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Effect of plasma fatty acid status on complication rates in patients receiving home parenteral nutrition

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Home parenteral nutrition (HPN) is lifesaving for individuals with severe intestinal failure. However, complications including venous thrombosis, central venous catheter (CVC) infection and liver disease can cause considerable morbidity and mortality. Plasma fatty acid profiles are abnormal in patients receiving HPN even with provision of parenteral lipid. The aim of the present study was to investigate whether these abnormal fatty acid profiles were associated with clinically relevant complications.

Fasting plasma samples were obtained from HPN patients in an outpatient setting. Plasma phospholipids were isolated by solid phase extraction, and fatty acids quantified by gas chromatography. Patient interview, review of case notes and plasma biochemistry (over the previous 12 months) were used to elucidate the incidence of complications including venous thrombosis, CVC sepsis, chronic cholestasis and abnormal liver function tests (LFT). Logistic regression analysis was used to identify factors associated with the risk of complications.

Samples were obtained from sixty four patients. Four (6%) patients had had one or more episodes of venous thrombosis over the previous 12 months. Twelve (19%) had had one or more episodes of CVC sepsis. Twenty (32%) patients had chronic cholestasis (defined as the following: $1.5 \times$ upper limit of normal (ULN) of ≥ 2 of gamma-glutamyl transferase (GGT), alkaline phosphatase (ALP), or bilirubin for >6 months). Thirteen (20%) patients had raised alanine transferase (ALT), twenty-nine (45%) had raised ALP and thirty-nine (61%) had raised GGT. In multivariate analysis, no patient- or nutrition-related factors and no fatty acids were associated with either venous thrombosis or CVC infection over the previous 12 months. Chronic cholestasis was independently associated with high parenteral energy intake, high palmitic acid (C16) levels and low α -linolenic (C18:3n-3) levels. Low EPA (C20:5n-3) levels were associated with raised plasma ALP and low linoleic acid (C18:2n-6) levels were associated with raised plasma GGT. These effects were independent of parenteral lipid intake.

This study suggests that abnormal fatty acid profiles seen in patients receiving HPN are associated with increased prevalence of chronic cholestasis and abnormal LFT. Whether there is a causal relationship, and the mechanism of such a relationship, remains unknown at present.