Abstract: 1417

Effect of sodium glucose cotransporter 2 inhibitor on sympathetic nerve activity in type 2 diabetes mellitus patients

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Topic(s):
Renal Artery Stenosis / Autonomic Nervous System

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Background: Diabetes mellitus (DM) is a well-known risk factor for cardiovascular diseases. Augmented sympathetic nerve activity plays an important role in the progressive worsening disease severity. Most of anti-diabetic drugs were demonstrated to not only decrease blood glucose, but also increase sympathetic nerve activity. Recently, it has been reported that sodium glucose cotransporter 2 (SGLT2) inhibitor has beneficial effects on cardiovascular events in spite of the decrease in blood glucose in type 2 DM patients. The underlying mechanisms remain speculative; however, it is assumed that SGLT2 inhibitor would improve sympathetic nerve activity in type 2 DM patients.

Purpose: The purpose of this study was to evaluate the effect of SGLT2 inhibitor on sympathetic nerve activity in type 2 DM patients.

Methods: This study was designed as the prospective single-arm study. Type2 DM patients whose HbA1c >7.0% with at least one atherosclerotic risk factors (Hypertension, obesity, smoking history, aging ...) were included. Patients who had renal failure (eGFR<45ml/min/1.73m²) or high age patients (>80 years old) were excluded. We measured blood glucose, HbA1c and blood insulin concentration at baseline and 12 weeks after treatment of dapagliflozin (5mg/day). Muscle sympathetic nerve activity (MSNA) was applied to scrutinize accurate sympathetic nerve activity in type 2 DM patients. Also, baroreflex sensitivity was calculated by examining the relationship between MSNA and beat to beat diastolic blood pressure.

Results: Eleven type2 DM patients were included in this study. Body mass index, blood pressure, HbA1c and blood insulin concentration tended to decrease at 12 weeks after dapagliflozin (body mass index: 27.2±6.3 vs. 24.9±3.2 kg/m², systolic blood pressure: 121±12.3 vs. 118±13.6 mmHg, diastolic blood pressure: 74.3±6.3 vs. 72.5±7.6 mmHg, HbA1c: 7.6±0.3 vs. 7.2±0.7%, insulin: 9.7±7.2 vs. 8.8±5.1 μU/ml). Dapagliflozin significantly decrease MSNA and heart rate compared to baseline (46.7±7.5 vs. 38.6±6.9 bursts/minute, P<0.05. Heart rate: 80.6±8.5 vs. 72.8±7.4 beats per minute, P<0.05). However, there is no interaction between the reduction in MSNA and baroreflex sensitivity or insulin resistance.

Conclusion: Our data demonstrated that dapagliflozin significantly decreased MSNA and HR beyond the lowering effect of blood glucose in type2 DM patients. These results indicate the favorable effect of SGLT2 inhibitor might be, in part, attributed to the improvement in sympathetic nerve activity.

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