中文題目：SGLT2 抑制劑引起酮酸中毒用於第二型糖尿病病人
英文題目：Euglycemic diabetes ketoacidosis in type 2 diabetes mellitus in patient with SGLT 2 Inhibitors
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Introduction
Sodium–glucose co-transporter 2 (SGLT2) inhibitors are a new family of anti-diabetes drugs that reduce blood glucose independent of insulin. SGLT2 inhibitors plus insulin therapy could significantly decrease fasting blood glucose and HbA1C, thereby reducing the daily required dose of insulin. A reduction in body weight and improvements in insulin resistance and β-cell function have also been widely reported with this therapy, and other potential advantages, including the reduction in blood pressure, adverse cardiovascular outcomes, and visceral adipose tissue volume, have been revealed. [1]

Case presentation
This 61years old woman was admitted due to severe nausea and vomiting for 1 day. She had type 2 diabetes mellitus for more than 10 years and she took regular oral diabetes agents including metformin, modified release gliclazide and dapafloxaxin 10mg as add-on therapy. Her HbA1C was 7.7 %.
On presentation, her white blood cell count (19020/μL), neutrophil was86.6%, serum creatinine (0.85mg/dL), and random blood glucose was 254mg/d L, serum ketone bodies level was 4.6, serum lactate level was 3.94.
Urinalysis showed the presence of ketones 3+. Arterial blood gas analysis revealed PH-7.158 (normal 7.35–7.45), PCO2- 17.9(normal 32-45), HCO3-6.3, (normal 20-24) mmol/L, PO2-117.9, BE(B) -20.4, an anion gap of 22.3 (normal 7–15) mmol/L C-reactive protein was 0.05mg/L. She received adequate intravenous fluid therapy, continuous insulin infusion as fixed dose, empiric
antibiotics for infection control. Dapagliflozin was discontinued.
Within 72 hours of intensive therapy, the anion gap had normalized, the insulin regimen was discontinued shift to subcutaneous form.
After her general condition become improved, she was discharged from hospital and OPD follow up was arranged.

Discussion
Diabetic ketoacidosis (DKA) is a complication commonly associated
with type 1 diabetes mellitus, but may also occur with type 2 diabetes in states of relative insulin deficiency. Since the approval of sodium–glucose cotransporter-2 (SGLT-2) inhibitors for the treatment of type 2 diabetes by the United States Food and Drug Administration (FDA) in March 2013, an increasing number of cases of ketoacidosis has been described. Patients with type 2 diabetes mellitus may develop diabetic ketoacidosis during states of relative insulinopenia, most frequently from inadequate medication or intercurrent illness. Near normal glycemic values were reported in many of these cases, which potentially delayed the recognition and treatment of the ketoacidosis.[1]
SGLT2 inhibitors cause a greater reduction than dipeptidyl peptidase-4 (DPP-4) inhibitors in body weight and the risk of cardiovascular disease. Furthermore, compared with glucagon-like peptide-1 (GLP-1) agonists, SGLT2 inhibitors reduce blood pressure, and heart failure. As this therapy is an oral preparation, an improvement in patient compliance is also achieved.

Despite these advantages, however, combination therapy with SGLT2 inhibitors and insulin has several risks. Although no difference has been found in the incidence of hypoglycemic events and urinary tract infection between the administration of this combination and that of placebo, the risk of genital tract infections was reported to increase with the combination therapy.[2]
So we should identify potential triggering factors during the exposure period to SGLT-2 inhibitors, which include inter-current illness, reduced food and fluid intake, reduced insulin doses, and history of alcohol intake.[3]

Conclusion
Diabetes mellitus (DM) is a systemic disease associated with an increased risk of adverse vascular events. DCCTEDIC and UKPDS have shown that improved glucose control through an increase in insulin therapy is associated with reductions in the long-term risks of both microvascular and macrovascular events. In summary, SGLT2is as adjunctive therapy improved glycemic control and body weight and decreased the required dose of insulin without increasing the risk of hypoglycemia.[4]

References

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