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Assessment of long-chain n-3 PUFA status in patients receiving home parenteral nutrition

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Home parenteral nutrition (HPN) is lifesaving for individuals with severe intestinal failure. Parenteral feeds may contain lipid but rarely contain the long-chain (LC) n-3 PUFA, EPA and DHA. The aim of the present study was to assess LC n-3 PUFA status in HPN patients compared with matched controls and investigate factors affecting levels.

Fasting plasma samples were obtained from HPN patients (*n* 64) in an outpatient setting and age, sex and BMI matched controls (*n* 54). Plasma phospholipids were isolated by solid phase extraction and fatty acids were quantified by gas chromatography. Case notes and parenteral prescriptions of all patients were reviewed. Patient and control data were compared using standard statistical tests. Logistic regression analysis was used to identify factors related to plasma fatty acid levels.

Nine (14%) out of the sixty-four HPN patients received parenteral fluid and electrolytes only. In the remaining fifty-five patients mean parenteral energy intake was 5.34 (SD 1.90) MJ/d. Thirty-five (55%) of these patients received parenteral lipid (Intralipid or Clinoleic). No patients received fish-oil-containing parenteral infusions. EPA and DHA levels were significantly lower in HPN patients compared to controls (1.06% *v.* 2.13% and 2.89% *v.* 5.31% total fatty acids (TFA) respectively, *P*<0.001). Linoleic acid levels were lower in HPN patients (12.6% *v.* 19.6% TFA, *P*<0.001); oleic acid levels were higher (17.0% *v.* 10.3% TFA, *P*<0.001). In multivariate analysis EPA levels were positively associated with BMI and parenteral lipid intake but negatively associated with total parenteral energy intake. DHA levels were positively associated with parenteral lipid intake and negatively associated with duration of HPN. Highest levels of both EPA and DHA were seen in patients receiving >0.5 g parenteral lipid/kg per d (1.20% and 4.02% TFA respectively) but these levels remained significantly lower than controls.

The present study demonstrates that patients receiving HPN had low plasma levels of LC n-3 PUFA. This did not appear to be entirely correctable with relatively high intakes of n-6 and n-3 PUFA rich soya-oil-based parenteral lipid infusions.