Application of noninvasive pulse waveform indexes relating to central blood pressure to characterization of antihypertensive treatments: ABC-J
(Antihypertensives and Blood Pressure of Central Artery Study in Japan)

Hiroshi MIYASHITA* on behalf of ABC-J Investigators
* Jichi Medical University, School of Medicine

[**Background**]

Central blood pressure (CBP) has been reported to be superior to conventional brachial blood pressure as a cardiovascular risk predictor in hypertensive patients. However, only limited antihypertensive agents have been investigated in regard to CBP lowering effect. Although randomized intervention trials are necessary to demonstrate effects of therapeutic agents, it is practically difficult to compare all classes of antihypertensives in a single intervention trial. Hence this cross-sectional observation study was conducted, in which all classes of commonly used antihypertensive agents were compared at once in terms of CBP.

[**Methods**]

Calibrated noninvasive radial artery pressure waveforms were recorded using an automated tonometric device (HEM-9000AI; Omron Healthcare, Co., Ltd.) in 1727 stably treated hypertensive patients and 848 non-hypertensive participants. Radial artery late systolic pressure (**SBP2**) has been known to reflect central systolic pressure, which is comparable to generalized transfer function (GTF)-based estimation. The difference between late and peak systolic pressures (**ΔSBP2**) as well as augmentation index (**rAI**) was determined as CBP-related indexes; i.e., markers specifically reflecting the central SBP level relative to brachial SBP. Along with parameters possibly influencing CBP, associations of treatment with all classes of antihypertensives or their combinations with the CBP-related indexes were assessed by multiple regression analysis.

[**Results**]

Regression models for these indexes were constructed for both participant groups, and used to adjust data for co-administered drugs as well as confounding factors including body height, BMI, gender, age, and diastolic blood pressure. **ΔSBP2** was 2.8 mmHg lower ($P < 0.001$) in patients treated with vasodilating antihypertensives (CCBs, ARBs and α-blockers) without significant inter-class difference than with non-vasodilating agents (β-blockers and diuretics), and even lower by 1.9 mmHg ($P < 0.001$) than estimated in non-hypertensive subjects. Combinations of two vasodilators showed further lower **ΔSBP2** by 5.8 and 3.1 mmHg compared with non-vasodilator combinations and non-hypertensive subjects, respectively ($P < 0.001$ for both comparisons). Additional adjustment for pulse rate reduced prominently high **ΔSBP2** in case of β-blockers to the diuretics level. Findings on **rAI** were mostly similar to those in **ΔSBP2**.

[**Conclusions**]

This cross-sectional observation suggests that, in comparison with non-vasodilators, vasodilating antihypertensives may generally have more potent central blood pressure-lowering effects without detectable class-specific effect.