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Effects of Kolavironon Liver Oxidative Stress and Beta-Cell Damage in Streptozotocin-Induced Diabetic Rats

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Abstract : The liver plays an important role in the regulation of blood glucose and is a target organ of hyperglycaemia. Hyperglycemia plays a crucial role in the onset of various liver diseases and may culminate into hepatopathy if untreated. Alteration in antioxidant defense and increase in oxidative stress that results in tissue injury is characteristic of diabetes. We evaluated the protective effects of kolaviron-a biflavonoid complex, on hepatic antioxidants, lipid peroxidation and apoptosis in the liver of diabetic rats. To induce type I diabetes, rats were injected with streptozotocin intraperitoneally at a single dose of 50 mg/kg. Oral treatment of diabetic rats with kolaviron (100 mg/kg) started on the 6th day after diabetes induction and continued for 6 weeks (5 times weekly). Diabetic rats exhibited a significant increase in the peroxidation of hepatic lipids as observed from the elevated level of malondialdehyde (MDA) estimated by High-Performance Liquid Chromatography. In addition, Oxygen Radical Absorbance Capacity (ORAC), ratio of reduced to oxidized glutathione (GSH/GSSG) and catalase (CAT) activity was decreased in the liver of diabetic rats. TUNEL assay revealed increased apoptotic cell death in the liver of diabetic rats. Examination of Pancreatic beta-cells by immunohistochemical methods revealed beta cell degeneration and reduction in beta cell/ islet area in the diabetic controls. Kolaviron-treatment increased the area of insulin immunoreactive beta-cells significantly. Kolaviron attenuated lipid peroxidation and apoptosis in the liver of diabetic rats, increased CAT activity GSH levels and the resultant GSH: GSSG. The ORAC of kolaviron-treated diabetic liver was restored to near-normal values. Kolaviron protects the liver against oxidative and apoptotic damage induced by hyperglycemia. The antidiabetic effect of kolaviron may also be related to its beneficial effects on beta-cell function.

Keywords : diabetes mellitus, kolaviron, oxidative stress, liver, apoptosis
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