NON-HIGH-DENSITY LIPOPROTEIN CHOLESTEROL LEVEL LINKED WITH INCIDENCE OF CHRONIC KIDNEY DISEASE IN HIV INFECTED PATIENTS

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INTRODUCTION

- HIV-infected patients receiving antiretroviral therapy (cART) have a high likelihood of dyslipidemia.
- However, it has not been fully understood whether the presence of dyslipidemia predisposes HIV-infected patients to kidney disease.

OBJECTIVES

- Correlation between non HDL-C and incident CKD.

METHODS

Longitudinal study for six-years.

Subjects:

•A total of 605 HIV-infected patients who had eGFR ≥ 60ml/min/m^2.

Methods:

•Incident CKD: eGFR less than 60 ml/min/1.73m^2 during follow-up period,

•*Multivariable linear regression analysis*: factors associated with non HDL-C.

•*Kaplan Meier analysis:* Cumulative survival rate.

•*Cox proportional hazards regression model*: Mortality HR with 95% CI, adjusted for age, sex, prevalence of hypertension, prevalence of diabetes mellitus, presence or absence of cART, duration of cART use, albuminuria, eGFR, and high HIV viral load (≥ 50 copies/mL) at baseline.

RESULTS

Table 1. Demographics and laboratory characteristics

	High non HDL-C (N = 303)	Low non HDL-C (N = 302)	*P* value
Age (y)	48 ± 11	43 ± 11	<0.0001*
Men (%)	91.0	90.2	0.7815
Japanese (%)	93.3	94.4	0.6137
Prevalence of HT (%)	15.4	19.0	0.2812
Prevalence of DM (%)	8.33	2.62	0.0021*
Prevalence of hepatitis C (%)	2.00	4.59	0.1096
cART+ (%)	92.8	87.4	0.0410*
PI+ (%)	80.7	74.8	0.0967
Duration of cART use (y)	5 ± 3	4 ± 3	0.0005*
UACR (mg/g)	114.9 ± 745.9	34.8 ± 102.9	0.0163*
eGFR (ml/min/1.73m^2)	87.1 ± 15.1	90.2 ± 17.7	0.0737
CD4 (cells/μL)	445 ± 216	389 ± 188	0.0013*
HIV-RNA (< 50 copies/mL, %)	86.7	76.7	0.0016*
Non HDL-C (mg/dL)	170.9 ± 32.0	107.0± 18.6	<0.0001*

HDL-C, high-density lipoprotein cholesterol; HT, hypertension; DM, diabetes mellitus; cART, combination anti retroviral therapy; PI, protease inhibitor; UACR, urinary albumin creatinine ratio; eGFR, estimated glomerular filtration rate; HIV, human immune deficiency virus-1. Asterisk (*) indicates that the parameter has statistical significance.

Figure 2. 6-year cumulative survival rate of incident CKD stratified by median value of non HDL-C level

