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Dietary intake of Calciferol, Ascorbic Acid, and Thiamine ameliorates lipopolysaccharide- induced sepsis and hepatic injury by suppressing oxidative stress and NF- κ B

Y. Ranneh¹ and A. Fadel²

¹Department of Nutrition and Dietetics, College of Pharmacy, Al-Ain University, United Arab Emirates and

²Research Institute for Sport and Exercise Sciences, School of Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UK

Numerous investigations have documented high concentrations of lipopolysaccharide (LPS) and low levels of calciferol, ascorbic acid and thiamine in the blood of septic individuals^(1,2,3). The objective of this study is to examine the protective impact of a combination of thiamine, ascorbic acid, and calciferol on liver function in a murine sepsis model.

Eighteen male Sprague Dawley rats were divided into three groups at random: control, LPS-treated with saline, and LPS-treated with a mixture of Thiamine (50 mg/Kg), Ascorbic acid (500 mg/Kg), and Calciferol (200 ng/Kg) (TAC). After 15 days of treatment, LPS (6 mg/Kg) was intraperitoneally injected. Hepatic function enzymes, oxidative stress markers, inflammatory cytokines, p38-MAPK and NF- κ B/p65 expression were examined using ELISA and western blotting. Hepatic tissues were histologically evaluated by hematoxylin and eosin stains.

TAC mixture decreased the mortality rate of septic rats, aspartate aminotransferase, alanine transaminase, alkaline phosphatase and total bilirubin levels in hepatic tissues. TAC mixture intake induced a significant ($P < 0.05$) reduction in serum TNF- α , IL-6, IL-1 β , MDA and an increment in serum CAT, SOD and GSH. The western blot results demonstrated a constraint in the expression of NF- κ B/p65, p38-MAPK and HMGB-1. TAC treatment showed minimal inflammatory foci and small congested blood vessels in the histopathological observation of hepatocellular-challenged with LPS.

In conclusion, the combination of thiamine, ascorbic acid, and calciferol alleviate acute inflammatory response and has the potential to be used as an adjuvant treatment for sepsis-induced hepatic damage.

References

1. Kawade N (2018) *J Nutr Sci Vitaminol* **64**, 404–11.
2. Gomes, JDA, Costa, RDC *et al.* (2017) *Metabolism* **68**, 133–44.
3. Donnino MW *et al.* (2010) *J Crit Care* **25**, 576–81.