Hepatoprotective potential of glyceryl trinitrate against chemically induced oxidative stress and hepatic injury in rats, Human and Experimental Toxicology

Abstract

Glyceryl trinitrate (GTN) has been used widely as a potent vasodilator to treat heart conditions, such as angina pectoris and chronic heart failure. This study aims to elucidate the effect of exogenous nitric oxide (NO) administration, using GTN, on carbon tetrachloride (CCl4)-induced oxidative stress and liver injury in rats. The results obtained demonstrated that NO generated by the administration of GTN affords protection against CCl4-induced oxidative stress and liver injury. Administration of CCl4 resulted in a significant ($p < 0.001$) increase in lipid peroxidation and tissue damage markers (aspartate and alanine transaminase and lactate dehydrogenase) release in serum. Parallel to these changes, CCl4 also caused downregulation of antioxidant enzymes including glutathione peroxidase (GPx), glutathione reductase (GR), and glutathione-S-transferase (GST), and several fold induction in γ-glutamyl transpeptidase (GGT) activity. Subsequent administration of GTN resulted in significant ($p < 0.001$) recovery of GSH-metabolizing enzymes in a dose-dependent manner. Further, administration of NO inhibitor, NG-nitro-l-arginine methyl ester (l-NAME), exacerbated CCl4-induced oxidative tissue injury. Overall, the study suggests that GTN might suppress oxidant-induced tissue injury and hepatotoxicity in rats.