

Effects of Ozone Oxidative Preconditioning on TNF- α Release and Antioxidant-Prooxidant Intracellular Balance in Mice During Endotoxic Shock

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Abstract

Ozone oxidative preconditioning is a prophylactic approach, which favors the antioxidant-prooxidant balance for preservation of cell redox state by the increase of antioxidant endogenous systems in both in vivo and in vitro experimental models. Our aim is to analyze the effect of ozone oxidative preconditioning on serum TNF- α levels and as a modulator of oxidative stress on hepatic tissue in endotoxic shock model (mice treated with lipopolysaccharide (LPS)). Ozone/oxygen gaseous mixture which was administered intraperitoneally (0.2, 0.4, and 1.2 mg/kg) once daily for five days before LPS (0.1 mg/kg, intraperitoneal). TNF- α was measured by cytotoxicity on L-929 cells. Biochemical parameters such as thiobarbituric acid reactive substances (TBARS), enzymatic activity of catalase, glutathione peroxidase, and glutathione-S transferase were measured in hepatic tissue. One hour after LPS injection there was a significant increase in TNF- α levels in mouse serum. Ozone/oxygen gaseous mixture reduced serum TNF- α levels in a dose-dependent manner. Statistically significant decreases in TNF- α levels after LPS injection were observed in mice pretreated with ozone

intraperitoneal applications at 0.2 (78%), 0.4 (98%), and 1.2 (99%). Also a significant increase in TBARS content was observed in the hepatic tissue of LPS-treated mice, whereas enzymatic activity of glutathion-S transferase and glutathione peroxidase was decreased. However in ozone-treated animals a significant decrease in TBARS content was appreciated as well as an increase in the activity of antioxidant enzymes. These results indicate that ozone oxidative preconditioning exerts inhibitory effects on TNF- α production and on the other hand it exerts influence on the antioxidant-prooxidant balance for preservation of cell redox state by the increase of endogenous antioxidant systems.