

Effects of parenteral glutamine supplementation on modulating the immune response in rats undergoing a total gastrectomy

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Abstract

The present study investigated the effect of parenteral glutamine (Gln) supplementation on cellular adhesion molecule expression and release of chemokines responsible for inflammatory cell recruitment in rats undergoing a total gastrectomy. Normal rats with internal jugular catheters were assigned to one control group and two experimental groups and received total parenteral nutrition (TPN). A total gastrectomy was performed in the experimental groups, whereas the control group received a sham operation (Sham). The TPN solutions were isonitrogenous and identical in nutrient composition except that the Sham group and one of the experimental group received conventional (Conv) TPN solution, whereas the other experimental group received 25 % of the amino acid nitrogen as Gln. Half of the rats in each group were killed 1 or 3 d after surgery or the Sham to examine their immune response. The results showed that the surgery produced higher polymorphonuclear leucocyte CD11b/CD18 expressions, and Gln supplementation lowered CD11b/CD18 expressions compared with the Conv group post-operatively. The levels of monocyte chemoattractant protein-1 and macrophage inflammatory protein-2 in peritoneal lavage fluid were higher in the Gln group than those in the Conv group 1 d post-operatively; these chemotactic proteins had returned to the levels comparable with those in the Sham group on post-operative day 3. These results suggest that Gln supplementation attenuated polymorphonuclear leucocyte integrin expression. In addition, Gln-enriched parenteral nutrition induced an earlier more intensive and rapid immune response to injury than the Conv parenteral nutrition after a total gastrectomy.