Management of Home Parenteral Nutrition Patients During a National Shortage of IV Lipids

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Introduction

Industry-wide drug shortages in the U.S. continue to be a challenge, and many key ingredients for home parenteral nutrition (HPN) remain in limited supply. The IV lipid shortage in early 2013 triggered the need to conserve IV lipids and therefore reduce the lipid dose in HPN solutions. IV lipids are an important source of calories and are necessary to prevent essential fatty acid deficiency (EFAD), which can develop within two weeks when no lipid source is provided. The purpose of this study was to evaluate patient response to a reduction in IV lipid dose.

Methods

A prospective, observational study was conducted to evaluate HPN patients who had a reduction in weekly IV lipid dose. Data was collected and trended on 105 adult HPN patients during a six-week IV lipid dose reduction. IV lipid doses were reduced based on the A.S.P.E.N. guidelines for minimal amount of IV lipids required to prevent EFAD. These guidelines suggest that lipids comprise 10% of total calories or a minimum of 100 g/week. Registered Dietitians collected data on several parameters that are typically followed for HPN patients, including:
- Macronutrient intake
- Total calorie intake — PN and oral
  - A 24-hour food recall was conducted at six weeks to assess the patients’ average daily caloric intake.
- Weight
- Blood glucose and liver function
  - Liver function tests (LFTs) — ALT, AST, alkaline phosphatase — and blood glucose tests were conducted at the three-week mark and again at six weeks.
  - LFTs are used to monitor and track liver disease and can be influenced by changes in the macronutrients of PN, as PN is processed in the liver.
- Physical signs and symptoms of EFAD
  - We assessed for dermatitis, immunity, and neuropathy.
  - Each symptom/sign was evaluated through the use of a “yes or no” question that was asked after the patient had spent six weeks on a reduced lipid formula.

Results

- At the six-week mark, 56 patients remained in the study. Patients were dropped from the study for a variety of reasons, which included discontinueation of therapy, hospitalization, and death.
- The average length of time on HPN was 30 months (with a range between one week and 30 years).

IV Lipid Dose

- Prior to the IV lipid dose reduction, patients received an average of 292 grams of IV lipids per week, or an average of 26% of their calories from lipids (see Figure 1).
- After the IV lipid dose reduction, patients received an average of 129 grams of IV lipids per week, or an average of 12.5% of their total calories from lipids (see Figure 1). The majority of patients received IV lipids three times per week.

Caloric Intake and Liver Function Tests

- Lipid calories were replaced by dextrose and protein calories. Despite the changes in dextrose, blood glucose remained within normal range throughout the study.
- There was little change in LFT results (see Figure 2).
- Twenty-four patients consumed fewer than 500 calories/day orally, while the other 32 patients had a more substantial caloric intake.
- Figure 3 shows the variety in amount of oral intake seen in HPN patients. This intake ranged from 500 calories/day to 3,200 calories/day. It should be noted that absorption was likely limited in patients with short bowel syndrome and/or intestinal failure.
- The average percentage change in weight was a 1.8% increase at week six.

EFAD Screening Questions

- Less than 18% of patients (10) responded “yes” to EFAD screening questions about skin changes (scaling, thinning, and dryness) related to linoleic acid deficiency (which is more common than alpha-linolenic acid deficiency, the other form of EFAD). Nine percent (five patients) responded “yes” to the neuropathy-related question, and 11% (six patients) responded “yes” to the immune-related question (See Figure 4).
- None of the remaining 56 patients responded “yes” to all three screening questions used to evaluate EFAD.

Conclusions

This study indicated that HPN patients safely tolerated a reduction in IV lipid dose. None of the patients involved in the study experienced multiple signs or symptoms signifying EFAD, and weight and laboratory values related to liver function and blood glucose were relatively unchanged. Most of the patients had some oral intake, which likely helped prevent EFAD.

The significant range in average length of time on PN illustrates the great variety of patients affected by national shortages of IV products. These results can be replicated by following A.S.P.E.N. guidelines and providing patients with approximately 10% of total calories from IV lipids, or a minimum of 100 grams of IV lipids/week. Additional research could assess whether benefits are associated with an overall reduction in lipids.