Adequate Home Parenteral Nutrition Does Not Improve Lean Body Mass in Bone Marrow Transplantation Patients with Graft Versus Host Disease.

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Abstract

Rationale: Severe graft versus host disease (GVHD) following bone marrow transplantation may require home parenteral nutrition (HPN). The aim of this study was to measure changes in body composition in patients receiving HPN.

Methods: This historic cohort study compared HPN patients with and without GVHD. All patients in the adult HPN database from 1991 to 2002 with a baseline nutrition assessment (NA) and a repeat between 4 and 52 weeks were eligible. Those receiving HPN for < 5 days/week were excluded. 20 of 69 GVHD patients met these criteria, 20 of 57 controls without GVHD were matched for gender, BMI and days between NA. Results were analyzed by paired t-tests and Wilcoxon signed rank tests as appropriate. Repeated measures logistic regression was used to control for covariates.

Results: The mean age of GVHD and control patients was 38 ± 12 vs 55 ± 18 (p = 0.001); between NA were 81 ± 44 vs 51 ± 40 (p = 0.001). The mean duration of HPN was 108 ± 104 vs 122 ± 108 (p = 0.30). Exclusion criteria were: severe liver disease (BMI ≥ 30.0 ± 8.0) for 12 patients. Fat stores decreased in both groups within 8 weeks and did not change in repeat assessments (p < 0.001). Complete visceral protein data for the 40 paired assessments were available. Severe visceral protein loss occurred in both groups, and there were no significant differences between the groups (p = 0.596). Growth hormone (GH) and insulin levels were significantly higher in the control group at the first and second nutrition assessment (p < 0.05), while GH levels in the GVHD group had a mean decrease (2.5 mm). This change was significantly different between both groups (p < 0.001).

Discussion

• Patients with GVHD had lower total energy per kg (p = 0.04).
• Control patients had a higher BMI at the second nutrition assessment (p = 0.02) and a higher baseline transferrin (p = 0.002) compared to GVHD patients.
• Control patients had a higher MUAC compared to GVHD patients, and had a slight increase in MUAMC from the first and second nutrition assessment (+ 0.6 mm), while GVHD patients had a mean decrease (-2.5 mm). This change was significantly different between both groups (p < 0.001).

Background & Aim

Patients with Graft versus Host Disease (GVHD) of the gastrointestinal tract are at high risk for the development of severe protein-calorie malnutrition (PCM) due to a result of anaemia, nausea, vomiting, diarrhoea and abdominal pain.¹ The pathogenesis of PCM in GVHD of the gastrointestinal tract is attributed to limited oral intake due to nausea/vomiting or diarrhea, protein loss under the influence of anti-inflammatory and immunosuppressive agents, and increased protein and energy requirements.² It has been suggested that daily macronutrient requirements of adults with GVHD range from 1.5-2.0 g/kg for protein and 30-40 kcal/kg for energy.²,³ While PN has been shown to improve survival in BMT,²,³ GVHD ranges from 1.5-2.0 g/kg for protein and 30-40 kcal/kg for energy.²,³

Nearly all patients have a comprehensive nutrition assessment at the start of HPN and many, information maintained in the database includes age, gender, diagnosis, indication for HPN, nutritional goals, dietary intake, and recent laboratory results. While nutrition assessment is a vital process to ensure adequate nutrition support, many patients with severe gastrointestinal GVHD are unable to tolerate enteral feeding plans. In GVHD patients, the risk of sepsis is higher in the controls (p = 0.01), and albumin increased significantly in the controls (p < 0.001).

Methods

An historic cohort study using data obtained from a computerized database of all adult patients who receive HPN between 1991 and 2002 at the Cleveland Clinic Foundation. Information maintained in the database includes age, gender, diagnosis, indication for HPN, nutritional goals, dietary intake, and recent laboratory results. Nearly all patients have a comprehensive nutrition assessment at the start of HPN and many, but not all, have a repeat value during a subsequent clinic or hospital encounter. The nutrition assessment consists of the following measures:

• Height
• Body mass index (BMI)
• Triceps skin fold (TSF)
• Mid upper arm muscle circumference (MUAMC)
• Serum albumin and transferrin

Patients are closely monitored and the parenteral nutrition prescription is adjusted to improve the nutritional status of the patient. Monitoring includes the evaluation of daily weight, intake and output. In the case of patients with severe diarrhea, serial nutrient intake is recorded in the laboratory studies that are sent to the HPN office each week. Clinic visits are scheduled at 1, 3, 6 and 12 months after discharge from the hospital to assess clinical and nutritional status.

The nutrient composition of the HPN prescription with the greatest energy content given within 4 weeks of discharge was chosen as the representative formula for each patient. Patients on HPN with GVHD of the gastrointestinal tract were matched to one control subject by gender and BMI of 15 days between the 1st and 2nd nutrition assessment.

Data were analyzed using a Wilcoxon signed rank test as appropriate. Repeated measures were conducted on patients who used HPN for more than 4 weeks. The correlation between baseline and repeat assessments was calculated for each parameter using Pearson’s correlation coefficient. A significance level of 0.05 was used for all analyses.

Results

Patient Characteristics

69 patients with GVHD received HPN. 16 GVHD patients were excluded because they did not have nutrition assessment within 4 weeks of discharge, and 10 patients with GVHD less than 4 weeks. Twenty (20) of 53 GS patients were matched with control patients. 80 patients had information on HPN episode.

88 had information on TPN

71 had information on TPN

105 had nutrition assessment

97 excluded because no TPN information

78 excluded because no nutrition assessments

497 had nutrition assessment available

381 excluded because they did not have more than one nutrition assessment or one was not performed during the time frame

116 had both baseline and repeat assessments

8 excluded because of incomplete information on formula

110 had formula information corresponding to the assessments

30 excluded after matching

20 subjects left after matching 1:1 with GVHD subjects on gender, BMI category, and days between assessments

Table 1 shows the distribution of gender, BMI and time interval between the initial and follow up nutrition assessment between the two groups. Differences are not significant (p > 0.05).

Table 2: Endurance scores of TPN-NA

Table 3: Energy intake and body composition measures.

References