Concomitant Protective and Therapeutic Role of Verapamil in Chronic Mercury Induced Nephrotoxicity in the Adult Rat: Histological, Morphometric and Ultrastructural Study

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Background: Mercury intoxication is a widespread problem as mercury is used in the manufacture of thermometers, batteries and electrical switches. It forms one of the most diffusible environmental pollutants. Mercury has a nephrotoxic effect which could occur at low exposure levels. Verapamil could help in the treatment of mercuric toxicity.

Aim: to examine the protective and therapeutic effect of concomitant verapamil on chronic mercuric chloride nephrotoxicity. This was done through histological, morphometric and transmission electron microscopic studies.

Methods: Sixty adult male albino rats were used. The rats were divided into a control group and 4 experimental groups: group I (HgCl₂), group II (concomitant HgCl₂ and verapamil), group III (HgCl₂ withdrawal) and group IV (HgCl₂ withdrawal then verapamil treatment).

Results: Chronic administration of HgCl₂ resulted in cortical nephrotoxic effects in the form of glomerular sclerosis, acute tubular necrosis and interstitial inflammatory cellular infiltration which eventually ended in interstitial fibrosis. Concomitant use of verapamil with HgCl₂ improved the previous pathological changes partially. The findings in group III were less severe compared to group IV. The persistence of the pathological findings in these groups reflects the irreversible nephrotoxic changes caused by chronic HgCl₂ exposure.

Conclusions: We concluded that the concomitant administration of verapamil has a much better effect in minimizing the nephrotoxic effect caused by chronic HgCl₂ than its therapeutic administration. So, we recommended the prophylactic use of verapamil in suspected cases of chronic mercuric chloride nephrotoxicity to preserve renal function.

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