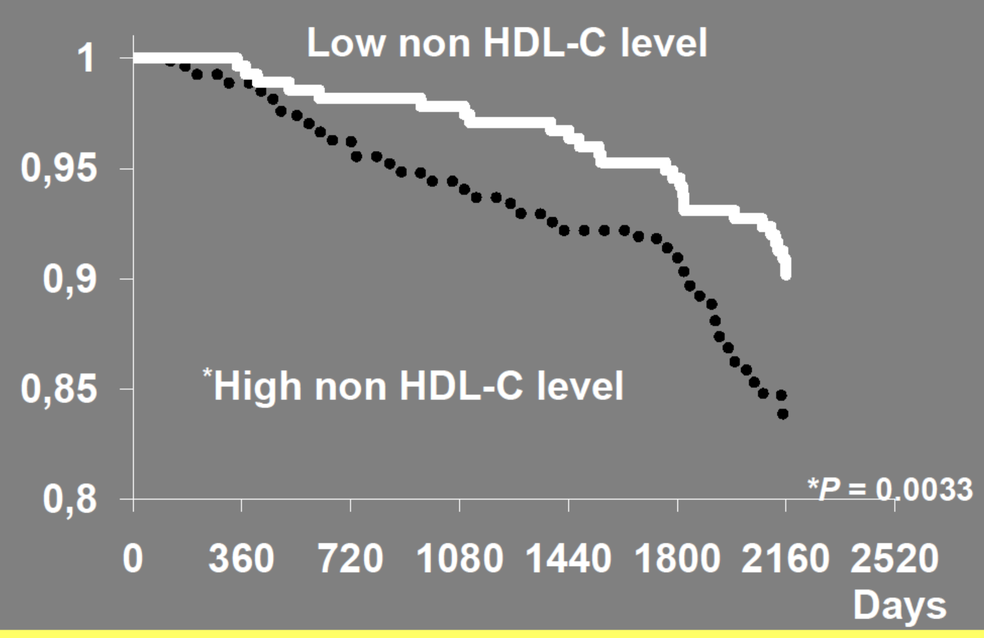

Table 2. Factors associated with non HDL-C

Factor	Multivariable linear regression analysis		
	β ± SE	Standardized β	P-value
Age	0.375 ± 0.174	0.101	0.0317*
Sex, men	1.897 ± 2.944	0.027	0.5198
Prevalence of HT	-0.879 ± 2.308	-0.016	0.7032
Prevalence of DM	13.48 ± 3.942	0.151	0.0007*
cART+	12.28 ± 7.148	0.074	0.0862
Average duration of cART use	0.499 ± 0.599	0.036	0.4526
eGFR	-0.185 ± 0.108	-0.073	0.0903
UACR	0.009 ± 0.003	0.120	0.0060*
CD 4	0.026 ± 0.009	0.133	0.0042*
High HIV viral load+	-1.004 ± 2.943	-0.015	0.7330

HDL-C, high-density lipoprotein cholesterol; HT, hypertension; DM, diabetes mellitus; cART, combination anti retroviral therapy; eGFR, estimated glomerular filtration rate; UACR, urinary albumin creatinine ratio; HIV, human immune deficiency virus-1; β, regression coefficient; SE, standard error
Asterisk (*) indicates that the parameter has statistical significance.

Figure 1. Correlation between non HDL-C and albuminuria

There were significantly positive correlation between non HDL-C and albuminuria.

Hypothesis : diagram of relationship between them

Table 3. Cox hazard analysis for incident CKD

Variable	Univariable analysis		Multivariable analysis	
	HR (95% CI)	*P*-value	HR (95% CI)	*P*-value
High non HDL-C	1.99 (1.26-3.22)	0.0031*	1.63 (1.02-2.67)	0.0423*
Age, years	1.05 (1.03-1.07)	<0.0001*	1.02 (0.99-1.04)	0.1188
Sex, men	1.28 (0.61-3.31)	0.5450		
Prevalence of HT	1.99 (1.18-3.24)	0.0110*	1.44 (0.85-2.37)	0.1734
Prevalence of DM	2.47 (1.09-4.83)	0.0314*	1.49 (0.61-3.27)	0.3609
cART+	1.42 (0.67-3.65)	0.3901		
Average duration of cART use	1.01 (0.94-1.08)	0.8772		
Albuminuria	1.002 (1.001-1.003)	<0.0001*	1.001 (1.000-1.002)	0.0127*
eGFR	0.92 (0.91-0.94)	<0.0001*	0.93 (0.91-0.95)	<0.0001*
CD 4	0.998 (0.997-0.999)	0.0070*	0.998 (0.997-0.999)	0.0026*
High HIV viral load	0.90 (0.53-1.62)	0.9661		

HDL-C, high-density lipoprotein cholesterol; CKD, chronic kidney disease; HT, hypertension; DM, diabetes mellitus; cART, combination anti retroviral therapy; eGFR, estimated glomerular filtration rate; HR, hazard ratio; CI, confidence interval
Asterisk (*) indicates that the parameter has statistical significance.

SUMMARY AND DISCUSSION

- We confirmed that positive correlation between non HDL-C and albuminuria.
  ⇒ Dyslipidemia may cause glomeruloscrerosis and interstitial fibrosis through glomerular endothelial dysfunction, podocyte injury, and mesangial damage.
- Correlation between non HDL-C and incident CKD.
  Non HDL-C was a significant factor about incident CKD.
  ⇒ There are several reported that high non-HDLC and low HDLC was associated with renal impairment.

CONCLUSIONS

HIV-infected patients with increased non-HDL-C level are more likely at high risk of future CKD. The intervention effect of lipid lowering therapy on incident CKD will be warranted in them.

52 ERA 285--SP

J3) Chronic Kidney Disease. Clinical Epidemiology.

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DOI: 10.3252/pso.eu.52era.2015

ePosters supported by F. Hoffmann- La Roche Ltd.

52nd ERA-EDTA CONGRESS London 2015 UNITED KINGDOM MAY 28 - 31

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