Effects of dietary fish oil supplementation on cellular adhesion molecule expression and tissue myeloperoxidase activity in hypercholesterolemic mice with sepsis

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Abstract

This study investigated the effects of fish oil on adhesion molecule expression and tissue myeloperoxidase (MPO) activity in hypercholesterolemic mice with sepsis. There were one control and two experimental groups in this study. The control group (C) was fed a regular chow diet for 7 weeks, while hypercholesterolemia in the experimental group was induced by feeding a high-fat diet (20%, w/w) with cholesterol (2%, w/w) for 4 weeks. Then the experimental group was divided into two subgroups with identical nutrient distributions except that one subgroup was fed soybean oil (SO), while part of the soybean oil was replaced by fish oil (FO) in the other one for 3 weeks. After feeding the diets for 7 weeks, sepsis was induced in all three groups by cecal and ligation and puncture (CLP), and mice were sacrificed at 0, 6 or 24 h after CLP, respectively. The results showed that the FO group had a higher intracellular interferon-γ/interleukin-4 ratio and lower tumor necrosis factor-α and monocyte chemoattractant protein-1 concentrations in peritoneal lavage fluid at 6 h after CLP than those in the C and SO groups. Lymphocyte CD11a/CD18 expressions were higher at 0 and 6 h and neutrophil CD11b/CD18 were higher at 6 h in the SO group than in the FO and C groups. The SO group had higher plasma intercellular adhesion molecule (ICAM)-1 levels than C group at 0 and 6 h, whereas no difference in ICAM-1 concentrations were observed between the C and FO groups at 0 h after CLP. Hypercholesterolemia resulted in higher tissue MPO activities. There were no differences in MPO activities in various organs between the two experimental groups. These results suggest that hypercholesterolemic mice fed FO did not exhibit immunosuppression when complicated with sepsis. FO administration reduced adhesion molecule expressions and inflammatory-related mediators at the site of injury at an early but not a late stage of sepsis. However,

compared with the SO group, the influences of FO on MPO activities in various organs were not obvious in hypercholesterolemic mice with sepsis.