Abstract


Combined Administration of l-Carnitine and Ascorbic Acid Ameliorates Cisplatin-Induced Nephrotoxicity in Rats.

Alabi QK, Akomolafe RO, Olukiran OS, Nafiu AO, Adefisayo MA, Owotomo OI, Omole JG, Olamilosoye K.

Department of Physiological Sciences, Faculty of Basic Medical Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria; Department of Haematology and Blood Transfusion, College of Medicine, Faculty of Basic Medical Sciences, Afe Babalola University, Ado Ekiti, Ekiti State, Nigeria; Department of Physiology, Faculty of Basic Medical Sciences, University of Medical Sciences, Ondo State, Nigeria; Department of Haematology and Immunology, Faculty of Basic Medical Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

OBJECTIVES: Cisplatin (CIS) is an effective antitumor drug. However, its clinical use is limited due to nephrotoxicity. l-Carnitine and vitamin C are both natural antioxidant that can be obtained from diets. This study investigated the effects of l-carnitine and/or vitamin C in rats against cisplatin-induced nephrotoxicity.

METHODS: Twenty-five male Wistar rats were divided into 5 groups of 5 rats each. Group 1, normal control. Group 2, positive control, received cisplatin (10 mg/kg/day intraperitoneally [i.p.]) for 3 days. Groups 3, 4, and 5 received cisplatin for 3 days and thereafter l-carnitine (50 mg/kg/day), vitamin C (100 mg/kg/day), or their combination, respectively, for 28 days. At the end of the study, a biochemical study was carried out in which nephrotoxicity markers, electrolytes, hematological indices, oxidative stress biomarkers, and renal histopathological alterations were evaluated.

RESULTS: CIS-treated rats developed significant polyuria, increase in the plasma levels of creatinine, urea, and inorganic phosphate (Pi), alteration in hematological parameters, and decrease in plasma levels of Na+, Cl−, K+, Ca2+, and Mg2+. Measurements of 24-hour urine output demonstrated markedly decreased creatinine and urea and increased Na+, Cl−, K+, Ca2+, and Mg2+ levels in the CIS-treated group, whereas Pi levels were not changed. It also caused significantly decreased catalase (CAT), superoxide dismutase (SOD), and reduced glutathione (GSH) levels in the rats’ kidneys. Histopathological scores revealed renal tubular damage in CIS-treated rats. However, l-carnitine, vitamin C, or their combination significantly attenuated the alterations caused by CIS in the plasma and kidneys of the rats.

CONCLUSION: l-Carnitine and vitamin C administration ameliorated CIS-induced nephrotoxicity due to their antioxidant and anti-inflammatory effects.

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