Glutamine supplementation enhances mucosal immunity in rats with gut-derived sepsis

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摘要

Abstract

OBJECTIVE: Supplemental glutamine (Gln) has been demonstrated to improve the immunologic response and reduce mortality in rodents with sepsis. However, the effects of Gln on gut-associated lymphoid tissue function after infection and sepsis are not clear. We investigated the effects of Gln-supplemented diets before sepsis, Gln-enriched total parenteral nutrition (TPN) after sepsis, or both on the intestinal immunity in rats with gut-derived sepsis. METHODS: Male Wistar rats were assigned to control and four experimental groups. The control and experimental groups 1 and 2 were fed a semi-purified diet; in experimental groups 3 and 4, part of the casein in the diets was replaced with Gln. After feeding rats the respective diets for 10 d, sepsis was induced by cecal ligation and puncture (CLP) in the experimental groups, whereas the control group underwent a sham operation; at the same time, the internal jugular vein of all rats was cannulated. All rats were maintained on TPN for 3 d. Thecontrol group and groups 1 and 3 were infused with conventional TPN, and groups 2 and 4 were given a TPN solution supplemented with Gln, which provided 25% of total amino acid nitrogen. All rats were killed 3 d after the sham operation or CLP. Intestinal immunoglobin A levels, total lymphocyte yields, and lymphocyte subpopulations in Peyer's patches were analyzed. RESULTS: Total Peyer's patch lymphocyte numbers were significantly higher in the Gln-supplemented groups than in the control group.Distributions of CD3+ and CD4+ in group 1 were significantly lower than those in the control group, whereas no differences were observed among the control and Gln-supplemented groups. Plasma immunoglobulin A levels were higher in the Gln-supplementedgroups than the control group and group 1. Intestinal immunoglobulin A levels were significantly higher in groups 2 and 4 than in the control group and group 1. CONCLUSIONS: Preventive use of a Gln-supplemented enteral diet before CLP or intravenousGln supplementation after CLP have similar effects in promoting proliferation of total lymphocyte in gut-associated lymphoid tissue, enhancing IgA secretion, and maintaining T-lymphocyte populations in Peyer's patches. Gln administered before and after CLP did not seem to have a synergistic effect on enhancing mucosal immunity in rats with gut-derived sepsis.