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Opinion Article

SGLT2 Inhibitors and Its Role in Diabetes

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SGLT2 (Sodium-glucose Cotransporter-2) is the protein which transport and promotes the reabsorption from glomerular filtration glucose back to circulation & responsible for kidney's glucose reabsorption.

SGLT2 inhibitors are a new class of oral medications used in treating type 2 diabetes, which have a unique mechanism action and lowers the glucose levels independent of insulin.

SGLT2 inhibitors have been approved by FDA (Food and Drug Administration) and since 2013 these are used as a treatment for diabetes. There are 3 classes of drugs used in the treatment. They are: 1. Dapagliflozin (Forxiga), 2. Canagliflozin (Invokana), and 3. Empagliflozin (Jardiance)

The efficacy and safety of SGLT2 inhibitors have not been established in type 1 diabetes patients. Research has been found to show benefits in cardiac patients with diabetes, and is being studied for possible use in type 1 diabetes.

SGLT2 is a low-affinity, and high capacity glucose transporter located in the kidneys (proximal tubule). It is responsible for 90% of glucose reabsorption. Inhibition of SGLT2 leads to decrease in blood glucose due to increase in renal glucose excretion. The mechanism of action of this newest class of drugs also offers further glucose control by allowing increased insulin sensitivity and uptake of glucose in the muscle cells, decreased gluconeogenesis and improved first phase insulin release from the beta cells.

SGLT2 is proposed in prehistoric times, we developed an elegant system for maximizing energy conservation and storage, due to lack of consistent food supplies. This system reduces the activity of neurological endocrine system to slow down the metabolism and conserve the stored energy in our bodies, as well as a method to increase reabsorption of excess glucose that was removed by kidneys.

Majority of type 2 diabetes patients have an adequate or most likely an over-abundant supply of glucose from the foods we eat this system is no longer necessary for survival and in fact contributes to increased weight and diabetes risk. The first defect was addressed in May of 2009 when Cycloset (bromocriptine mesylate rapid release) was approved by the FDA and now with the approval of Invokana (canagliflozin), Jardiance (empagliflozin), and Farxiga (dapagliflozin), we have medications to address the second half of this problem.

Drugs in SGLT2 inhibitors class include empagliflozin, canagliflozin, dapagliflozin, ipragliflozin (which has not yet been approved for use in the U.S.). Canagliflozin is the only drug in this class approved by the FDA for the treatment of type 2 diabetes.

Vaginal yeast infections and urinary tract infections are most common side effects associated with canagliflozin with the greatest risk being in female patients and those men who are uncircumcised.

There is also increase desire to urinate and the medication is not indicated in patients with type 1 diabetes, or patients with frequent ketones in their blood or urine, severe renal impairment, end stage renal disease or patients receiving dialysis. Patients should be advised to expect glucose to be in the urine.

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