Abdominal Adiposity and Intima-Media Carotid Thickness: An Association

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Short Editorial relate to the article: Indicators of Abdominal Adiposity and Carotid Intima-Media Thickness: Results from the Longitudinal Study of Adult Health (ELSA-Brazil)

Atherosclerosis is the main cause of morbidity and mortality in adults in Brazil and worldwide. Classical risk factors have shown its causal association from randomized experimental studies, such with cholesterol and hypertension. Other risk factors, including abdominal adiposity, show positive associations with atherosclerosis-related outcomes.

The ELSA-Brazil observational study[1] began collecting data in 2008 with clinical, epidemiological and laboratorial variables of 15,105 public servants aged 35 to 74 years. Several articles on these data have already been published and have brought relevant information about the association between risk factors and varied outcomes. In the present issue, Michaela Eickemberg et al.[2] present data from a cross-sectional study that explores different measures of abdominal adiposity and its association with carotid intima-media thickness (C-IMT) measurement.

Epidemiological studies seek to find plausible associations between risk factors and clinical outcomes or "surrogates" (here represented by C-IMT). Associations may or may not be causal. For an association between variables to indicate possible causality, it is necessary that some criteria, proposed by British statistician Austin Bradford Hill,[3] be considered. They are:

a) strength of association (magnitude of effect);
b) consistency (or reproducibility);
c) specificity (one disease, one variable);
d) temporality (cause before effect);
e) biological gradient (greater exposure, more disease);
f) plausibility (known mechanism);
g) coherence (between laboratory and clinical data);
h) experiment (not always possible);
i) analogy (comparison with similar situations).

Keywords

Cholesterol; Hypertension; Risk Factors; Obesity, Abdominal; Carotid Artery Diseases/mortality; Media-Carotidea.

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When applying these criteria to the study in question we have: a) the magnitude of effect of abdominal adiposity on C-IMT is a modest one (odds ratio around 1.4); b) there are other studies that prove this association; c) abdominal adiposity is not the only cause of atherosclerosis; d) it is probable that the adiposity precedes the intima-media thickening; e) we do not have definitive evidence of a biological gradient; f) there is biological plausibility for the assessed association; g) coherence between laboratory and clinical data is present; h) animal experiments have shown that a hyperlipidemic diet directly affects the arteries; i) in analogy with other risk factors, abdominal adiposity may indicate more arterial adiposity.

Of all these criteria, only one is a prerequisite for causality: temporality, that is, the cause before the effect. As the present study has a cross-sectional design, temporality is, by definition, excluded. Therefore, we are discussing a non-causal association. The main conclusion of the study is that there is a statistically significant association between the different rates of abdominal adiposity and C-IMT, and the simplest of these (the abdominal circumference) showed the greatest association strength in the logistic model, adjusted for selected confounding variables.

With these comments, we want to put into perspective the importance of the critical analysis of observational studies. This criticism is necessary, but we have to emphasize that without observational studies, medical science would not have developed so far. The knowledge of the diseases that affect the human being was based on data from careful observations analyzed in order to reduce the effect of statistical and systematic biases.

The ELSA-Brazil study and its sub-studies, such as that of Eickemberg et al.,[1] fit this quality profile, which are so necessary to science. With careful data collection and a group of researchers committed to an excellent quality standard, ELSA-Brazil has brought valuable information about risk factors in a specific group of Brazilians, data that can guide future health policies.

The causality of abdominal adiposity over atherosclerosis-related clinical events has been recently confirmed by mendelian randomization, an observational method of estimating causal effects using genetic variants, such as instrumental variables.[4,5]

References

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