

**NOTE**

Non-HDL-cholesterol, waist circumference and the HOMA index: Correlations in the healthy

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Background

Non-high density lipoprotein cholesterol (nHDLc) (total minus HDL-cholesterol) is a significant predictor of cardiovascular disease in several population studies. There are several advantages to its measurement. First, it makes no assumption about the relationship between VLDL cholesterol and triglycerides. Second, nHDLc includes an assessment of all apolipoprotein B-containing lipoproteins considered to be atherogenic. Finally, nHDLc can be assessed reliably in patients with triglyceride levels >400 mg/dl and in patients who are not fasting [1–8].

According to the ATPIII guidelines, a therapeutic goal for nHDLc in healthy patients is below <190 mg/dl [9].

Aim

The aim of this letter is to report on the links between a user-friendly anthropometrical variable such as waist circumference (WC), insulin resistance (IR) surrogates homeostasis model assessment (HOMA)-IR [10] and nHDLc in healthy participants.

Methods

A total of 164 healthy Caucasian individuals (78 men and 86 women) were recruited from hospital staff in Barcelona (Spain) for a cross-sectional survey. Eligibility criteria included absence of any family history of diabetes (WHO criteria), hypertension and dyslipidemia as well as not taking medications known to affect carbohydrate or lipid metabolism. WC, blood pressure, total cholesterol, triglycerides, HDL-cholesterol, glucose, and insulin were measured by standard methods. A HOMA index ≥ 3.8 was considered diagnostic of insulin resistance [11].

Results

WC showed a significant correlation with nHDLc ($r = 0.446$; $P < 0.0005$) and HOMA-IR ($r = 0.715$; $P < 0.0005$). Contingency Table 1(a) is formed by WC cut-offs – low risk – (<102/<88 cm) or – high risk – ($\geq 102/\geq 88$ cm) (M/F) vs. levels of nHDLc – normal (<190 mg/dl) – or – high (≥ 190 mg/dl). Sensitivity, specificity and likelihood ratio are 89.5%, 54% and $P = 0.000237$, respectively.

Table 1(b) is formed by normal HOMA index (<3.8) or – high HOMA index (≥ 3.8) vs. levels of non-HDL-cholesterol – normal (<190 mg/dl) – or

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Table 1 Numbers of individuals with normal or high levels of nHDLc and (a) low risk or high risk WC and (b) normal or high HOMA indexes

| | nHDLc (mg/dl) | | N |
|-------------------------|------------------|------|-----|
| | <190 | ≥190 | |
| (a) $P < 0.0005$ | | | |
| WC (cm) (<88/<102)(M/F) | 47 | 2 | 49 |
| WC (cm) (≥88/≥102)(M/F) | 40 | 17 | 57 |
| | 87 | 19 | 106 |
| (b) $P = 0.016$ | | | |
| HOMA < 3.8 (% nHDLc) | 94 | 10 | 104 |
| HOMA ≥ 3.8 (% nHDLc) | 30 | 11 | 41 |
| | 124 | 21 | 145 |

– high (≥190 mg/dl). Sensitivity, specificity and likelihood ratio are 52.4%, 75.8% and $P = 0.01126$, respectively.

Conclusion

Two insulin resistance surrogates appear capable of correctly classifying healthy individuals at risk of having suboptimal nHDLc values. Most insulin sensitive individuals display nHDLc levels below the therapeutic goal. WC measurement provides a non-invasive, low cost indirect reflection of both IR and nHDLc.

High risk WC is a sensitive predictor of high nHDLc values in individuals with IR. This relationship has not, to the best of our knowledge, been published elsewhere.

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