Effects of dietary fish oil on survival rate, plasma amino acid pattern, and inflammatory-related mediators in diabetic rats with sepsis

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Abstract

This study was designed to investigate the effects of dietary fish oil on survival rates, plasma amino acid profiles, and inflammatory-related mediators in diabetic rats with sepsis. Diabetes mellitus (DM) was induced in rats by streptozotocin. The DM rats were maintained for 4 weeks on medium fat (10%, w/w) diets containing either fish oil or safflower oil. After that, sepsis was induced by cecal ligation and puncture (CLP). There were 2 groups in this study: fish oil sepsis group (FOS) and safflower oil sepsis group (SOS). The survival rate was observed after CLP. Also, changes of the amino acid pattern as well as interleukin (IL)-1β, tumor necrosis factor (TNF)-α, prostaglandin (PG) E2at 6, 12, and 24 h after CLP were investigated. The results demonstrated that survival rates were not significantly different between the 2 groups. Plasma arginine levels were significantly lower in sepsis groups than that in the DM-chow group, regardless of whether the diabetic rats were fed fish oil or safflower oil. No significant differences were observed in plasma valine, leucine, isoleucine, glutamine, or arginine concentrations between the FOS and SOS groups at different time points. Concentrations of IL-1β in peritoneal lavage fluid (PLF) at 6 h and TNF-α at 6 h as well as at 12 h after CLP in the FOS group were significantly higher than those in the SOS group. PGE2levels in PLF, by contrast, were lower in the FOS group at 6 and 12 h after CLP than in the SOS group. These results suggest that differences in IL-1β, TNF-α, and PGE2levels in PLF in the early period of sepsis did not influence the survival rates and plasma amino acid profiles of the FOS and SOS groups. Compared with safflower oil, feeding diabetic rats with fish oil had no beneficial effects on survival rates and muscle protein breakdown. The immunologic impact of dietary n-3 polyunsaturated fatty acids on diabetic rats with sepsis requires further investigation.