RISK FACTORS

Little need to incorporate obesity measures in calculations of cardiovascular disease risk

A new study published in the *Lancet* has demonstrated that the commonly used obesity measures BMI, waist circumference, and waist-to-hip ratio provide no important additional predictive value to calculations of cardiovascular disease risk that already incorporate information about a patient's blood pressure, lipid levels, and history of diabetes mellitus. Nevertheless, the authors of this new report do point out that their finding “does not, of course, diminish the importance of adiposity as a major modifiable determinant of cardiovascular disease”.

David Wormser, an epidemiologist from the University of Cambridge, UK, who was involved in the study explains that “previous observational studies reported conflicting findings regarding the relative importance of overall and abdominal adiposity in relation to risk of cardiovascular disease. Moreover, guidelines have provided differing recommendations about the value of inclusion of clinical measures of adiposity in cardiovascular risk scores.” The Emerging Risk Factors Collaboration, therefore, set out to assess the utility of incorporating BMI, waist circumference, and/or waist-to-hip ratio into risk calculations for cardiovascular disease.

Data for 221,934 patients who participated in any one of 58 prospective studies performed in developed countries throughout Europe, North America, and the Asia-Pacific region were assessed by the investigators. All patients had no known history of cardiovascular disease at their study's baseline.

The investigators recorded 14,297 first-ever cardiovascular disease outcomes, including 8,290 coronary heart disease outcomes (4,982 nonfatal myocardial infarctions and 3,308 deaths attributed to coronary heart disease), 2,906 incident ischemic strokes, 596 hemorrhagic strokes, 2,070 unclassified strokes, and 435

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other cerebrovascular events. Median time to first outcome was 5.7 years. In total, data for 1.87 million person-years at risk were incorporated into this analysis.

BMI (except for values $<20 \text{ kg/m}^2$), waist circumference, and waist-to-hip ratio were shown to have log-linear associations with risks of coronary heart disease and ischemic stroke. Notably, after adjustment for the Framingham risk score covariates of age, sex, smoking status, systolic blood pressure, history of diabetes, and levels of total and HDL cholesterol, these three measures of obesity were found to be associated with similar hazard ratios for coronary heart disease (1.11, 1.12, and 1.14, respectively) and ischemic stroke (1.06, 1.11, and 1.14, respectively).

Addition of one or more of BMI, waist circumference, and waist-to-hip ratio to a cardiovascular disease risk prediction model that included information on all the aforementioned Framingham risk score covariates except total and HDL cholesterol resulted in substantially less improvement in cardiovascular disease risk discrimination than addition of these lipid measures to the same risk model (C-index change ranging

from 0.0006 to 0.0023 versus 0.0087 C-index change). Furthermore, when these obesity measures were added to a cardiovascular disease risk prediction model that included information on all the aforementioned Framingham risk score covariates including levels of total and HDL cholesterol, no obvious effects on cardiovascular disease risk discrimination (C-index changes ranging from -0.0001 to 0.0008) or reclassification in predicted 10-year risk categories (net reclassification improvement ranging from -0.19% to -0.03%) were recorded.

“This study underlines the value of general practitioners continuing to measure cholesterol and blood pressure for cardiovascular risk prediction, irrespective of body shape,” comments David Wormser. Indeed, in their study report, the investigators went one step further to highlight that, on the basis of the larger impact of blood lipid measures compared with obesity measures on cardiovascular disease risk prediction, there is a “desirability of supporting the development of lipid assessment in resource-poor settings”.

Although the study findings point to a lack of utility of obesity measures in cardiovascular disease risk prediction when information on the patient's blood pressure, lipid levels, and diabetes history is available, the authors are quick to point out that “because excess adiposity is a major determinant of the intermediate risk factors noted above, our findings underscore the importance of controlling adiposity to help prevent cardiovascular disease”.

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Original article The Emerging Risk Factors Collaboration. Separate and combined associations of body-mass index and abdominal adiposity with cardiovascular disease: collaborative analysis of 58 prospective studies. *Lancet* doi:10.1016/S0140-6736(11)60105-0