

Effect of N-Acetyl cysteine on oxidative stress and Bax and Bcl2 expression in the kidney tissue of rats exposed to lead

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Background: This study aimed to consider the lead-induced oxidative damage of the kidney of male rats and the role of antioxidant N-acetylcysteine (NAC) in preserving cells against Pb toxicity.

Methods: Rats were randomly divided into five groups including G1 (control), G2 (single 70 mg/kg dose of Pb), G3 (continuous daily 2 mg/kg dosing of Pb for 4 weeks), G4 (single dose of Pb + 50 mg/kg NAC), and G5 (continuous daily dosing of Pb + 50 mg/kg NAC).

The level of malonic dialdehyde (MDA) and total antioxidant capacity were measured spectrophotometrically. The level of Pb in serum and kidney tissue was measured by atomic absorption spectroscopy. Expression of Bax and Bcl2 genes was estimated using RT-PCR.

Results: It was shown that single and continuous exposure to Pb caused a considerable increase of Pb content in serum and kidney tissue of rats in G2 and G3 groups compared to other groups. NAC treatment significantly improved TAC values and decreased MDA values in the serum of rats exposed to Pb. Single and continuous Pb dosing caused a 3.9- and 13.1-fold increase in Bax expression and 1.5-fold and 2.1-fold decrease in Bcl2 expression in a kidney tissue respectively. Current study revealed that single and especially continuous Pb exposure was strongly associated with Pb accumulation, antioxidant depletion, oxidative stress and kidney cells apoptosis.

Discussion: NAC can help protect kidney tissue against Pb by elevating antioxidant capacity, mitigating oxidative stress and normalization of Bax and Bcl2 genes expression.

Keywords: Pb, kidney, N-acetyl cysteine, oxidative stress, Bax, Bcl2, apoptosis.