Effects of glutamine supplementation on innate immune response in rats with gut-derived sepsis

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Abstract

The present study examined the effect of glutamine (Gln)-enriched diets before sepsis or Gln-containing total parenteral nutrition (TPN) after sepsis, or both, on the phagocytic activity and blood lymphocyte subpopulation in rats with gut-derived sepsis. Rats were assigned to a control group or one of four experimental groups. The control group and groups 1 and 2 were fed a semipurified diet; groups 3 and 4 had part of casein replaced by Gln. After feeding the diets for 10 d, sepsis was induced by caecal ligation and puncture (CLP); TPN was maintained for 3 d after CLP. The control group and groups 1 and 3 were infused with conventional TPN and groups 2 and 4 were supplemented with Gln in the TPN solution. All rats were killed 3 d after CLP or sham operation to examine their immune responses. The results showed that compared with the control group, the phagocytic activities of peritoneal macrophages were enhanced in groups 3 and 4, but not in groups 1 and 2. The proportion of CD3+ cells in group 1 was significantly lower ($P<0.05$) than that of the control group, whereas no differences were observed among the control and Gln-supplemented groups. The CD4+ cell proportion was significantly lower ($P<0.05$) in group 1 compared with the control group and groups 3 and 4. These findings suggest that Gln-enriched diets before CLP significantly enhanced peritoneal macrophage phagocytic activity, preserved CD4+ cells and maintained blood total T lymphocytes in gut-derived sepsis. However, parenteral Gln administration after caecal ligation and puncture had no favourable effects on modulating immune response in septic rats.