**Original article**

**Title: SGLT2 inhibitors improved time-in-range without increasing hypoglycemia in Japanese patients with type 1 diabetes: A retrospective single center pilot study**

**INTRODUCTION**

Hypoglycemia is a risk factor for cardiovascular complications and dementia in patients with diabetes1,2. By contrast, continuous hyperglycemia leads to micro- and macrovascular complications3. Thus, the triumvirate of strategies for glucose control include reduction of hyperglycemia and hypoglycemia, and maintenance of a small glycemic variability (that is, a small coefficient of variation [CV] for glucose levels)4. In addition to that, the recent International Consensus proposed a glucose target based on continuous glucose monitoring data. Increasing the target time-in-range (TIR, percentage of time with glucose levels between 3.9 and 10.0 mmol/L [70-180 mg/dL]) is important to archive target glucose control5, but hypoglycemia and hyperglycemia occur frequently in patients with type 1 diabetes6,7. In addition, low C-peptide values, reflecting inadequate endogenous insulin secretion, have been associated with increased glycemic variability and hypoglycemia8; and maintenance of glucose control is difficult in patients with type 1 diabetes (especially in those with low C-peptide values). Studies have reported effects of sodium-glucose co-transporter 2 (SGLT2) inhibitors for glucose control and glycemic variability in patients with type 1 diabetes with low c-peptide value9-12. A randomized trial showed ipragliflozin improved the HbA1c and reduced the total insulin dose and body weight in Japanese patients with type 1 diabetes with C-peptide values <0.1987 nmol/L11. Another randomized trial showed dapagliflozin improved the mean glucose, mean amplitude of glucose excursion (MAGE), and TIR without increasing the time below range (TBR, percentage of time spent with glucose <70 mg/dL or <3.9 mmol/L) in patients with type1 diabetes with c-peptide values <0.23 nmol/L12. These results indicated that SGLT2 inhibitors may be useful for patients with type 1 diabetes having difficulty maintaining adequate glucose control. However, whether these SGLT2 inhibitors improve glycemic variability and TIR, and contribute to improved glucose control in Japanese patients with type 1 diabetes remained unclear. In addition, the results of other studies did not include data from real-world clinical practice. The aim of this study was to investigate the efficacy of SGLT2 inhibitors in terms of glucose control (that is, for TIR and glycemic variability) in Japanese patients with type 1 diabetes with low C-peptide values.