



Short Communication

Role of empagliflozin on function of kidney of type 2 diabetes mellitus (T2DM) patients

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T2DM (Type 2 diabetes mellitus) is a progressive disease and a major risk factor for microvascular and macrovascular disease.^{2,3} The high risk of complication both microvascular and macrovascular has raised an enormous public health concern worldwide.⁴ The principal risk factor for microvascular complication is hyperglycemia, hence, to maintain glycemic control patients often need lifestyle management and treatment which could be an initial period of monotherapy or combination treatments.^{2,5}

An increased risk of premature death is associated with T2DM with a threefold rise in the risk of atherosclerotic changes in comparison to the population who do not have T2DM. Persons with T2DM have common and severe clinical manifestation of peripheral arterial disease (PAD) as compared to control.⁶ T2DM patients manifest a two-to-threefold increased risk of cardiovascular disease in comparison to patients without diabetes.⁵ Cardiovascular diseases are the leading cause of mortality and morbidity in patients with T2DM, accounting for 80% mortality.^{5,6} The risk of developing myocardial infarction and stroke as compared to people without diabetes increases the risk of death.^{6,7} The patients who have manifestation of diabetes mellitus are at an increased risk of cardiovascular death, with the risk being like patients with prior myocardial infarction but without diabetes.⁵ Lowering plasma glucose levels have shown a slight cardiovascular benefit, which is observed when is patients is on prolonged follow-up period though no

convincing evidence has been shown on cardiovascular events and deaths.⁷

Chronic kidney disease (CKD) with an estimated prevalence of 8-16% is rising worldwide and has initiated a global health-care concern for prompt initiatives and firm commitments to find effective treatments.⁸ End-stage renal disease (ESRD) is associated with diabetic nephropathy (DN) is amongst the major microvascular complications in patients with diabetes mellitus which affects mortality. Patients with T2DM are at increased risk of developing kidney disease with every 3-4 patients (approximately 35%) being affected and associated with increased mortality.³ Diabetes is the leading cause of end-stage renal disease in the Western world.⁹ The exact pathophysiology responsible for changes seen in kidney of patients with DN is still not clear.⁹ Though intensive glucose lowering strategies have shown to reduce surrogate markers of renal complications² and are essential for the prevention of diabetes-induced end-organ damage.⁹

The UKPDS 35 (United Kingdom Prospective Diabetes Study) has demonstrated that intensive glycemic control not only inhibits the incidence but also slows the progression of microvascular complications in patients with T2DM.^{4,10} ADVANCE-ON Study (The Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation Post-Trial Observational Study) has recently shown that intensive glycemic controls have a long-term benefit in preventing ESRD in patients with diabetes.^{4,11}

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Inspite of intensive plasma glucose control and the use of single drugs therapy that block the RAAS (renin–angiotensin–aldosterone system), patients with T2DM are at an increased risk for cardiorenal causes of death and complications^{3,12}. A new class of drugs that lower the plasma glucose, the SGLT 2 (Sodium–glucose co transporter) inhibitors induce glucosuria thereby resulting in optimal glycemic control in patients of diabetes mellitus⁴ they reduce rates of hyperglycemia by reducing reabsorption of renal glucose and increasing urinary glucose excretion.⁷ Empagliflozin, a selective SGLT-2 inhibitor has been approved for type 2 diabetes mellitus either as single drug therapy or add-on therapy. Empagliflozin decreases the glycosylated haemoglobin levels in patients with T2DM and also been shown to be effective in patients presenting with CKD (Stage 2 or 3a). It has shown to increase weight loss and reduce the blood pressure without any variation in the heart rate. It has found to have favorable effects on markers of arterial stiffness and vascular resistance, visceral adiposity, albuminuria, and plasma urate thereby attenuating both diabetes nephropathy and CVD (cardiovascular disease) in patients with T2DM.^{4,7} Empagliflozin has shown to decrease the intraglomerular pressure and also effect hyperfiltration in type 1 diabetes mellitus patients, thereby suggesting the role of empagliflozin in improving renal outcomes.³ Studies have also shown that empagliflozin leads to an increase in LDL (low-density lipoprotein) and HDL (high-density lipoprotein) cholesterol.⁷

Empagliflozin has shown the potential to improve the kidney function in the patients suffering from type 2 diabetes mellitus, though more investigation needs to be done to confirm the role it might play in diabetic nephropathy in the long-run in patients suffering from diabetes mellitus.

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Conflict of Interest

None.

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