Effects of arginine supplementation on mucosal immunity in rats with septic peritonitis

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摘要

Abstract

Background: Supplemental Arginine (Arg) has been demonstrated to improve the immunologic response and reduce mortality in rodents with sepsis. However, the effects of Arg on gut-associated lymphoid tissue function after infection and sepsis are not clear. The aim of this study was to study the effect of Arg-supplemented diets before and Arg-enriched total parenteral nutrition (TPN) after sepsis or both on the intestinal immunity of rats with septic peritonitis. Methods: Rats were assigned to four groups. Groups 1 and 2 were fed a semipurified diet, while in the diets of groups 3 and 4, part of the casein was replaced with Arg. After feeding the experimental diets for 10 days, sepsis was induced by cecal ligation and puncture (CLP); at the same time, the internal jugular vein was cannulated. All rats were maintained on TPN for 3 days. Groups 1 and 3 were infused with conventional TPN, while groups 2 and 4 were given a TPN solution supplemented with Arg, which replaced 10% of the total amino acids. All rats were sacrificed 3 days after CLP. Intestinal immunoglobin (Ig) A levels, total lymphocyte yields, and lymphocyte subpopulations in Peyer's patches were analyzed. In vitro cytokine secretion by splenocytes and Peyer's patch lymphocytes were also measured. Results: Total lymphocyte yields in Peyer's patches, and small intestinal immunoglobulin A (IgA) secretion in group 4 were significantly higher than the groups 1 and 2. No differences were observed between groups 3 and 4. There were no differences in the interleukin (IL)-2 and interferon-[Formula: see text] levels among all groups when splenocytes were stimulated with mitogen. However, in vitro splenocyte IL-10 production in group 4 was significantly higher than those of groups 1 and 2, and had no difference from group 3. There wereno differences in the ratios of B and T lymphocyte subpopulations in Peyer's patches among all groups. Conclusions: Enteral Arg supplementation before sepsis tended to enhance total lymphocyte yields in Peyer's patches and intestinal IgA secretion. Arg administered both before and after CLP had a synergistic effect on improving intestinal immunity, possibly by enhancing systemic IL-10 secretion. However, intravenous Arg administration after

CLP had no favorable effects on mucosal immunity in rats with septic peritonitis.