Editorial

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The Association of Brachial-Ankle Pulse Wave Velocity with Acute Postprandial Hyperglycemia in Korean Pre-diabetic and Diabetic Subjects

Chul Woo Ahn

Division of Endocrinology and Metabolism, Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Subjects with diabetes have accelerated atherosclerotic vascular lesions. The risk of having coronary, cerebral, and peripheral arterial diseases is higher in diabetic subjects than in non-diabetic subjects [1]. Atherosclerosis involves a combination of fatty degeneration and vessel stiffening of the arterial wall. Sclerotic changes are more difficult to assess than atherosis and, because of this, it have attracted less attention. For example, the standard evaluation of atheromatous by histopathology and serial angiography is a sensitive method that does not detect sclerotic changes [2]. In animal studies, a direct relationship has been established between regression of atherosclerosis and an increase in arterial distensibility [3,4].

Pulse wave velocity (PWV) is known to be an indicator of arterial stiffness [5,6], and has been regarded as a marker of vascular damage [7,8]. Recent studies have demonstrated that PWV is not only a marker of vascular damages, but also a prognostic predictor when it is measured using noninvasive automatic devices [9,10]. Therefore, PWV can be potentially used for screening vascular damage in a large population [6,11]. Recently, an instrument was developed to measure brachial–ankle PWV (baPWV) by using a volume-rendering [12]. Nakamura et al. have found that the length of abdominal aorta that is affected by calcification, which is a known risk factor for cardiovascular morbidity and mortality, also independently predicted baPWV [13]. Accordingly, baPWV could be used as a new measure of vascular damage that may predispose an individual to cardiovascular events. baPWV was mainly affected by age, systolic blood pressure and sex. Many other factors, such as body weight, body mass index (BMI), waist to hip ratio, HbA1c, microalbuminuria, triglyceride, ϒGTP, and duration of diabetes mellitus , also affected baPWV [14].

Long-term glycemic control is known to be correlated with the changes of baPWV in type 2 diabetic subjects who frequently have accompanying insulin resistance for 12 months [15]. In addition, hyperinsulinemia contributes to the development of arterial stiffness, which is assessed by measuring the baPWV, in the early stages of type 2 diabetes mellitus [16]. Glycemic control and the hyperinsulinemic state are important factors that determine the PWV in diabetic subjects. In a study of university students in Japan, baPWV was significantly higher in obese (BMI > 30 kg/m^2) male subjects than in the overweight (25 < BMI < 30 kg/m^2) subjects and higher in the males with nonalcoholic fatty liver disease (NAFLD) than in those without NAFLD [17].

In the present study, the investigators measured baPWV, fasting, 30- and 120-minute post-challenge glucose levels, as well as other metabolic parameters, in 633 subjects with fasting hyperglycemia. Among the participants, 62.9% were pre-

Corresponding author: Chul Woo Ahn
Division of Endocrinology and Metabolism, Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, 612 Eonjuro, Gangnam-gu, Seoul 135-270, Korea
E-mail: acw@yuhs.ac

diabetic, and 31.7% were diagnosed with having diabetes. The mean baPWV value was significantly higher in subjects with diabetes, when compared with that of the pre-diabetic group. This was especially the case for the 30-minute post-challenge glucose level, which was a significant determinant for the mean baPWV value, even after the adjustment for other confounding variables. This finding corresponds to the results of a study by Succurro et al. [18] that had included 400 Caucasian subjects. Succurro et al. suggested that normal glucose tolerance subjects with a 1-hour post-load glucose ≥ 155 mg/dL have an atherogenic profile that includes having an intima-media thickness that is similar to impaired glucose tolerance subjects, which suggests that there is an association of post-challenge plasma glucose levels other than 2-hour glucose levels with the development of atherosclerosis and diabetes mellitus. Moreover, there is some evidence that post-challenge plasma glucose and glycemic spikes are more strongly associated with atherosclerosis than fasting glucose or the HbA1c level [19]. Therefore, postprandial hyperglycemia may be a good candidate for predicting future atherosclerosis and metabolic syndrome, and eventually cardiovascular disease in high-risk subjects.

In this study, the investigators provided valuable evidence of the relationship between the 30-minute post-challenge glucose level and the baPWV in Korean subjects with fasting hyperglycemia. Although the investigators did not include subjects with normoglycemia, the baPWV was significantly correlated with post-challenge 30-minute glucose levels during oral glucose tolerance test, more so than either the 120-minute or fasting glucose levels in subjects with hyperglycemia. The limitation of this study is the absence of the difference in mean baPWV between subjects with normoglycemia and hyperglycemia. As the author had stated, there was no patients with normoglycemia since study subjects were referred to the endocrinology department, due to the detection of a high fasting glucose level at least once. Therefore, it seems reasonable to compare the diabetic group to a control group. Despite this limitation, the importance of this study is that it focuses on the effect that acute hyperglycemic excursion has on arterial stiffness in subjects with glucose intolerance. Finally, I express my gratitude to the authors for conducting this study and fully expect of its expansion in order to yield even more useful results.

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