increasing exposure to NNRTI-based therapy. Between NNRTI-based therapies, the only difference was in the TG level which tended to increase with increasing exposure to EFV and to decrease with increasing exposure to NVP[14]. The different effect of each NNRTI in the TG level found in the Swiss HIV cohort study is as same as the finding in the present study.

The mechanism underlying lipid profile changes by NNRTI is unclear except for the increase of HDL-C value. NVP or EFV may increase the HDL-C level by stimulation of apoA-1 production which was demonstrated in one study in mice[15] and another study in human subjects[16]. The substantial increase of the HDL-C level in HIV infected patients treated with NNRTI based ART is interesting because the elevated HDL-C level is associated with the reduced risk of the coronary heart disease[17].

In the present study, the authors also found more increase of the HDL-C value in the NVP-based than in the EFV-based ART. This finding is consistent with the 2NN study, which is the large multi-center NNRTI-based ART trial[18]. The 2NN study showed the larger increase of the HDL-C value and the lesser increase of the TG value in the NVP group than in the EFV group while the change of the TC and LDL-C values were not significantly different between the two treatment groups. The more favorable lipid profile in the NVP group than in the EFV group make NVP to be the NNRTI of choice in HIV infected patients who have high cardiovascular risk.

The present study has some limitations. First, the present study performs on TB associated with HIV infected patients who usually have poor nutritional status so the subject may not represent HIV infected patients in general. Second, the rather low number of subjects included in the present study may influence the validity of the result. Further study with a large sample size and more diverse HIV infected subjects should be performed to confirm this finding.

In conclusion, NNRTI-based ART is associated with increases of the TC, LDL-C, and HDL-C values in Thai HIV-infected patients. The increase of HDL-C value was significantly higher in NVP-based than EFV-based ART. A larger proportion of patients with high TC, low HDL-C and high TG were observed in EFV-based than NVP-based ART. Due to relatively favorable lipid profile, NVP-based ART should be considered in HIV infected patients who have high cardiovascular risk.

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Potential conflicts of interest

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References

1. Carr A, Samaras K, Thorisdottir A, Kaufmann GR, Chisholm DJ, Cooper DA. Diagnosis, prediction, and natural course of HIV-1 protease-inhibitor-associated lipodystrophy, hyperlipidaemia, and diabetes mellitus: a cohort study. Lancet 1999; 353: 2093-9.
2. Behrens G, Dejam A, Schmidt H, Balks HJ, Brabant G, Korner T, et al. Impaired glucose tolerance, beta cell function and lipid metabolism in HIV patients under treatment with protease inhibitors. AIDS 1999; 13: F63-70.
3. Periard D, Telenti A, Sudre P, Cheseaux JJ, Halfon P, Reymond MJ, et al. Atherogenic dyslipidemia in HIV-infected individuals treated with protease inhibitors. The Swiss HIV Cohort Study. Circulation 1999; 100: 700-5.
4. van der Valk M, Kastelein JJ, Murphy RL, van Leth F, Katlama C, Horban A, et al. Nevirapine-containing antiretroviral therapy in HIV-1 infected patients results in an anti-atherogenic lipid profile. AIDS 2001; 15: 2407-14.
5. Tashima KT, Bausserman L, Alt EN, Aznar E, Flanigan TP. Lipid changes in patients initiating efavirenz- and indinavir-based antiretroviral regimens. HIV Clin Trials 2003; 4: 29-36.
6. Bennett MT, Johns KW, Bondy GP. Current and future treatment of HIV-associated dyslipidemia. Future Lipidol 2008; 3: 175-88.
7. Friis-Moller N, Sabin CA, Weber R, d'Arminio MA, El Sadr WM, Reiss P, et al. Combination antiretroviral therapy and the risk of myocardial infarction. N Engl J Med 2003; 349: 1993-2003.
8. DAD Study Group, Friis-Moller N, Reiss P, Sabin CA, Weber R, Monforte A, El Sadr W, et al. Class of antiretroviral drugs and the risk of myocardial infarction. N Engl J Med 2007; 356: 1723-35.
9. Aurpibul L, Puthanakit T, Lee B, Mangklabruks A, Sirisanthana T, Sirisanthana V. Lipodystrophy and metabolic changes in HIV-infected children on non-nucleoside reverse transcriptase inhibitor-based antiretroviral therapy. Antivir Ther 2007; 12: 1247-54.
10. Manosuthi W, Sungkanuparph S, Tantanathip P, Lueangniyomkul A, Mankatitham W, Prasithsirikul W, et al. A randomized trial comparing plasma drug concentrations and efficacies between 2 nonnucleoside reverse-transcriptase inhibitor-based regimens in HIV-infected patients receiving rifampicin: the N2R Study. Clin Infect Dis 2009; 48: 1752-9.
11. Executive summary of the third report of The National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). JAMA 2001; 285: 2486-97.
12. Padmapriyadarsini C, Ramesh KS, Terrin N, Narendran G, Menon PA, Ramachandran G, et al. Dyslipidemia among HIV-infected Patients with tuberculosis taking once-daily nonnucleoside reverse-transcriptase inhibitor-based antiretroviral therapy in India. Clin Infect Dis 2011; 52: 540-6.
13. Buchacz K, Weidle PJ, Moore D, Were W, Mermin J, Downing R, et al. Changes in lipid profile over 24 months among adults on first-line highly active antiretroviral therapy in the home-based AIDS care program in rural Uganda. J Acquir Immune Defic Syndr 2008; 47: 304-11.
14. Young J, Weber R, Rickenbach M, Furrer H, Bernasconi E, Hirschel B, et al. Lipid profiles for antiretroviral-naive patients starting PI- and NNRTI-based therapy in the Swiss HIV cohort study. Antivir Ther 2005; 10: 585-91.
15. Tohyama J, Billheimer JT, Fuki IV, Rothblat GH, Rader DJ, Millar JS. Effects of nevirapine and efavirenz on HDL cholesterol levels and reverse cholesterol transport in mice. Atherosclerosis 2009; 204: 418-23.
16. Franssen R, Sankatsing RR, Hassink E, Hutten B, Ackermans MT, Brinkman K, et al. Nevirapine increases high-density lipoprotein cholesterol concentration by stimulation of apolipoprotein A-I production. Arterioscler Thromb Vasc Biol 2009; 29: 1336-41.
17. Wilson PW, Abbott RD, Castelli WP. High density lipoprotein cholesterol and mortality. The Framingham Heart Study. Arteriosclerosis 1988; 8: 737-41.
18. van Leth F, Phanuphak P, Stroes E, Gazzard B, Cahn P, Raffi F, et al. Nevirapine and efavirenz elicit different changes in lipid profiles in antiretroviral-therapy-naive patients infected with HIV-1. PLoS Med 2004; 1: e19.

