The official journal of the Japan Atherosclerosis Society and
the Asian Pacific Society of Atherosclerosis and Vascular Diseases

Editorial

J Atheroscler Thromb, 2022; 29: 1-2. http://doi.org/10.5551/jat.ED153

The Relationships between Micro- and Macrovascular Damages: Their Functional and Morphological Aspects

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See article vol. 29: 11-23

The arterial tree is roughly divided as large artery, which comprises of vascular smooth muscle cells and connective tissues (elastin and collagen), and small artery, which mainly comprises of vascular smooth muscle cells morphologically. Functionally, the circulation is divided as macrocirculation, which conduits blood to periphery, and microcirculation, which regulates blood perfusion to organs[1, 2]. The risk factors for cardiovascular disease are the key players in atherosclerotic vascular damages in the arterial tree (Fig. 1)[3]. However, it has not been fully clarified whether these risk factors cause morphological/functional vascular damages in macro- and microcirculations homogeneously or heterogeneously from the early stages of atherosclerosis.

In this issue, Sugiura et al examined the cross-sectional associations of morphological/functional vascular damages in macrocirculation, which was assessed by the measurements of carotid intima-media thickness (IMT) and cardio-ankle vascular index (CAVI), with morphological vascular damages in microcirculation, which was assessed by the presence and extent of retinopathy, in subjects without the manifestations of atherosclerotic vascular damages[4]. They found a cross-sectional association of both morphological/functional vascular damages in macrocirculation with morphological vascular damages in microcirculation[4].

The macrocirculation and microcirculation are proposed to have a cross-talk, and functional vascular damages and this cross-talk are thought to affect morphological arterial damages in macro- and microcirculations (Fig. 1)[1, 3]. The functional vascular damage in macrocirculation is thought to cause morphological/functional vascular damages in microcirculation (i.e., pulsatile microvasculopathy) (Fig. 1)[2, 5], and the findings of the Sugiura's study were consistent with this concept. Moreover, Sugiura et al found a close association of IMT (representing morphological vascular damage), rather than CAVI (representing functional vascular damage), with retinopathy[4], and these findings suggest that the direct effect of risk factors on cardiovascular disease, rather than pulsatile microvasculopathy, is a major player for morphological microvascular damages in the early stages of atherosclerosis. However, in the pulsatile microvasculopathy, blood pressure itself is one of the major players[2, 5], and pulse wave velocity (PWV), which is a marker of functional vascular damage in macrocirculation, rather than blood pressure adjusted PWV, had a close association with the progression of retinopathy[6]. Thus, the significance of blood pressure ought to be considered in the assessment of the associations between functional vascular damage in macrocirculation and morphological/functional vascular damages in microcirculation.

The present study is well-designed, and we wish to examine the associations among morphological/functional micro-and macrovascular damages in prospective studies.

Conflict of Interest

Courses endowed by Omron Health Care company and Asahi Calpis wellness company.

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Received: October 23, 2020 Accepted for publication: October 27, 2020

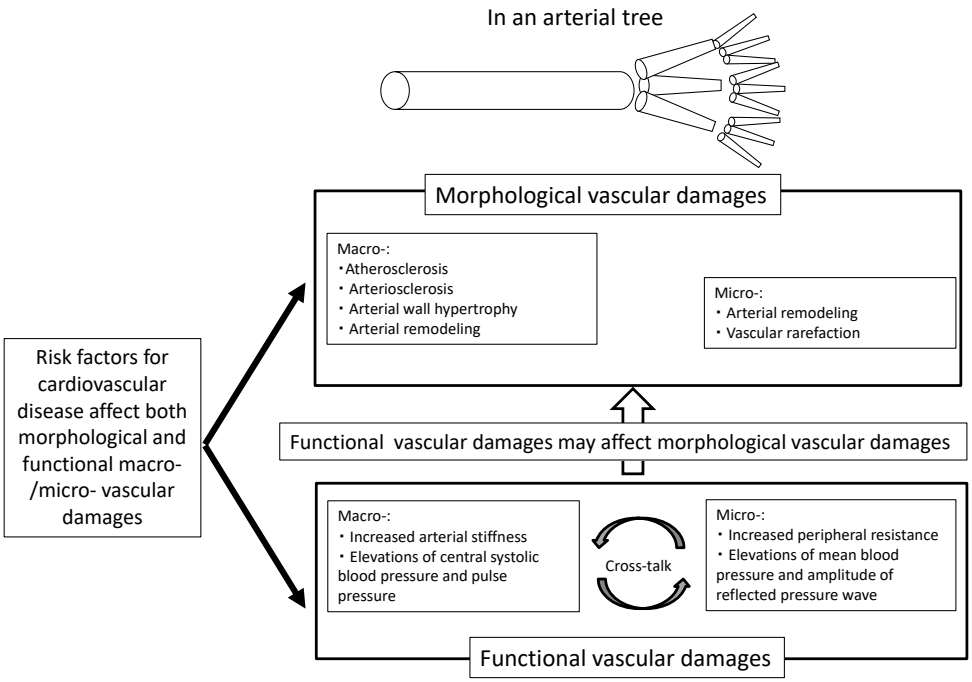

Fig. 1. The associations among morphological/functional vascular damage in macrocirculation and in microcirculation

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