

Sung-Ling Yeh, PhD
An-Chyi Chyi, MS
Institute of Nutrition and Health
Science, Taipei Medical College

Effects of Dietary Fish Oil and Safflower Oil on Plasma Lipids and Amino Acid Profiles in Diabetic Rats with Sepsis

Key Words

Diabetes mellitus
Sepsis
Fish oil
Safflower oil
Plasma lipids
Amino acid pattern

ABSTRACT

This study was designed to investigate the effects of dietary fish oil on plasma and liver lipids, and amino acid profiles in diabetic rats with or without sepsis. Diabetes mellitus (DM) was induced in rats by streptozotocin (60 mg/kg). The DM rats were maintained for 4 weeks on a diet containing either fish oil or safflower oil (10%, w/w). After 4 weeks of feeding study, each experimental group was further divided into septic and non-septic subgroups. Sepsis was induced by cecal ligation and puncture; only sham operation was performed on non-septic groups. There were 4 groups in this study: fish oil control group (FOC, $n = 10$); fish oil sepsis group (FOS, $n = 10$); safflower oil control group (SOC, $n = 10$); and safflower oil sepsis group (SOS, $n = 10$). The results demonstrate that plasma glucose was significantly higher in the septic groups than in the non-septic control groups, whereas no differences in plasma concentrations of cholesterol or non-esterified fatty acids were observed between groups with and without sepsis. No significant differences in plasma concentrations of glucose or lipids were observed between the FOS and SOS groups, except for triglyceride, which was higher in the FOS than in the SOS group. The plasma amino acid profiles of this study demonstrate that the concentrations of glutamine, arginine, valine, leucine, and isoleucine in the septic groups were lower than those in the non-septic groups. No significant difference was observed in amino acid concentrations between the fish oil group and safflower oil group. There were no differences in hepatic total lipids among all groups. However, hepatic triglyceride levels were significantly higher in the SOS group than in the other 3 groups. These results suggest that fish oil has no beneficial effects on plasma glucose, cholesterol, or non-esterified fatty acids in diabetic rats with sepsis, and fish oil feeding has no favorable effects on ameliorating muscle protein breakdown or intracellular glutamine depletion. (N. Taipei J. Med. 2000; 3:181-189)

Received: April 17, 2000
Accepted: August 10, 2000

Correspondence: Dr. Sung-ling Yeh
Institute of Nutrition and Health Science, Taipei Medical College,
250 Wu Hsing St., Taipei 110-31, Taiwan, R.O.C.
Tel: 886-2-27361661 ext.653, 115, Fax: 886-2-27373112
E-mail: sangling@tmc.edu.tw