

# Potential beneficial impact of angiotensin receptor blockers on arterial stiffness in hypertension

Kouichi Tamura, Nozomu Kishio, Kotaro Haruhara, Kazushi Uneda, Kengo Azushima, Hiromichi Wakui

Department of Medical Science and Cardiorenal Medicine, Yokohama City University Graduate School of Medicine, Yokohama 236-0004, Japan  
Correspondence to: Kouichi Tamura, MD, PhD, FACP, FAHA. Department of Medical Science and Cardiorenal Medicine, Yokohama City University Graduate School of Medicine, 3-9 Fukuura, Kanazawa-ku, Yokohama 236-0004, Japan. Email: tamukou@med.yokohama-cu.ac.jp.

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Hypertension is highly prevalent worldwide and is one of the major risk factors for cardiovascular and renal diseases. Accumulated results of clinical trials showed that strict control of blood pressure (BP) is essential to prevent target organ damage and to reduce cardiovascular mortality in hypertensive patients. In many countries, major antihypertensive drugs are calcium channel blockers (CCBs), angiotensin II receptor blockers (ARBs), angiotensin-converting enzyme (ACE) inhibitors, diuretics, and beta-blockers (including alpha/beta-blockers), according to the international hypertension guidelines (1-5).

The vascular function parameters (arterial stiffness and central hemodynamics), including ankle-brachial pressure index (ABI), pulse wave velocity (PWV), cardio-ankle vascular index (CAVI), augmentation index (AI) and central systolic blood pressure (cSBP), do not always correlate with the peripheral brachial BP value, but do reflect the pressure load in the major organs. Several previous studies demonstrated that these variables (cSBP, AI, and PWV) are more closely related to organ damage than brachial BP (6-9). Previous meta-analyses also showed that the cSBP, AI, and PWV are independent risk factors for cardiovascular disease, and that these variables may reflect the different characteristics of the pathophysiologic abnormalities related to arterial stiffness (10,11). Therefore, it would be important to improve the vascular parameters of both arterial stiffness and central hemodynamics, in addition to reduction in the peripheral brachial BP value (clinic BP), for the efficient cardiovascular protection.

Experimental and clinical evidence has reported that activation of the renin-angiotensin system (RAS) is involved in the pathogenesis of hypertension and the related target

organ damage, and multiple studies have shown the usefulness of RAS blockade induced by ACE inhibitors and ARBs for the management of hypertension. In addition, several previous studies showed beneficial effects of the RAS inhibitors on the vascular function parameters (12-14). Furthermore, several preceding meta-analyses for effects of the RAS inhibitors on arterial stiffness and/or wave reflections also demonstrated the RAS inhibitors improved PWV and/or AI in certain pathological conditions (15,16).

Interestingly, the system review and meta-analysis by Chen *et al.* in the recent issue of the *Journal of Thoracic Disease (JTD)* was conducted to analyze the clinical benefits of different antihypertensive agents in improving arterial stiffness in hypertensive patients (17). The effect of ARB on the improvement of the PWV was not superior to other types of antihypertensive agents, but ARB was superior to other types of antihypertensive agents for improving the AI in this system review and meta-analysis, thereby suggesting that ARB maybe superior to other antihypertensive agents to improve of arterial stiffness (17). The results of this systematic review and meta-analysis by Chen *et al.* would strengthen the clinical evidence in favor of ARB as one of the first-line antihypertensive drugs for most patients with hypertension with its ability to exert efficient BP lowering effects and to inhibit cardiovascular and renal events (5).

However, monotherapy with either an ARB or a CCB, another first-line antihypertensive drug, achieves the target BP recommended by the hypertension guidelines in only a limited number of patients and, thus, combination therapy is required in a majority of patients (5). The results of a recent meta-analysis of the efficacy and safety of adding an ARB to a CCB following ineffective CCB

monotherapy demonstrated that adding an ARB to CCB significantly improved BP control and the percentage of on-target hypertension treatment with significantly reduced incidence of adverse events (18). Therefore, further research to investigate the therapeutic effects of different types of antihypertensive agents, as a monotherapy or in combination, is necessary for efficient suppression of cardiovascular and renal events in hypertension (19,20).

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Comment on:* Chen X, Huang B, Liu M, *et al.* Effects of different types of antihypertensive agents on arterial stiffness: a systematic review and meta-analysis of randomized controlled trials. *J Thorac Dis* 2015;7:2339-47.

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