Effects of Arginine Supplementation on Nutrient Metabolism and Immune Response in Burned Mice

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摘要

Abstract

This study investigated the effect of arginine (Arg) supplementation on nutrient metabolism and splenocyte response in burned mice. Also, the survival of burned mice complicated with Pseudomonas aeruginosa was evaluated. Experiment 1: Sixty male BALB/c mice were assigned to 2 groups. One group was fed with casein as the protein source, the other group was supplemented with 2.4% (w/w) Ara in addition to casein. After 4 weeks, all mice received a 3017,c body surface area burn injury. Mice in eachgroup were sacrificed for 3 consecutive days after the burn with 10 mice on each respective day. Plasma blood chemistry and amino acid profiles were analyzed. Spleens were removed aseptically from mice 1 day after the burn, interferon (IFN)-gamma andinterleukin (IL)-4 concentrations secreted by cultured splenocytes were measured. Experiment 2: Thirty mice were divided into 2 groups as described in experiment 1. After 4 weeks. burn injury was induced, and mice were challenged with P. aeruginosa.Survival of the burned mice was observed for 7 days. In experiment 1, no differences in plasma glucose, non-esterified fatty acids, and lactic acid concentrations were observed between the 2 groups on each respective day. Ara group had higher levelsof alanine and branched-chain amino acids on day 2, also, plasma Ara and glutamine levels were higher in the Ara group on days 2 and 3 after the burn than in the control group. IFN-gamma concentrations in rnitogen stimulated splenocyte cultures werehigher in the Ara group than the control group. No difference in IL-4 concentrations was observed. In experiment 2, the survival did not differ between the 2 groups. These results suggest that Ara supplementation had no beneficial effect on glucoseand lipid metabolism. nor had any effect on survival when burned mice were complicated with P. aeruginosa infection. However, Ara supplementation reduced the depletion of plasma Ara and glutamine levels at the hypercatabolic stage after the burn, andmay have potential benefit on enhancing Cellular immune response.