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BENEFICIAL ROLE OF CAFFEIC ACID ON DIABETIC NEPHROPATHY ASSOCIATED WITH TYPE-I DIABETES MELLITUS IN RATS

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Objectives: Diabetic cardio-renal complications mainly attributed to increase in oxidative stress and release of pro-inflammatory and inflammatory cytokines. Caffeic acid (CA) is one of the most common phenolic compound reported to possess diverse pharmacological activities such as antidiabetic, antioxidant, free radical scavenging, and anti-inflammatory. Therefore, the present study was aimed to study the effect of CA on diabetic nephropathy associated with type-I diabetes mellitus (TIDM) in rats.

Methods: TIDM in rats was induced by streptozotocin (STZ) injection once only (45 mg/kg, i.v). The animals were divided into four groups, and treatment was given for eight weeks with CA (25 mg/kg, and 50 mg/kg, p.o.) in two specified diabetic groups. After eight weeks, serum and urine was collected and various serum and urine parameters were estimated. Further, kidneys were removed for estimation of oxidative parameters and histopathological evaluation.

Results: Diabetic rats exhibited increased in the levels of glucose, TC, and TG, LDL-C and decreased HDL-C level. CA-treatment restored back the level of glucose and other lipid parameters. STZ-induced diabetic rats showed significantly high serum levels of creatinine, blood urea nitrogen (BUN) and decreased albumin levels. Diabetic rats also exhibited significantly elevated levels of sodium, creatinine and albumin in urine. Further, treatment with CA showed significantly decreased the serum levels of creatinine, BUN and increased albumin levels. Urinary markers were also ameliorated with CA treatment. Moreover, diabetic rats showed significantly increased the levels of malondialdehyde and decreased the activities of superoxide dismutase and glutathione in kidney homogenate. Treatment with CA showed significantly reduced malondialdehyde and increased activities of superoxide dismutase and glutathione. Histopathological findings revealed normal tubule, intact Bowman's capsule and markedly reduced glomerular sclerosis in kidney tissues.

Conclusions: The present data supported the beneficial effect of CA on diabetic nephropathy may be via anti-oxidative actions.