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The Effect of Pre-Injury Supplementation with Selenium or Vitamin E on Lipid Peroxidation and Antioxidant Enzymes in Burn Injury

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Abstract: Aim: The purpose of this experimental study was to investigate the effect of pre-injury supplementation with vitamin E or selenium on antioxidant enzyme and malondialdehyde levels, as markers of lipid peroxidation, after thermal injury to rats. Materials and Methods: The animals were divided into 3 groups: Group 1 (n = 15): controls, no supplementation; Group 2 (n = 14): received vitamin E (100 mg/kg per day) for 10 days pre-burn; Group 3 (n = 14): received selenium (4 ppm in drinking water) for 10 days pre-burn. All animals were given second-degree burns. Serum and liver tissues of the rats were sampled 3 d after being burned. Serum and liver tissue superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px), and glutathione S-transferase (GST) activity and malondialdehyde (MDA) levels were measured. Results: Group 2 had significantly higher serum and liver tissue SOD, GSH-Px, and liver tissue CAT activity when compared to Group 1. In contrast, serum and tissue MDA levels and tissue GST activity were significantly lower in Group 1. Group 3 had greater serum and liver tissue SOD and GSH-Px activity, and lower MDA levels compared to Group 1. Conclusions: These data revealed that supplementation with vitamin E or selenium during the pre-injury period decreased lipid peroxidation and increased liver tissue SOD, GSH-Px, CAT, serum SOD, and GSH-Px activity following thermal injury to rats. Thus, supplementation with vitamin E or selenium, at appropriate doses, for patients at high risk of oxidative damage, such as surgical patients, may have beneficial effects.

Key Words: Selenium, vitamin E, antioxidant enzyme, malondialdehyde, burn injury

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