Calculation Methods of Ankle Brachial Index and Correct Diagnosis of Peripheral Arterial Disease

Abstract: A very recent study reported that subjects with familial hypercholesterolemia had increased arterial stiffness but not a low ankle brachial index.

Letter to the Editor

We read with interest the article by Plana et al. who reported that subjects aged between 20 and 60 years with familial hypercholesterolemia (FH) had increased arterial stiffness compared to controls, as determined by the augmentation index (AIx)1). Moreover, the authors observed increased carotid intima media thickness in their patient group but found no difference in ankle brachial index (ABI) values. They also found a linear relationship between AIx and apolipoprotein B100 blood level. Considering the young age of their participants, the results are important and suggest that more effective preventive measures should be applied given these early structural vascular changes in subjects with FH; however, we needed to point out two issues regarding the ABI data in the present study.

ABI is successfully used to diagnose peripheral arterial disease (PAD), a predictor of all-cause and cardiovascular mortality2), with high sensitivity and specificity3). A normal ABI is defined as a value between 0.9 and 1.4, although several sub-categories such as borderline or low normal ABI values have also been described due to their stronger associations with increased cardiovascular risk than ABI from 1.1 to 1.44). An important issue is that ABI testing is used to diagnose PAD on a personal basis; therefore, as in the present study, the use of mean ABIs of a population in scientific comparisons has little utility considering that there may be a true difference in the number of subjects with a low ABI (≤0.9) consistent with the diagnosis of PAD, even though mean ABIs are statistically similar. For this reason, comparison of the numbers of participants with a low ABI (≤0.9) in the FH and control groups could provide more definitive information in the study by Plana et al. The second issue regards the method of ABI calculation, which was best described previously in TASC-II guidelines5). To determine ABI, right and left ABIs are first calculated separately by dividing the higher systolic blood pressures in each ankle (a. tibialis posterior or a. dorsalis pedis) by the higher brachial systolic blood pressure measured in the right or left upper limbs. Then, the lower of the right or left ABI values is recorded as the final ABI value of the tested individual; however, a modified ABI calculation has been introduced which uses the lower readings, instead of the higher readings, at each ankle6), which was chosen as the method of ABI determination in the present study. This latter “modified” ABI calculation has the advantage of detecting more people at risk of atherosclerotic disease but it may easily and falsely overestimate the prevalence of PAD7). The method may be advantageous in younger populations because the prevalence of PAD starts to increase at a later age8); however, if this method is used to compare two separate groups, the risk of misclassifying people as having PAD is valid and has similar strength for both groups. In other words, controls with early subclinical atherosclerosis might also be diagnosed with PAD because the modified ABI seems to be sensitive to detect even slight changes in blood flow to the lower extremities. Indeed, other than being a screening option at present, the clinical utility of this approach has not been clarified yet; therefore, the use of standard instead of modified ABI to identify people with PAD could probably provide more accurate comparisons and definitive data in the study by Plana et al.

Conflicts of Interest

None to declare.

References

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