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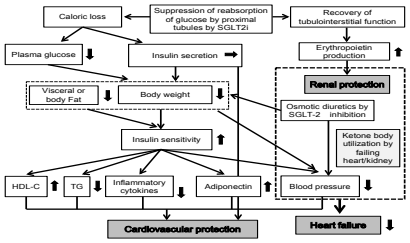
Cardiovascular and renal protective effects of sodium-glucose co-transporter 2 inhibitors



The sodium-glucose co-transporter 2 inhibitors (SGLT2i) suppress renal tubular glucose reabsorption and reduce plasma glucose, in an insulin-independent manner. To treat patients with type-2 diabetes, in addition to glucose control, the management of coronary risk factors is crucial. I systematically reviewed published articles about the possible anti-atherosclerotic effects beyond glucose lowering of SGLT2i and found that SGLT2i are proved to be significantly associated with weight loss and reduction of blood pressure by a relatively large number of studies. We retrospectively picked up patients who had been continuously prescribed SGLT2i by a chart-based analysis and compared the data before the SGLT2i treatment with the data at 6 months after the SGLT2i treatment started and found that SGLT2i significantly reduced HbA1c and body weight and improved liver function. Approximately 90% of SGLT2 is expressed in proximal renal tubules, therefore, the use of SGLT2i to patients with low estimated glomerular filtration rate (eGFR) was not recommended because of low efficacy. To understand an influence of eGFR on improvement in metabolic parameters by SGLT2i, we sub-analyzed our study and discovered that body weight decreased by SGLT2i, independently of eGFR, however, the changes in HbA1c and liver function depended on eGFR. SGLT2i have been reported to slow the progression of renal disease in patients with type-2 diabetes. Recently, Sano reported that elevation of hematocrit by SGLT2i may be a surrogate marker for recovery from tubule-interstitial injury, which made me found out that elevated erythropoietin may be one of renal protective effects of SGLT2i. Recent our study which investigated 6 kinds of SGLT2i demonstrated that SGLT2i ameliorated body weight, blood pressure, liver function, serum lipids and uric acid, in addition to improvement of glucose metabolism in patients with type-2 diabetes. Large RCTs with SGLT2i and a multinational observational analysis showed reduction of development heart failure by SGLT2i, which made me think about the possible mechanisms of prevention of heart failure due to SGLT2i.

Recent Publications

1. Yanai H, et al. (2016) Sodium-Glucose Co-transporter 2 Inhibitors: Possible Anti-Atherosclerotic Effects beyond Glucose Lowering. *J Clin Med Res*; 8: 10-14.

2. Katsuyama H, Hamasaki H, Adachi H, Moriyama S, Kawaguchi A, Sako A, Mishima S, Yanai H (2016) Effects of Sodium-Glucose Cotransporter 2 Inhibitors on Metabolic Parameters in Patients with Type 2 Diabetes: A Chart-Based Analysis. *J Clin Med Res*; 8: 237-243.

References

1. Jabbour S A, Goldstein B J (2008) Sodium glucose co-transporter 2 inhibitors: blocking renal tubular reabsorption of glucose to improve glycemic control in patients with diabetes. *Int J Clin Pract*; 62: 1279-1284.

2. Sano M, Takei M, Shiraishi Y, Suzuki Y (2016) Increased Hematocrit During Sodium-Glucose Co-transporter 2 Inhibitor Therapy Indicates Recovery of Tubulo-interstitial Function in Diabetic Kidneys. *J Clin Med Res* 8: 844-847.

Biography

Hidekatsu Yanai is the Director of the Department of Internal Medicine and Clinical Research and Trial Center, National Center for Global Health and Medicine Kohnodai Hospital, Japan. He has obtained his MD and PhD degrees in National Defense Medical College and Hokkaido University School of Medicine, respectively. He studied as Invited PhD Research Fellow in the National Institutes of Health (NIH), USA. He is the Editor-in-Chief of *Journal of Endocrinology and Metabolism* and also an Editorial Board Member of 10 medical journals. He has 183 published English papers in refereed medical journals.

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