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Response

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Response: Effects of 6 Months of Dapagliflozin Treatment on Metabolic Profile and Endothelial Cell Dysfunction for Obese Type 2 Diabetes Mellitus Patients without Atherosclerotic Cardiovascular Disease (J Obes Metab Syndr 2020;29:215-21)

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This study reports that 6 months of treatment with dapagliflozin combined with metformin is beneficial for obese patients with type 2 diabetes mellitus; this treatment improved both the metabolic parameters and pulse wave velocity (PWV). We speculated that the decrease in a patient's arterial stiffness through treatment with dapagliflozin is beneficial to the patient's cardiovascular health. In our study, a significant improvement in central PWV was only observed in the group with body fat reduction, and there was a significant correlation between change in body fat mass and PWV.

As you mentioned, blood pressure (BP) is an important regulator of PWV.[1] We also observed that the reduced systolic BP during treatment with the sodium-glucose cotransporter 2 (SGLT-2) inhibitor dapagliflozin (baseline vs. after 6 months: 127.8 ± 14.3 vs. 124.6 ± 17.3 mmHg, $P < 0.05$) was caused by the decrease in central fat mass (31.09 ± 9.90 vs. 28.31 ± 9.91 kg, $P < 0.001$); the decrease in body weight (83.01 ± 16.42 vs. 79.70 ± 16.13 kg, $P < 0.001$) during the following 6 months was correlated with reduced central fat mass. Bivariate analysis following adjustment for central fat mass and BP showed a coefficient of 0.23 ($P < 0.005$).

Excess visceral fat is known to be associated with increasing mean BP, and body fat reduction is associated with a decrease in mean BP.[2] Persistently elevated BP and increased central fat mass in individuals may partially contribute to the increased risk of cardiac hypertrophy and heart failure1 and increased cardiovascular mortality.

Visceral fat mass was the only white-adipose-tissue parameter that represented an independent, significant, and positive regressor for arterial stiffness; this determination was made through PWV analysis. The volume of visceral fat cells may explain the well-known correlations between central fat mass, arterial stiffness, and cardiovascular risk, at least in obese subjects.[2]

The correlation coefficient (Spearman's rho) indicates the relationship between improved PWV and waist-to-hip ratio changes between baseline and 6 months (age ≤ 45 years; aortic PWV, 0.92; $P < 0.05$). In this study, the association between abdominal obesity and PWV was confirmed in the young group (i.e., individuals aged below 45 years) but not in the group of patients aged over 45 years.

Central arteries are rich in elastin; this enables efficient arterial-ventricular coupling and optimal transfer of stroke volume to circulation.[3,4] Elastic fibers degrade and fragment with age as well as disease progression. These phenomena are accelerated by the additional crosslinking of elastic fibers with advanced glycation end products, leading to increased arterial stiffness.[5]

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Study concept and design: DML, WMH; acquisition of data: DML, WMH; analysis and interpretation of data: DML, JYH, JDK, WMH; drafting of the manuscript: JYH, DML; critical revision of the manuscript: JYH, WMH, DML; statistical analysis: DML, WMH; obtained funding: DML; administrative, technical, or material support: PKY; and study supervision: DML, WMH.

REFERENCES

1. Tomiyama H, Yamashina A. Arterial stiffness in prehypertension: a possible vicious cycle. J Cardiovasc Transl Res 2012;5:280-6.
2. Arner P, Bäckdahl J, Hemmingsson P, Stenvinkel P, Eriksson-Hogling D, Näslund E, et al. Regional variations in the relationship between arterial stiffness and adipocyte volume or number in obese subjects. Int J Obes (Lond) 2015;39:222-7.
3. O'Rourke MF, Staessen JA, Vlachopoulos C, Duprez D, Plante GE. Clinical applications of arterial stiffness: definitions and reference values. Am J Hypertens 2002;15:426-44.
4. Yano Y, Vongpatanasin W, Ayers C, Turer A, Chandra A, Carnethon MR, et al. Regional fat distribution and blood pressure level and variability: the Dallas heart study. Hypertension 2016;68:576-83.
5. Corden B, Keenan NG, de Marvao AS, Dawes TJ, Decesare A, Diamond T, et al. Body fat is associated with reduced aortic stiffness until middle age. Hypertension 2013;61:1322-7.