The protective effects of zinc and vitamin E supplementation against kidney toxicity by lithium in rats

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Abstract:

The valuable effects of antioxidants supplementation on lithium-induced nephrotoxicity has not been understood yet. The purpose of this study was to evaluate the renoprotective effect of zinc sulfate (Zn) and/or vitamin E (Vit. E) against lithium chloride (Li)-induced nephrotoxicity in rats. Forty male rats were divided into five groups. The first worked as controls and the other were treated with Li (20 mg/kg daily for 4 weeks). Group I of Li-treated was left without treatment, however, group II, III and IV were treated with Zn (10 mg/kg daily for 4 weeks), Vit. E (10 mg/kg, twice a week for 4 weeks), and the combination of Zn and Vit. E, respectively. Rats were killed for collection of blood and kidneys for biochemical and histological studies. The results showed a significant increase in Li in kidney tissue in all treated groups with Li, however, Zn was only increased in the groups treated with Zn, whereas Cu was similar in all treated and control groups. Plasma levels of creatinine, urea and glucose showed differences among the treated groups. The levels of lipid peroxidation, nitric oxide, glutathione, superoxide dismutase and catalase in renal tissue were significantly increased in Li-treated groups in comparison with the control and ameliorated by treatment with Zn and the combination of Zn and Vit. E. Histological observation showed perivascular edema and interstitial lymphocytic cell reaction in kidney of rats treated with Li, however co-treatment with Zn and/or Vit. E resulted in improvement of the histological changes. In conclusion Li-exposure causes a histological and biochemical changes mediated by oxidative stress and Li accumulation and co-treatment with Zn and/or Vit. E may protect against Li toxicity.

Keywords:

Lithium toxicity; Kidney; Vitamin E; Zinc; Oxidative stress; Metal accumulation.

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