



Comparative evaluation of the protective effect of selenium and garlic against liver and kidney damage induced by mercury chloride in the rats

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Abstract:

The present study was designed to compare the protective effect of selenium and garlic against liver and kidney damage induced by (*ip*) injection of 0.5 mg/kg mercury chloride (HgCl₂) in rats. Thirty-six Sprague-Dawley rats were used in the present experiment and divided into six groups: one group was orally given (1 ml) saline and served as a control group; two groups of rats were given either selenium (0.1 mg/kg) or garlic (63 mg/kg) alone, once daily an oral dose for 30 successive days; other two groups of rats were given either selenium or garlic alone, once daily a dose for 15 successive days prior to HgCl₂ injection and on the next 15 successive days simultaneously with HgCl₂ injection; and the last group of rats was injected *ip* with HgCl₂ for 15 days and at the end of the experiment (which lasted 30 days), blood samples for the biochemical analysis were obtained from all rats after being lightly anesthetized with ether, and specimens of kidney and liver were removed and prepared for histochemical study. Computer image analysis was applied to liver and kidney tissues to evaluate the DNA density and DNA ploidy pattern in different groups. The results revealed that the rats injected with HgCl₂ showed a significant increase in levels of blood urea nitrogen (BUN), serum creatinine, alanine aminotransferase (ALT), aspartate aminotransferase (AST) by 29.3%, 62.5%, 29.46% and 30.61%, respectively, while alkaline phosphatase (ALP) showed a significant decrease by 22.6% as compared with saline control group. Rats that were given selenium in combination with the HgCl₂ injection showed a significant decrease in BUN, Serum creatinine, ALT and AST levels, while ALP was significantly increased as compared with HgCl₂ group. Also rats that were given garlic in combination with HgCl₂ injection showed a significant decrease in BUN, Serum creatinine, ALT and AST levels, although serum ALP level showed an increase as compared to HgCl₂ group. Rats that had been orally administered selenium or garlic alone did not show any significant changes in the serum level of BUN, Serum creatinine, ALT and AST but there was a significant decrease in ALP level as compared with saline control group. The cytometric results revealed that injection of HgCl₂ induced an increase in the DNA density in kidney tissues with an increase in aneuploid cells and decrease in diploid cells. However, DNA density decreased in liver tissues with mild decrease in diploid cells and little percentage of aneuploid cells. We can conclude that oral administration of either selenium or garlic produces a significant protection against liver and kidney damage induced by the HgCl₂ injection, but garlic appears to be more protective.

Key words:

selenium, garlic, HgCl₂, kidney, liver enzymes, DNA, rats
