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Protective Effect of N-Acetyl Cysteine and Alpha Lipoic Acid on Rats Chronically Exposed to Cadmium Chloride

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Abstract : Cadmium is one of the most harmful heavy metals able to induce severe injury. In this study, sixty four male Sprague Dawley rats weighing (70-80 gm) were used. Rats were divided into 4 groups each group of 16 rats. Group A: served as control and received commercial ration and distilled water Group B: cadmium chloride was administered orally in water at dose of 300 ppm cadmium (560 mg/L as CdCl2). Group C: Animals received cadmium in drinking water in addition to administration of N-acetylcysteine (NAC) orally at a dose of 150 mg/kg body weight, equivalent to 1500 ppm in food. Group D: Animals received cadmium in drinking water in addition to administration of alpha lipoic acid (ALA) orally at a dose of 150 mg/kg body weight, equivalent to 1500 ppm in food. The experiment was continued for 2 months. Collection of blood and tissue samples was performed at 2, 4, 6, 8 weeks. Blood sample were collected for serum biochemical analysis including malondialdehyde (MDA), total antioxidants, aspartate aminotransferase (AST), alanine aminotransferase (ALT), total protein, albumin, urea and uric acid. Tissue specimens were collected for histopathological examination including liver, kidney, brain and testis. Histopathological examination revealed that cadmium choloride induces pathological alterations which increased in severity with time. The use of NAC and ALA can ameliorate toxic effect of CdCl2. The results showed significant decrease MDA and significant increase total antioxidants in group C and D compared to group B, Liver enzymes include AST and ALT showed significant decrease. Regarding to results of total protein and albumin, they revealed significant increase. Urea and uric acid showed significant decrease. From our study we conclude that NAC and ALA have protective effect against cadmium toxicity.

Keywords : ALA, cadmium, histopathology, NAC
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