ความเปลี่ยนแปลงของไขมันในเลือดของผู้ป่วยเอชไอวีร่วมกับวัณโรคชาวไทยที่ได้รับยาต้านไวรัสเอชไอวีที่มี nonnucleoside reverse transcriptase inhibitors เป็นพื้นฐาน

วิโรจน์ หมั่นคติธรรม, อรุณ เหลืองนิยมกุล, วีรวัฒน์ มโนสุทธิ

วัตถุประสงค์: เพื่อศึกษาและเปรียบเทียบความเปลี่ยนแปลงของไขมันในเลือดของผู้ป่วยเอชไอวีร่วมกับวัณโรคที่ได้รับยาต้านไวรัสเอชไอวีที่มี nonnuceoside reverse transcriptase inhibitors (NNRTI) เป็นพื้นฐานสองชนิด

วัสดุและวิธีการ: ในการศึกษาแบบสุ่มชนิดเปิดที่เปรียบเทียบผลการรักษาของผู้ป่วยเอชไอวีร่วมกับวัณโรคที่ได้รับยา nevirapine (NVP) หรือ efavirenz (EFV) ร่วมกับยา stavudine และ lamivudine ดัชนีมวลกายของผู้ป่วย, จำนวนเม็ดเลือดขาวชนิด CD4 ในเลือด, ปริมาณเชื้อไวรัสเอชไอวีในพลาสมา, ค่าน้ำตาลในเลือดขณะอดอาหาร, ค่าโคเลสเตอรอลรวม (TC), low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C) และค่าไตรกลีเซอไรด์ (TG) ในพลาสมาได้รับการตรวจที่สัปดาห์ที่ 0, 24 และ 48 ของการรักษาด้วยยาต้านไวรัสเอชไอวี

ผลการศึกษา: จากจำนวนผู้ป่วย 121 ราย ที่เข้าร่วมการศึกษาอายุเฉลี่ย 36.9 ปี และ 66% เป็นเพศชายภายหลัง 48 สัปดาห์ ของการรักษาด้วยยาต้านไวรัสเอชไอวีค่ามัธยฐาน (พิสัยควอไทล์) ของเปอร์เซ็นต์การเปลี่ยนแปลงจากเริ่มต้นของค่า TC, LDL-C และ HDL-C และ TG เท่ากับ 21.1 (5.4-40.7)%, 23.5 (-0.8-49.8)%, 22.7 (0-50)% และ -1.0 (-34.6-32.2)% ตามลำดับ ค่ามัธยฐาน (พิสัยควอไทล์) ของเปอร์เซ็นต์การเปลี่ยนแปลงของค่า HDL-C ในกลุ่ม NVP มากกว่ากลุ่ม EFV อย่างมีนัยสำคัญทางสถิติ (31.9 [9.6-50.0] กับ 12.2 [-8.8-51.2]; p =0.03) ที่ 48 สัปดาห์ของการรักษาด้วยยาต้านไวรัสเอชไอวี, สัดส่วนของผู้ป่วยที่มีค่า TC สูง (21.5%), LDL-C สูง (29.2%) เพิ่มขึ้น และค่า HDL-C ต่ำ (11.6%) ลดลงเทียบกับเมื่อเริ่มต้นอย่างมีนัยสำคัญทางสถิติ (ทั้งหมด $p < 0.01$) สัดส่วนของผู้ป่วยที่มีค่า TC สูง, TG สูง และ HDL-C ต่ำพบในกลุ่ม EFV มากกว่า กลุ่ม NVP อย่างมีนัยสำคัญทางสถิติ ($p = 0.03$ สำหรับค่า TC สูง, $p = 0.01$ สำหรับค่า TG สูง, $p < 0.01$ สำหรับค่า HDL-C ต่ำ)

สรุป: การใช้ยาต้านไวรัสเอชไอวีที่มี NNRTI เป็นพื้นฐานทำให้ค่า TC, LDL-C, HDL-C ในเลือดของผู้ป่วยเอชไอวีร่วมกับวัณโรคชาวไทยสูงขึ้น กลุ่มที่ได้รับ NVP มีค่าไขมันในเลือดที่มีผลดีต่อโรคหลอดเลือดหัวใจมากกว่ากลุ่มที่ได้รับ EFV