

The Value of Ultrasonographic Measurement of Flow Mediated Dilatation

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The perturbation of brachial blood flow by ultrasonographic measurement of hyperemia using Flow Mediated Dilatation (FMD) method was a valid method in the measurement of vascular dysregulation in the conduit artery. This method has been intensively used to measure the cardiovascular risk for many decades [1], and the Flammer [2], one of the first research groups using the FMD method, has provided plenty of evidence of systemic endothelial dysfunction in many disease conditions including hypertension [3] and diabetes [4].

Endothelial dysfunction occurs when healthy endothelium loses its ability to maintain vascular homeostasis in response to risk factors resulting in vasoconstriction, thrombosis and vascular smooth muscle cell proliferation. Nitric Oxide (NO) is the main vasodilator secreted by the endothelium. It is synthesized from L-arginine by endothelial Nitric Oxide Synthase (eNOS) in the presence of cofactors including tetrahydrobiopterin, resulting in the production of NO and L-Citrulline. NO then diffuses into the vascular smooth muscle cells, activating guanylatecyclase, leading to an increased production of cyclic guanosine monophosphate and a decrease of intracellular calcium. Numerous studies have consistently reported Statins can improve endothelial function by reducing the expression of inflammatory cytokines and growth factors, inhibits angiotensin II induced oxidative stress and enhances activity of endothelial NOS, thereby increasing NO bioavailability. However, the evidence reported from the use of antioxidants is conflicting. Vitamin C has been proven

to cause an impact on endothelial function in smokers. However, a large-scale randomized study demonstrated that vitamin E did not have a beneficial effect on cardiovascular events in high-risk patients [4]. Another cohort study using a combination of antioxidants (beta-carotene, vitamin C, vitamin E) also demonstrate no improvement in endothelial function [3].

To sum up, the validity and accuracy of the detection of endothelial dysfunction and new cardiovascular risk markers are extremely important to prevent the early onset of cardiovascular disease, and ease the heavy financial burden to the patients, hospital and society.

References

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