Effects of MCT/LCT and LCT emulsions on plasma lipids and nitrogen retention in streptozotocin-induced diabetic rats receiving total parenteral nutrition

CHEN W.-J. ; SUNG LING YEH ; YI PING WU
Chen WJ;Yeh SL and Wu YP

Abstract

This study was designed to investigate the effects of emulsions containing medium-chain triacylglycerols (MCT) or long-chain triacylglycerols (LCT) on plasma lipids and nitrogen retention in diabetic rats receiving total parenteral nutrition (TPN). Diabetes was induced in rats by streptozotocin (STZ). Control and diabetic rats were divided into two TPN groups. The TPN groups received solutions at an energy level of 30 kcal/100 g body weight with 37.5% of the nonprotein energy provided as fat. All TPN solutions were isonitrogenous and identical in nutrient composition except for the fat emulsion, which was composed of LCT or MCT/LCT (1:1). The results showed that plasma triacylglycerol (TG), nonesterified fatty acids (NEFA), and β-hydroxybutyrate levels were higher in diabetic rats compared with control rats, whereas plasma insulin levels and nitrogen retention were lower. Plasma glucose levels, TG, NEFA, and β-hydroxybutyrate levels were significantly decreased after TPN administration in diabetic groups. Plasma glucose and TG levels, however, remained higher in diabetic groups than in control groups. No differences in the concentrations of plasma TG. cholesterol, NEFA, β-hydroxybutyrate or nitrogen retention were observed between the two diabetic groups. These results suggest that MCT/LCT infusion did not lead to hyperketonemia and hypercholesterolemia as compared with LCT infusion, and had no beneficial effect on nitrogen retention in rats with STZ-induced diabetes under the present experimental conditions.