



A Comparison of Non-HDL, HDL, and TC/ HDL for the Presence of Systemic Atherosclerotic Calcification

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BACKGROUND

- Vascular calcification is a marker for atherosclerotic disease
- Previous studies have demonstrated an association between coronary calcium and both LDL and HDL cholesterol
- The serum lipid measures of non-HDL cholesterol and total cholesterol to HDL-cholesterol ratio (TC/HDL) may be associated with the presence of atherosclerotic calcification in the coronary and other arterial beds
- The aim of this study was to determine the nature of associations between three different cholesterol measures (HDL, Non-HDL, and TC/HDL) and calcification due to atherosclerosis in multiple vascular areas (carotids, coronaries, thoracic aorta, abdominal aorta and iliacs)

METHODS

- From February 2001 to June 2001, 1,028 asymptomatic participants were evaluated for the extent of calcified atherosclerosis in 5 distinct vascular beds at a private, university affiliated disease prevention center

-Vascular beds:

-Carotid, Coronary, Thoracic Aorta, Abdominal Aorta, Iliacs

- Atherosclerotic calcification was determined by electron beam computed tomography during a single session using 100-ms scan time and preceding caudally from the base of the skull to the symphysis pubis

-Slice thicknesses for the vascular scan segments were:

-3 mm for the coronary, 6 mm through the neck, abdomen, and pelvis, and 5 mm for the thorax

-Quantitative calcium scores were determined according to the method described by Agatston

-Atherosclerotic calcification was defined as an area of calcification (= 2 adjacent pixels) with a density of = 130 HU

-Serum lipid measurements were collected at the same visit by fingerstick

Cohort Characteristics

Variable	Women	Men	p-value [§]
Age* (years)	56.9 (.541)	55.3 (.506)	0.03
Non-HDL* (mg/dl)	140.6(1.90)	154.2(1.77)	<0.01
HDL* (mg/dL)	63.4 (.72)	44.9 (.68)	<0.01
TC/HDL ratio*	3.47 (.07)	4.8 (.065)	<0.01
Total Cholesterol *	204.0(1.85)	199.1 (1.73)	0.134
Carotid \$	0 (1691.1)	0 (2730.0)	<0.01
Coronary \$	0 (1691.1)	13.92 (6055.6)	<0.01
Thoracic Aorta \$	0 (6872.0)	0 (11138.0)	<0.01
Abdominal Aorta	2.0(8835.0)	17.0(11111.0)	<0.01
Iliacs	0 (7698.0)	51.0 (16446.0)	<0.01

Adjusted for age
*Mean (SE); †Percent of Sample; § Median (range)

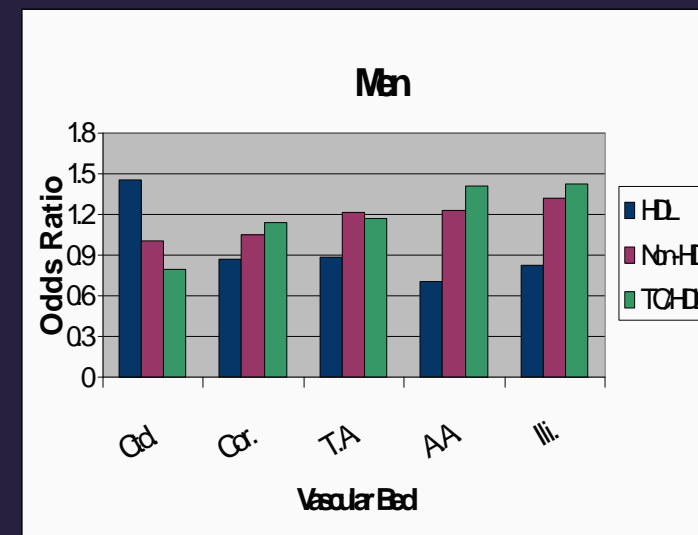
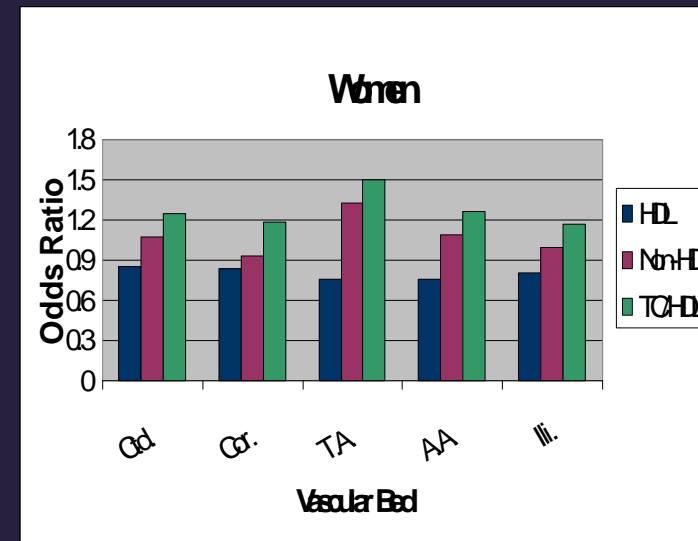
Correlations

Vascular Bed	Women (n= 461)			Men (n=567)		
	HDL	Non-HDL	TC/HDL	HDL	Non-HDL	TC/HDL
Carotids	-0.11†	0.12†	0.14†	0.06	-0.08*	-0.08*
Coronaries	-0.13†	0.11‡	0.15 †	-0.04	-0.05	0.01
Thoracic Aorta	-0.13†	0.18†	0.19†	0.00	-0.06	-0.04
Abdominal Aorta	-0.15†	0.14†	0.18 †	-0.05	-0.04	0.01
Iliacs	-0.12†	0.11‡	0.14 †	-0.03	-0.01	0.01

For those not taking a medication to reduce cholesterol
*p < 0.10, ‡p < 0.05, †p < 0.01

RESULTS

Odds for the Presence of Vascular Calcium by Cholesterol Measure



Adjusted for age, smoking, hypertension, diabetes, cholesterol medication

Multivariate Logistic Regression

Vascular Bed	Women (n=461)			Men (n =567)		
	HDL	Non-HDL	TC/HDL	HDL	Non-HDL	TC/HDL
Carotids	0.86	1.07	1.24*	1.46	1.00	0.80*
Coronaries	0.84	0.93	1.18	0.87	1.05	1.14
Thoracic Aorta	0.76*	1.33‡	1.50†	0.89	1.21	1.17
Abdominal Aorta	0.76*	1.09	1.27*	0.71‡	1.23*	1.41†
Iliacs	0.80*	0.99	1.17	0.82	1.32‡	1.42†

*p < 0.10, ‡p < 0.05, †p < 0.01
Adjusted for age, smoking, blood pressure, diabetes, cholesterol medication

COMMENTS

- In women, the TC/HDL ratio is more highly correlated with atherosclerotic calcification in multiple vascular beds compared with HDL and non-HDL cholesterol

- In women, the TC/HDL ratio had the largest standardized magnitude of association with calcium in each vascular bed

-Correlations between lipid measures and vascular calcium scores in women were twice those in men

-In men, the relationships were similar except for calcium in the carotids and thoracic aorta

- The TC/HDL ratio appears to be more highly associated with calcified atherosclerosis in multiple vascular beds than both HDL cholesterol and non-HDL cholesterol