

Introduction

- The implementation of combination antiretroviral therapy (ART) has profoundly decreased mortality and disease progression in children infected with HIV. However, morbidity from the long-term effects of ART has grown importance.
- Dyslipidemia is one of the major concerning long-term complications of ART¹. The prevalence of dyslipidemia was associated with drug regimen. Hypercholesterolemia was reported in 15% of children who prescribed protease inhibitors (PIs) and 6% for those prescribed non-nucleoside reverse transcriptase inhibitors (NNRTIs)².
- Data from previous studies were reported that HIV infection itself affects lipids metabolism by decrease total cholesterol (TC), high density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C). After initiation of antiretroviral therapy will lead to the restoration to pre-infection serum lipid levels³⁻⁴.
- Data from adult cohort who received NNRTI-based regimens have been reported to be associated with changes in plasma lipids of potential benefit with respect to the risk of developing cardiovascular disease (CVD)⁵.

Study Objective

The aim of this study is to determine the prevalence of dyslipidemia in children who received NNRTI-based antiretroviral therapy for at least 2 years.

Patients and Methods

Inclusion criteria

- HIV-infected children aged 4 to 15 years
- Received nevirapine (NVP) or efavirenz (EFV) in combination with stavudine and lamivudine for at least 2 years.

Laboratory methods

- Plasma samples for determination of lipids were collected at baseline and at weeks 24, 48, 72 and 96 of ART. Plasma samples were obtained after a 12-hour fast.
- Plasma concentration of total cholesterol (TC), high density lipoprotein cholesterol (HDL-C) and triglyceride (TG) were assessed by standard enzymatic assays. The concentration of low density lipoprotein cholesterol (LDL-C) was calculated using the Friedewald equation.

Definition

Dyslipidemia was defined as ≥ 2 abnormal measurements according to the National Cholesterol Education Program (NCEP) guidelines as follow⁶

- Hypercholesterolemia: TC ≥ 200 mg/dl and LDL-C ≥ 130 mg/dl.
- Hypertriglyceridemia: TG ≥ 200 mg/dl.
- Hypo-high density lipoprotein cholesterol: HDL-C ≤ 40 mg/dl.

Results

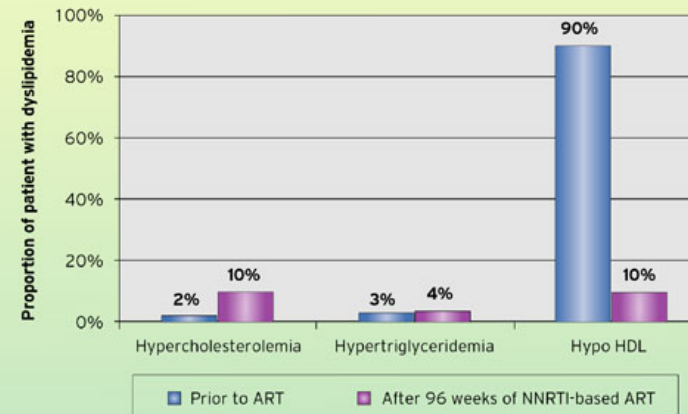
Table 1 Baseline characteristics of patients before initiation of ART

	All patients (N=116)	Nevirapine group (N=52)	Efavirenz group (N=64)	P-value
Male, n(%)	53(46%)	27 (52%)	26 (41%)	0.22
Age (years)	8.2 (2.6)	7.8 (2.7)	8.5 (2.4)	0.13
Weight for age Z-score (WAZ)	-1.8 (0.9)	-1.8 (1.1)	-1.8 (0.7)	1.00
Height for age Z-score (HAZ)	-2.3 (1.5)	-2.0 (1.8)	-2.5 (1.1)	0.11
CD4 percentage (%)	5.9 (5.3)	5.3(5.4)	6.3(5.8)	0.32
CD4 cell count (cell/mm3)	156(184)	145(204)	165(167)	0.58
Plasma HIV-1 RNA (log ₁₀ copies/mL)	5.3(0.5)	5.3(0.5)	5.4(0.5)	0.67

* data shown as mean(SD).

Proportion of children with dyslipidemia

Figure 1 Proportion of patient with dyslipidemia at baseline and after 96 weeks of ART



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Pattern of change in plasma lipid profiles over time

- Initiation of a NNRTI-based ART regimen is accompanied by a significant increase of total cholesterol, LDL-cholesterol, HDL-cholesterol and triglyceride.
- However, TC:HDL-C ratio which is a risk factor of future cardiovascular events, is significantly reduced after 48 weeks of NNRTI-based antiretroviral therapy.

Table 2 Lipid values over time are shown in the table as mean(SD).

Study week	TC (mg/dl)	LDL-C (mg/dl)	HDL-C (mg/dl)	TC: HDL-C ratio	TG (mg/dl)
0	128(31)	80 (33)	27(9)	5.2 (1.7)	109(66)
24	167(32)	100(28)	44(14)	4.1 (1.1)	114(59)
48	173(38)	100(31)	50(15)	3.6 (1.0)	113(70)
72	177(40)	104(32)	52(16)	3.7 (1.2)	113(78)
96	180(35)	102(29)	53(16)	3.6 (1.2)	125(94)

* data shown as mean(SD).

Comparison between children who received nevirapine and efavirenz regimen

- At week 96, children who received NVP had significantly higher HDL level than those who received EFV
Mean (SD) of HDL: NVP group 58(19) versus EFV group 50(13) mg/dl; p=0.01
- At week 96, children who received NVP had significantly lower TC:HDL-C ratio than those who received EFV
Mean (SD) of TC:HDL-c ratio: NVP group 3.4 (1.2) versus EFV group 3.8 (1.2); p=0.04

Conclusions

- There is a low prevalence of dyslipidemia (less than 10%) among children treated with NNRTI-based antiretroviral therapy for 2 years.
- Plasma lipids of potential benefit with respect to the risk of developing cardiovascular disease; higher HDL-C level and a lower TC:HDL-C ratio, are observed after initiation of treatment.
- Children who received NVP had more favorable lipid profile than one who received EFV.

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