Is Glyceryl Trinitrate, a Nitric Oxide Donor Responsible for Ameliorating the Chemical-Induced Tissue Injury In Vivo?

ABSTRACT

Oxidative stress induced by well-known toxins including ferric nitrilotriacetate (Fe-NTA), carbon tetrachloride (CCl_4) and thioacetamide (TAA) has been attributed to causing tissue injury in the liver and kidney. In this study, the effect of glyceryl trinitrate (GTN), a donor of nitric oxide and NG-nitroarginine methyl ester (L-NAME), a nitric oxide inhibitor on TAA-induced hepatic oxidative stress, GSH and GSH-dependent enzymes, serum transaminases and tumor promotion markers such as ornithine decarboxylase (ODC) activity and [^{3}H]-thymidine incorporation in rats were examined. The animals were divided into seven groups consisting of six healthy rats per group. The six rats were injected intraperitoneally with TAA to evaluate its toxic effect, improvement in its toxic effect if any, or worsening in its toxic effect if any, when given in combination with GTN or L-NAME. The single necrogenic dose of TAA administration caused a significant change in the levels of both hepatic and serum enzymes such as glutathione S-transferase (GST), glutathione reductase (GR), glutathione peroxidase (GPx), γ-glutamyl transpeptidase (GGT), glucose 6-phosphate dehydrogenase (G6PD), alanine aminotransferase (AST) and aspartate aminotransferase (ALT). In addition, treatment with TAA also augmented malondialdehyde (MDA), ornithine decarboxylase (ODC) activity and [^{3}H]-thymidine incorporation in rats liver. Concomitantly, TAA treatment depleted the levels of GSH. However, most of these changes were alleviated by the treatment of animals with GTN dose-dependently. The protective effect of GTN against TAA was also confirmed histopathologically. The present data confirmed our earlier findings with other oxidants including Fe-NTA and CCl_4. The GTN showed no change whatsoever when administered alone, however when it was given along with TAA then it showed protection thereby contributing towards defending the role against oxidants-induced organ toxicity. Overall, GTN may contribute to protection against TAA-induced oxidative stress, toxicity, and proliferative response in the liver, according to our findings.