



## Supplementation of Omega 3-Fatty Acids in Total Parenteral Nutrition Beneficially Alters Phospholipid Fatty Acid Pattern

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**Background:** Increased availability of n-3 PUFA (**P**oly **U**nsaturated **F**atty **A**cids) is considered an essential prerequisite for better clinical outcome due to a diminished availability of pro-inflammatory substances. Whether this enrichment can be achieved by parenteral nutritional supplementation of n-3 PUFA without sacrifice of safety was studied in a group of post-operative cancer patients.

**Methods:** A total of 40 patients with a need for parenteral nutrition after colorectal CA surgery were considered eligible for enrolment into this double blind, prospective, randomized phase III trial. For a period of at least 5 post operative days they received a parenteral nutritional regimen containing a 20% Lipid emulsion with (Lipoplus®, test group n=19) or without (Lipofundin MCT/LCT®, control group, n=21) Fish Oil. Clinical outcome parameters and safety were assessed by means of adverse events recording clinical parameters and hematological analyses. The content of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) as well as arachidonic acid (AA) in phospholipid fractions in plasma and in erythrocytes were analysed before surgery and on days 1, 6 and 10 post surgery using liquid gas chromatography.

**Results:** As compared to the control group, the test-group had significantly increased levels of EPA in the membranes of the erythrocytes in post operative day 6 ( $2.0 \pm 0.9$  vs.  $0.8 \pm 0.5$  % fatty acid methyl esters, FAME) and post operative day 10 ( $2.1 \pm 0.8$  vs.  $0.9 \pm 0.7$  % FAME,  $p < 0.05$ ). The EPA- and DHA-levels in the serum phospholipids of the test group were significantly higher than in the control group on the same postoperative days (EPA:  $7.0 \pm 2.6$  vs.  $1.3 \pm 0.8$  and  $3.6 \pm 1.0$  vs.  $1.0 \pm 0.4$  % FAME,  $p < 0.05$ ; DHA:  $11.8 \pm 1.9$  vs.  $8.4 \pm 1.5$  and  $11.2 \pm 1.6$  vs.  $8.5 \pm 1.4$  % FAME,  $p < 0.05$ ). AA levels were not significantly different in the both groups. Both lipid emulsions were well tolerated and safe. Parenteral nutrition enriched with Fish Oil may lead to increased availability of n-3 PUFA without sacrifice of safety.

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