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Hypertriglyceridemic waist identifies HIV+ men and women at increased cardiometabolic risk

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Background

Screening for increased waist circumference and hypertriglyceridemia (the hypertriglyceridemic-waist phenotype) is an inexpensive approach to identify patients at risk of coronary artery disease in apparently healthy individuals who may be at increased risk of type 2 diabetes and coronary heart disease because of an excess of intra-abdominal (visceral) fat. We examined the relationship between the hypertriglyceridemic-waist and selected cardiometabolic risk factors in HIV individuals.

Methods

The HW phenotype was defined as a waist circumference of 90 cm or more and a triglyceride level of 2.0 mmol/L or more in men, and a waist circumference of 85 cm or more and a triglyceride level of 1.5 mmol/L or more in women. Using these threshold values a total of 2322 patients (841 women and 1481 men) with HIV aged 18-75 years were divided into 4 groups: Low TG/Low WC, High TG/Low WC, Low TG/High WC, High TG/High WC. Continuous variables were analyzed using ANOVA or Kruskal-Wallis test where appropriate; categorical variables were compared using X2-test. The relationship between the HW and cardiometabolic risk assessed with Framingham risk score (FRS) was analyzed using multivariable logistic regression analyses.

Results

Compared with patients who had a waist circumference and triglyceride level below the threshold values, those with the HW phenotype had higher visceral adipose tissue (P<0.001), higher prevalence of hypertension and the metabolic syndrome (P<0.001), higher levels of total and LDL-cholesterol (P<0.001), lower levels of high-density lipoprotein cholesterol (P<0.001), and higher values of HOMA-insulin resistance (P<0.001) as shown in Table 1.

The FRS (median 10, range 5;16) was also highest in those with the HW phenotype (P<0.001). These observations were true independent of gender and remained significant after statistical control for illicit drug use, insulin resistance, antiretroviral therapy exposure, leg fat, and proteinuria as shown in image 1. Figure 1

Conclusions

Among HIV patients from an Italian monocentric cohort, the HW phenotype was associated with a deteriorated cardiometabolic risk profile and an increased FRS. It is suggested that the simultaneous measurement and interpretation of waist circumference and fasting triglyceride could also be used among HIV patients as an inexpensive tool to identify patients with excess visceral fat and with related cardiometabolic abnormalities.

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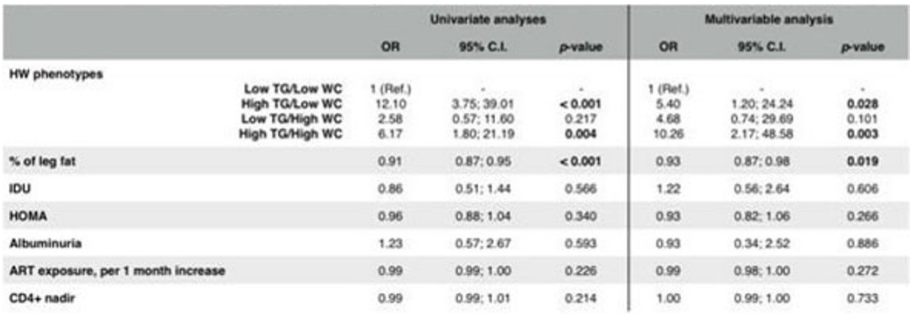
Table 1

