

Parenteral n-3 fatty acids modulates inflammatory and immune response in rats undergoing total gastrectomy

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Abstract

This study investigated the effect of n-3 fatty acid (FA)-containing parenteral nutrition on the circulatory lymphocyte subpopulation, intracellular cytokine and leukocyte adhesion molecule expression, and phagocytic activity in rats undergoing total gastrectomy. Normal rats with internal jugular catheters were assigned to normal control (NC) and two experimental groups and received total parenteral nutrition (TPN). At the same time, a total gastrectomy was performed in the experimental groups, whereas the NC group underwent a sham operation. The TPN solutions were isonitrogenous and identical in nutrient compositions except for differences in fat emulsion contents. The NC and one of the experimental groups received a soybean oil emulsion (SO), and the other experimental group received 50% soybean oil and 50% fish oil emulsion (FO). Half of the rats in each respective group were sacrificed 1 or 3 days after surgery or the sham operation to examine their immune response. The results showed that the FO group had a higher CD4 proportion and CD4/CD8 ratio than those of the SO and NC groups postoperatively. The phagocytic activity of peritoneal macrophages was higher in the FO group than in the NC group, but no difference was found between the SO and NC groups 3 days after surgery. The intracellular interferon (IFN)-gamma distribution in the FO group was higher than that of the SO group on postoperative days. Leukocyte adhesion molecule expressions and peritoneal monocyte chemotactic protein-1 levels were lower in the FO group than in the SO group on postoperative day 3. These results suggest that parenterally infused FO did not result in immunosuppression. In addition, FO administration promotes lymphocyte Th1 cytokine production, enhances peritoneal macrophage phagocytic activity, and reduces leukocyte adhesion molecule expression in rats with total gastrectomy.