Effects of fish oil in parenteral nutrition

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Abstract

Objective:

Fish oil is a rich source of ω-3 fatty acids (FAs), especially eicosapentaenoic acid and docosahexaenoic acid. The existing data suggest that eicosapentaenoic acid and docosahexaenoic acid are the active agents in fish oil. A number of clinical trials have shown that dietary fish oil supplementation has antiatherogenic properties and immunomodulation effects. Fish oils are not used widely in parenteral nutrition because fish oil emulsions have not been commercially available until very recently. Studies concerning the use of fish oil in parenteral route are rare.

Methods:

We reviewed the effect of parenteral fish oil infusion on lipid metabolism and immune response in normal and disease conditions.

Results:

Studies showed that the main effects of parenteral infusion of fish oil are: 1) incorporation of ω-3 FAs into cellular membranes of many cell populations that consequently influence the disease process of some disease conditions, 2) an effect on eicosanoid metabolism leading to a decrease in platelet aggregation and thrombosis, 3) amelioration of the severity of diet-induced hepatic steatosis, 4) less accumulation of lipid peroxidation products in liver tissue, and 5) immunomodulation effects and therapeutic benefits in animal disease models or various disease conditions of humans. Most of these studies suggested that parenteral infusion of ω-3 FAs have clinical beneficial effects comparable to those of dietary administration. However, different effects of ω-3 and ω-6 FAs in some situations has been reported. For example, plasma triacylglycerol levels were not lowered after fish oil infusion in normal or diabetic rats when compared with those of safflower oil or soybean oil infusion. The reason for the difference remain unclear.

Conclusion:

The metabolic and immunologic effects of parenteral use of ω-3 FAs requires further evaluation, especially in some disease conditions.

Keywords: total parenteral nutrition, fish oil, ω-3 fatty acids, eicosanoids, immunomodulation