	Low TG/Low WC	High TG/Low WC	Low TG/High WC	High TG/High WC	P value
n (%)	592 (25.50)	856 (36.86)	311 (13.39)	563 (24.25)	-
DEMOGRAPHICS					
Women, n (%)	284 (47.9)	245 (28.62)	145 (46.62)	167 (29.66)	< 0.001
Age mean (± S)	43.3 (6.7)	44.4 (6.6)	45.4 (7.7)	46.9 (7.8)	< 0.001
Physical activity, n (%)	232 (39.19)	282 (32.94)	103 (33.12)	152 (27.00)	< 0.001
Smoke (> 10 cigs/day), n (%)	187 (31.59)	285 (33.29)	73 (23.47)	165 (29.31)	0.010
Alcohol consumption, n (%)	270 (45.61)	363 (42.41)	154 (49.52)	279 (49.56)	0.032
ANTHROPOMETRICS					
BMI mean (± SD)	21.2 (2.2)	21.7 (2.3)	26.3 (3.9)	27.1 (3.8)	< 0.001
VAT cm^3, median (IQR)	75 (49; 103)	100 (67; 138)	136 (101; 194)	172 (125; 236)	< 0.001
Waist Circumference cm, median (IQR)	79 (75; 83)	81 (77; 85)	94 (90; 98)	95 (91; 101)	< 0.001
Hip Circumference cm, median (IQR)	87 (83; 90)	86 (83; 89)	94 (91; 97)	94 (90.5; 98)	< 0.001
Thigh Circumference cm, median (IQR)	45 (42.5; 48)	45 (43; 48)	49 (46; 52)	49 (46; 52)	< 0.001
% of Leg Fat, median (IQR)	12.6 (7.2; 19.9)	7.7 (5.6; 12.7)	18.1 (12.5; 26.2)	14.0 (9.9; 21.1)	< 0.001
HIV history					
IDU n (%)	201 (33.95%)	286 (33.41%)	99 (31.83%)	151 (26.82%)	< 0.001
CD4+ Nadir median (IQR)	181 (78; 260)	154 (59; 260)	189 (90; 290)	171.5 (63; 260)	0.014
CD4+ Current median (IQR)	499.5 (370; 672)	523 (364; 700)	492 (360; 658)	543.5 (375; 737)	0.113
VL undetectable n (%)	363 (61.32)	492 (57.48)	190 (61.09)	329 (58.44)	0.432
Months of PI exposure median (IQR)	24 (0; 60)	35.5 (8; 69.5)	30 (0; 58)	39 (9;7269)	0.005
Months of NNRTI exposure median (IQR)	16 (0; 45)	18 (0; 48)	17 (0; 49)	16 (0; 46)	0.445
CARDIOVASCULAR					
Framingham risk median (IQR)	2 (1; 5)	6 (2; 10)	2 (1; 6)	6 (2; 12)	< 0.001
Hypertension, n (%)	131 (22.13)	302 (35.28)	119 (38.26)	259 (46.00)	< 0.001
Albuminuria, n (%)	38 (6.42)	84 (9.81)	24 (7.72)	59 (10.48)	< 0.001
LIPID METABOLISM					
Triglycerides median (IQR), mmol/L	1.03 (0.81; 1.27)	2.32 (1.87; 3.41)	1.10 (0.89; 1.30)	2.37 (1.85; 3.34)	< 0.001
Total cholesterol mean (± SD), mmol/L	4.43 (1.09)	5.05 (1.22)	4.55 (1.10)	5.17 (1.30)	< 0.001
HDL mean (± SD), mmol/L	1.36 (0.44)	1.05 (0.42)	1.33 (0.41)	1.06 (0.30)	< 0.001
LDL mean (± SD), mmol/L	2.70 (0.84)	3.02 (1.03)	2.83 (0.91)	3.09 (1.01)	< 0.001
ApoA1 mean (± SD), mg/dL	148.7 (32.6)	137.5 (26.8)	149.9 (29.8)	139.7 (27.0)	< 0.001
ApoB mean (± SD), mg/dL	85.6 (23.4)	108.8 (29.0)	90.3 (24.3)	110.3 (27.3)	< 0.001
HOMA-IR median (IQR)	2.25 (1.39; 3.38)	3.07 (2.04; 5.01)	3.26 (2.21; 5.13)	4.31 (2.74; 6.68)	< 0.001



		Univariate analyses			Multivariable analysis		
		OR	95% C.I.	p-value	OR	95% C.I.	p-value
HW phenotypes							
	Low TG/Low WC	1 (Ref.)	-	-	1 (Ref.)	-	-
	High TG/Low WC	12.10	3.75; 39.01	< 0.001	5.40	1.20; 24.24	0.028
	Low TG/High WC	2.58	0.57; 11.60	0.217	4.68	0.74; 29.69	0.101
	High TG/High WC	6.17	1.80; 21.19	0.004	10.26	2.17; 48.58	0.003
% of leg fat		0.91	0.87; 0.95	< 0.001	0.93	0.87; 0.98	0.019
IDU		0.86	0.51; 1.44	0.566	1.22	0.56; 2.64	0.606
HOMA		0.96	0.88; 1.04	0.340	0.93	0.82; 1.06	0.266
Albuminuria		1.23	0.57; 2.67	0.593	0.93	0.34; 2.52	0.886
ART exposure, per 1 month increase		0.99	0.99; 1.00	0.226	0.99	0.98; 1.00	0.272
CD4+ nadir		0.99	0.99; 1.01	0.214	1.00	0.99; 1.00	0.733

Figure 1 Univariate and multivariable logistic regression anlyses for associated factors with Framingham risk score more than 20%.