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Effect of High Dietary Fish Oil and Soybean Oil with Cholesterol Supplementation on Plasma and Liver Lipids in Septic Rats

Key Words

Sepsis
Fish oil
Soybean oil
Hypertriglyceridemia
Fatty liver

ABSTRACT

This study was designed to investigate the effect of high fat cholesterol-containing diets with different fatty acid compositions on plasma and liver lipids in septic rats. Male Wistar rats aged of 4 weeks were divided into 2 experimental groups. All rats were fed a high fat (15%, w/w) semipurified diet containing 0.1% (w/w) cholesterol. The composition of the diet fed to each group was identical except for the sources of fat. One group of rats was fed fish oil and the other group was fed soybean oil. The experimental diets were used for 4 weeks. After that, each experimental group was further assigned to 2 subgroups, depending on whether they received an operation for cecal ligation and puncture to induce sepsis. Twenty-four hours later the rats were sacrificed. The results demonstrated that plasma concentrations of triglyceride (TG) and cholesterol were significantly higher in septic rats than in those without sepsis. Plasma TG concentration was higher, whereas the high-density lipoprotein-cholesterol/total cholesterol ratio was lower in fish oil septic rats than in soybean oil septic rats. The liver compositions of total lipids and TG were significantly lower in the septic groups than in the corresponding groups without sepsis. Rats prefed fish oil had significantly lower total liver lipids and TG than did those prefed soybean oil, regardless of whether the animals were septic or not. These results suggest that sepsis-induced hypertriglyceridemia is not ameliorated by prefeeding with a fish oil diet in the presence of cholesterol supplementation. In contrast, plasma lipid profiles deteriorated more severely in septic rats prefed fish oil than in those prefed soybean oil. However, fish oil feeding has a greater preventive effect on liver fat accumulation than does soybean oil feeding in either septic or non-septic rats.

INTRODUCTION

Sepsis is one of the major causes of death for critically ill patients. When bacterial toxins insult the sys-

tem, abnormal nutrient metabolism may occur.¹ Among the clinical symptoms associated with lipid metabolism, hypertriglyceridemia and fatty infiltration of the liver are two prominent characteristics of