Peripheral Adiposity and Cardiovascular Risk

To the Editor:

In their recent Circulation article describing a study of older Danish women, Tankó et al\(^1\) presented strong evidence that peripheral localization of fat mass is associated with reduced calcification in the aorta. This interesting finding leads one to ask whether all anatomic sites of peripheral fat contribute equally to the apparent protective effect. Several studies have previously found that increased size in the lower limbs is associated with reduced cardiovascular or metabolic risk.\(^2\^-4\) However, I am unaware of any studies showing tissue mass in the upper limbs to have such a protective effect.

It would be useful to determine the separate contributions of lower-limb and upper-limb fat mass to the reduction in aortic calcification and other cardiovascular risk factors that Tankó et al found. If the protective effect could be attributed primarily to mass in the lower limbs, then future investigators could simplify their work by focusing studies solely on the lower-limb mass. Clinicians could benefit likewise from inexpensive, lower-limb measurements that might improve the risk stratification of patients in daily practice.

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Response

We thank Dr Kahn for his pertinent question about our study. We have accordingly reanalyzed our cross-sectional data obtained on the same 1317 elderly women to estimate the distinct influences of peripheral fat mass as measured by dual-energy x-ray absorptiometry in the lower limbs compared with that in the upper limbs.

We found a stronger inverse association of the severity score for aortic calcification with fat mass in the lower (\(r=-0.142, P=0.001\)) compared with fat mass in the upper limbs (\(r=-0.062, P=0.023\)). After adjusting for all potential cardiovascular confounders, the independent inverse correlation with fat mass in the lower limbs remained virtually unchanged (\(r=-0.130, P<0.001\)), whereas the correlation with fat mass in the upper limbs no longer was statistically significant (\(r=-0.042, P=0.129\)).

Similar lower-limb versus upper-limb contrasts were found when we examined the correlations with metabolic risk factors independent of age, body mass index, central fat mass, level of education, coffee and alcohol consumption, weekly fitness activity, current and previous smoking, diabetes, and current use of hormone replacement therapy. Under these conditions, the lower-limb and upper-limb partial correlations for fasting glucose were \(-0.137 (P<0.001)\) and \(-0.023 (P=0.422)\), the correlations for white blood cell count were \(-0.082 (P=0.004)\) and \(-0.030 (P=0.281)\), and those for total cholesterol were \(-0.079 (P=0.005)\) and \(-0.052 (P=0.067)\). Both compartments appeared to exhibit a favorable effect on serum triglyceride (\(r=-0.239 [P<0.001] \) and \(r=-0.112 [P<0.001]\), respectively).

In the subpopulation of 290 women with a more thorough analysis of metabolic risk profile, the lower-limb and upper-limb partial correlations for the homeostasis assessment of insulin resistance index were \(-0.140 (P=0.023)\) and \(0.048 (P=0.437)\), the correlations for HDL cholesterol were \(0.176 (P=0.004)\) and \(0.105 (P=0.087)\), and those for lipoprotein (a) were \(-0.146 (P=0.017)\) and \(-0.056 (P=0.366)\). None of the compartments was associated with apolipoprotein A1 or LDL cholesterol, whereas both compartments were significantly associated with apolipoprotein B (\(r=-0.261 [P<0.001]\) and \(r=-0.144 [P=0.019]\), respectively).

These results confirm Dr Kahn’s implication that the antiabetic and antiatherogenic influence of peripheral fat mass is attributable primarily to fat mass on the lower limbs. Our findings suggest a need for thorough assessment of the diagnostic and prognostic value of simple anthropometric measures of lower-body fat depots. Studies to clarify the determinants of lower-body fat mass might also contribute to the prevention of cardiovascular disease.

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