

Nephroprotective effect of Gallic acid against mercuric chloride (HgCl₂) induced damage in rats

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Abstract Presenter:

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Abstract

Introduction: Mercury has hematotoxic, hepatotoxic, neurotoxic, nephrotoxic and genotoxic effects. Tissue damage induced by mercuric chloride (HgCl₂) is associated with the promotion of oxidative stress. In this study, Gallic acid (GA), as potent antioxidant compound, was examined against mercuric chloride (HgCl₂)-induced kidney injury in Wistar rats.

Methods and Results: In this experimental study, animals were divided into five groups (n=7). Groups 1 and 2 respectively received normal saline (2 ml/kg, orally.) and HgCl₂ (0.4 mg/kg, orally) for 28 consecutive days. Group 3 only received GA (200 mg/kg, orally) for 28 consecutive days. Groups 4 and 5 received orally GA at doses of 50 and 200 mg/kg, respectively, one hour after administration of HgCl₂ for 28 consecutive days. Then On the 29th day, the rats were sacrificed, and blood samples were collected to determine biochemical parameters such as serum creatinine (Cr) and blood urea nitrogen (BUN) levels. For oxidative stress evaluation, malondialdehyde (MDA) and reduced glutathione (GSH) levels and also catalase (CAT), glutathione peroxidase (GPx) and superoxide dismutase (SOD) activity were evaluated in left kidney tissue. The right kidney was used for histological examination. The results obtained from our study showed a significant increase in the levels of MDA, Cr and BUN, and decrease of GSH, CAT and SOD after ingestion of HgCl₂ (p<0.05). Pre-treatment with GA showed diminished in the levels of MDA, Cr and BUN and enhanced of GSH, CAT, GPx and SOD activity (p<0.05). Additionally the nephroprotective effect of the GA was established by the histological evaluation of the kidneys.

Conclusions: Our results indicate that GA has protective effect against HgCl₂-induced renal damage probably by scavenging free radicals, reducing the oxidative stress, and increasing the antioxidant defense mechanism.

Key words: Nephrotoxicity, Mercuric chloride, Gallic acid, Rat.

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