Brachial Ankle Pulse Wave Velocity: A Classic but Still Important Method

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In 1892, William Osler proposed that “a man is only as old as his arteries.” As implicated by this memorable statement, cardiovascular disease has become one of the major disorders in contemporary medicine. Atherosclerosis leads to hypertension, myocardial infarction, cerebral infarction and arteriosclerosis obliterans, thereby causing a large number of deaths in industrialized countries. To prevent the progression of atherosclerosis, regular health examinations should be performed in which assessing blood pressure is, needless to say, most important. Pulse wave velocity (PWV), a noninvasive and convenient method, serves as an indicator of arterial stiffness (1, 2) and a marker of vascular damage (3-5). In addition, PWV is a predictor of cardiovascular morbidity resulting from lifestyle patterns (6, 7). In this regard, PWV is useful for screening subjects in large populations.

In this issue of the Journal, Doba et al. (8) investigated brachial ankle PWV (baPWV) in elderly Japanese patients followed for five years and compared temporal changes in blood pressure and baPWV among groups who did or did not receive antihypertensive therapy. The authors showed that: 1) antihypertensive therapy resulted in no significant changes in baPWV; whereas, increases in baPWV occurred in normotensives and hypertensives not receiving medication, and 2) systolic blood pressure, hemoglobin and male gender were independently and positively associated with increases in baPWV at the end of the study. From these findings, they drew the conclusion that antihypertensive therapy can prevent the progression of arterial stiffness that occurs with aging. Although the long-term outcomes of the studied patients have not yet been determined, these findings shed a light on the unique role of baPWV in this cohort.

Because baPWV correlates well with systolic and diastolic blood pressure (9), the existence of hypertension should be taken into consideration in the evaluation of baPWV data. In addition, the drawback of baPWV is the lack of detailed information regarding atherosclerosis: namely, baPWV reflects stiffness in both central and peripheral muscular arteries (5, 10). The cardio-ankle vascular index evaluates arterial stiffness without being influenced by blood pressure (9) and is obtained using simultaneous recordings of electrocardiogram, heart sounds, blood pressure and cardio-ankle PWV. Recently, it has become possible to reliably assess the peripheral endothelial function and arterial stiffness with peripheral arterial tonometry resulting from reactive hyperemia during which local nitric oxide (NO) is released (11).

Compared with advanced methods, baPWV provides basic information on atherosclerosis. Furthermore, baPWV deserves continued usage in the early detection of cardiovascular disease and monitoring of the development of peripheral arterial disease. Therefore, this easy-to-use and low-cost method remains a useful and powerful tool to prevent cardiovascular morbidity in patients with lifestyle diseases.

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References


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