

MCT/LCT emulsion ameliorate liver fat deposition in insulin-treated diabetic rats receiving total parenteral nutrition

S.-L. Yeh, M.-T. Lin and W.-J. Chen

Abstract

This study was designed to investigate the effects of high energy infusion and insulin treatment on plasma and liver lipids in diabetic rats receiving total parenteral nutrition (TPN). Diabetes was induced in rats by streptozotocin. The diabetic rats were assigned to two TPN groups to receive either long chain triglyceride (LCT) or medium chain triglyceride (MCT)/LCT (1:1) as a fat source. The TPN solutions were isonitrogenous, isocaloric and identical in nutrient composition except for the fat emulsion. All rats received the TPN solution at an energy level of 35 kcal/100 g of body weight. The LCT and MCT/LCT groups were further divided into two subgroups, depending on whether they were treated with insulin. The results demonstrated that, between the MCT/LCT and LCT groups, no differences were observed in body weight and nitrogen retention, as well as the concentrations of plasma glucose, nonesterified fatty acids, β -hydroxybutyrate, and total cholesterol. Diabetic TPN rats without insulin treatment had weight loss and negative nitrogen balance during the experiment. Diabetic TPN rats treated with insulin, however, demonstrated less weight loss and positive nitrogen retention. Insulin treated groups had significantly higher liver fat content than did those without insulin treatment. Furthermore, liver fat content was significantly higher in the LCT group than in the MCT/LCT group among insulin treated TPN rats. These results suggest that compared with the LCT emulsion, infusion of the MCT/LCT emulsion ameliorated liver fat deposition in insulin-treated diabetic rats receiving TPN.