

KSN 2016 Abstract Submission

Transplantation & Immunology

KSN2016ABS-1446

Effect of empagliflozin on tacrolimus-induced diabetes mellitus

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Background: Empagliflozin (Empa) is a sodium glucose transporter for control hyperglycemia in type 2 diabetic patients. In this study, we investigated the effect of Empa on tacrolimus (TAC) - induced diabetes mellitus (DM)

Methods: Experimental model of Tac-induced DM in rats was induced by treating TAC (1.5mg/kg) subcutaneously for 3 weeks, and two doses of Empa (5 and 10mg/kg) was injected for additional 3 weeks. Control rats were treated with Empa only. Body weight, water intake and urine volume were measured every week. The effect of Empa on TAC-induced DM was evaluated by assessing intraperitoneal glucose tolerance test (IPGTT), serum insulin level, and glucose stimulated insulin secretion (GSIS). In addition, the effect of Empa on kidney function was also studied.

Results: TAC treatment decreased delta body weight (29.0 ± 4.6 vs 53.5 ± 6.4 , $p < 0.05$) and increased water intake (40.0 ± 2.8 vs 31.6 ± 3.3 , $p < 0.05$) and urine volume (33.3 ± 2.4 vs 24.7 ± 4.4 , $p < 0.05$) compared with controls. Treatment with TAC caused elevated IPGTT level at 30, 60, 90, 120 min (427.4 ± 25.0 vs 160.0 ± 29.0 , 291.6 ± 24.9 vs 123.8 ± 10.0 , 214.9 ± 18.0 vs 111.3 ± 6.5 , 183.6 ± 15.0 vs 104.3 ± 6.9 , $p < 0.05$), renal dysfunction (Figure 1.) and reduced GSIS (18.2 ± 0.8 vs 2.4 ± 0.3 , $p < 0.01$) compared to controls. IPGTT revealed that Empa treatment reduced blood glucose level at each time point (Figure 2.) and AUCg (401.9 ± 39.5 , 358.6 ± 29.6 vs 535.9 ± 28.8 , $p < 0.05$), and increased GSIS (4.8 ± 1.0 , 16.3 ± 2.2 vs 18.2 ± 0.8 , $p < 0.05$) compared to TAC group, and this effect of dose-dependent.

Conclusion: Empa is effective in control TAC-induced hyperglycemia and renal dysfunction. This finding provides clinical usefulness of Empa in renal transplant patients with TAC-induced DM.

Figures:

Figure 1.⁴¹

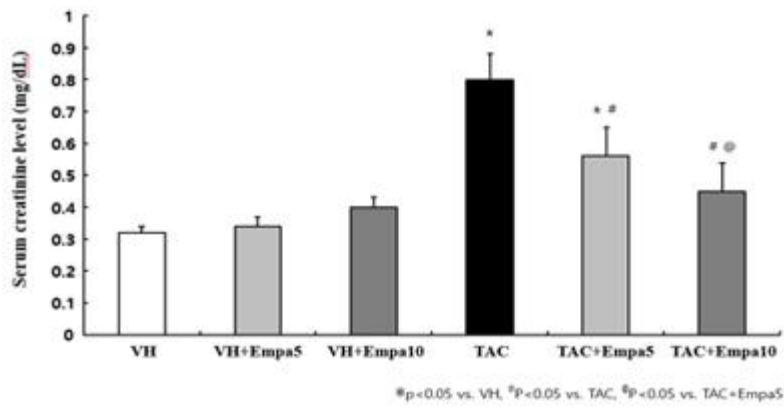
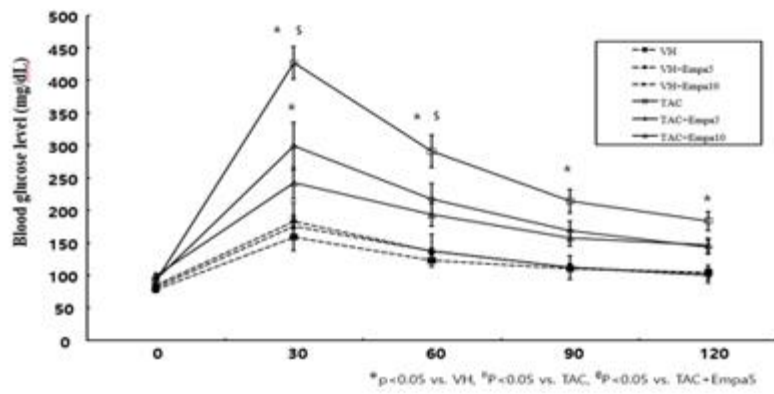


Figure 2.⁴¹



Keywords: None