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Antidiabetic And Renoprotective Effects of Trigonella Foenum Graecum And Sodium Orthovanadate In Experimental Diabetes Rats.

Pardeep Kumar

Department of Biochemistry, F H M College and Hospital, India

Objectives: To explore the prospect of using low doses of sodium orthovanadate (SOV) in combination with Trigonella seed powder (TSP) and evaluate their antidiabetic and renoprotective effects on altered metabolites in kidney of alloxan diabetic rats.

Methods: Diabetes was induced by administration of alloxan monohydrate (15 mg/100 g body weight.) and rats were treated with 2 IU insulin, 0.6mg/ml SOV, 5% TSP in the diet and a combination of 0.2 mg/ml SOV and 5% TSP separately for three weeks. Renal damage was assessed by measuring ACR (Albumin to Creatinine Ratio) and GFR (glomerular filtration rate), serum creatinine , proteinuria, enzymuria, expression of glucose transporters (Glut 1, Glut 4), renin-angiotensin system, lipid peroxidation and activities of polyol pathway enzymes. Protein concentrations of insulin receptor, GLUT1 ,GLUT 2, glucokinase genes and heat-shock (HSP60 and HSP70) in renal tissue were determined by Western blot analyses.

Results: Experimental diabetic rats group showed hyperglycemia with almost four fold high blood glucose levels. Diabetic rats exhibited an increased level of lipid peroxidation, serum creatinine levels, and decreased expression of glucose transporters (Glut 1, Glut 4) with heat-shock proteins. Combined therapy of lower dose of SOV with TSP significantly reduced metabolites of polyol pathway, oxidative stress , ACR and nitric oxide activity in kidney of alloxan diabetic rats. Markers of podocyte damage in kidney (nephrin, podocin, and podocalyxin) and GFR were normalized by SOV and TSP treatment. TSP treatment alone is partially effective in restoring the above diabetes induced alterations. Dietary combined SOV and TSP effectively countered the diabetes-induced structural abnormalities of renal tissue.

Conclusions: It may be concluded that lower doses of SOV (0.2mg/ml) could be used in combination with TSP to effectively in normalization of altered kidney metabolic parameters and GLUT without any harmful side effect and renoprotective actions in experimental diabetes rats.