Dietary fish oil enhances adhesion molecule and interleukin-6 expression in mice with polymicrobial sepsis

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Abstract

This study investigated the effects of fish oil (FO) diet on plasma intercellular adhesion molecule 1 (ICAM-1) levels and leucocyte integrin expression in polymicrobial sepsis. Mice were randomly assigned to a control group and an FO group. The control group was fed a medium-fat diet containing soyabean oil, whereas in the FO group, 70 % of the soyabean oil was replaced by FO for 3 weeks. After that, sepsis was induced by caecal ligation and puncture (CLP) in the experimental groups and mice were killed at 0, 6, 12 and 24 h, respectively, after CLP. Results showed that compared with the control group, plasma ICAM-1 levels were higher in the FO group 6 h after CLP. Intra-lymphocyte interferon-γ expression in the FO group was lower, whereas IL-4 expression was higher than in the control group 12 and 24 h after CLP. The expression of leucocyte integrin was significantly higher in the FO group 12 and 24 h after CLP. The FO group had higher IL-6 levels at 12 h in the lungs, at 6 and 12 h in the kidneys, and at 6, 12 and 24 h in the intestines after CLP. The survival rate did not differ between the two groups after CLP. The present findings suggest that pretreatment with an FO diet enhances adhesion molecule and inflammatory cytokine expressions during sepsis, which might aggravate the inflammatory reaction and increase neutrophil infiltration into tissues. In addition, FO diet promotes the Th2-type response and suppresses cellular immune response in polymicrobial sepsis.