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Protective Effects of Berberine on Kidney Fibrosis And Lipid Alterations In L-NAME-Induced Hypertensive Rats

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Objectives: Berberine is a natural alkaloid with a bright yellow color isolated from the plant Coptis chinensis. Recently, human and animal studies indicated that berberine also had a hypoglycemic activity and an extra-beneficial protection for cardiovascular system in hypertension or diabetes The present study was designed to evaluate the effect of berberine on high blood pressure associated cardiac dysfunction, kidney fibrosis and lipid alterations in N(ω)-nitro-l-arginine methyl ester hydrochloride (l-NAME) induced hypertensive rats and identify the molecular mechanism underlying the vascular protection.

Methods: Twenty-four male albino rats were divided into control, l-NAME (40mg/kg, intraperitoneally) and berberine (100, 200 and 400 mg/kg/day) was intragastrically administered in experimental groups to hypertensive rats for 6 weeks. Tissue damage was assessed by histopathological examination. Besides, we measured levels of angiotensin II, lipid peroxidation, plasma nitric oxide, antioxidant enzymes activity and 3-hydroxy-3-methylglutaryl- Coenzyme A (HMG-CoA) reductase in serum , liver and kidney with urinary markers of renal injury and albumin.

Results: Berberine treatment significantly dose dependent decreased mean arterial pressure, left ventricular end diastolic pressure, organ weights (heart, liver and kidney), lipid peroxidation products in tissues, activities of caridac marker enzymes and the levels of renal function markers in serum of l-NAME rats. Berberine (400 mg/kg/day) treatment also significantly increased the level of plasma nitric oxide metabolites, and antioxidants in tissues of l-NAME rats. Alterations in plasma angiotensin-converting enzyme activity, level of plasma lipoproteins and tissue lipids were corrected by berberine treatment in l-NAME rats.
Berberine treatment significantly decreased the activity of HMG-CoA reductase in plasma and liver, whereas the activity of lecithin cholesterol acyl transferase was significantly increased in the plasma of hypertensive rats.

Conclusions: These results of the present study concludes that berberine acts as a protective agent against hypertension associated cardiac dysfunction, kidney fibrosis and lipid alterations in l- NAME rats.