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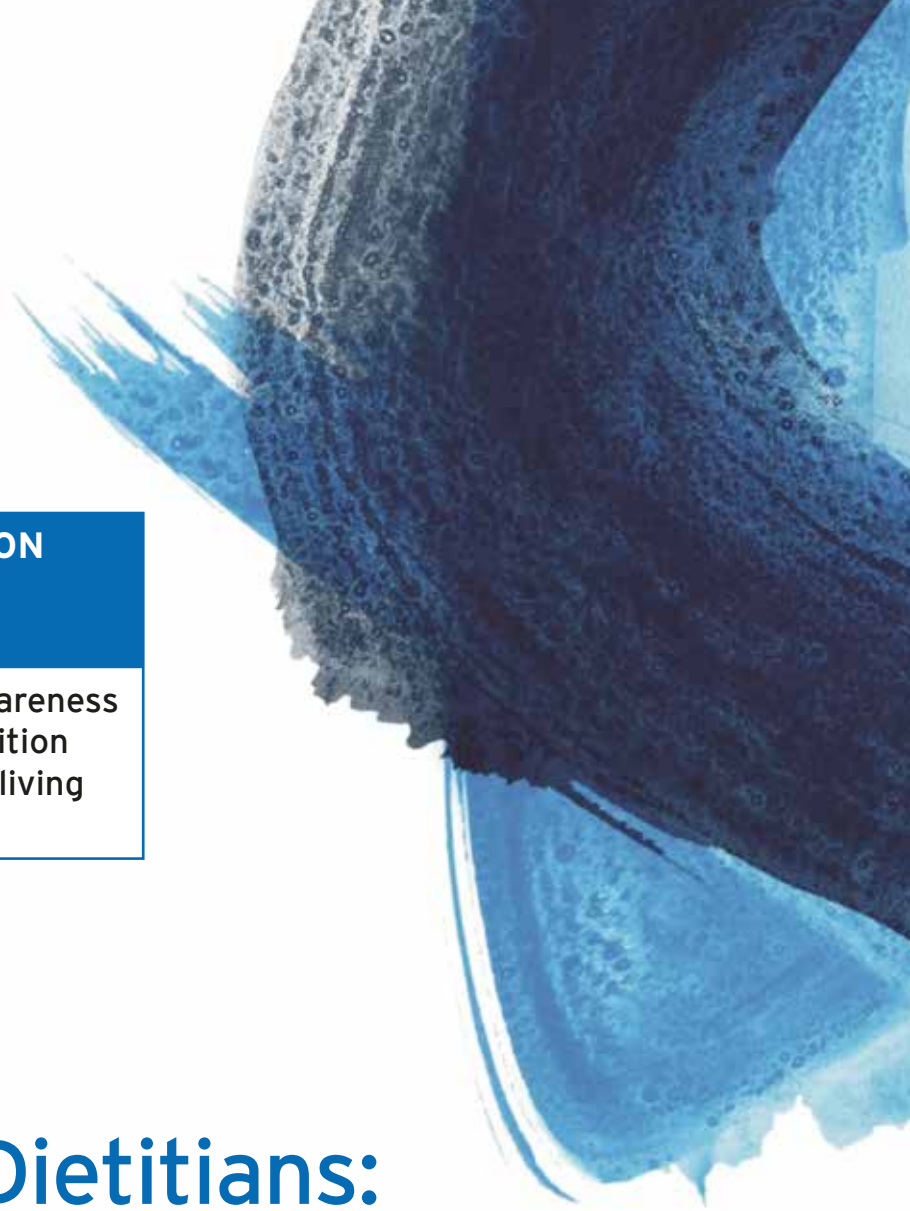


HOME ARTIFICIAL NUTRITION AWARENESS (HAN) WEEK starts on 3rd August 2020

A week dedicated to raising awareness about essential life-saving nutrition treatments received by people living in the community, at home.

Top Tips for Dietitians: Sending a patient home on Home Parenteral Nutrition

Author:

Sarah-Jane Hughes,
Principal Dietitian and Clinical Lead,
Regional Intestinal Failure Service,
Northern Ireland.

July 2020

This article was sponsored by Fresenius Kabi. Any views expressed are those of the author(s). Apart from the subject matter Fresenius Kabi has had no editorial input.

Intestinal Failure has been defined in the following ways:

'Reduction in functioning gut mass below the minimum amount necessary for adequate digestion and absorption of nutrients' (Fleming and Remington, 1981)

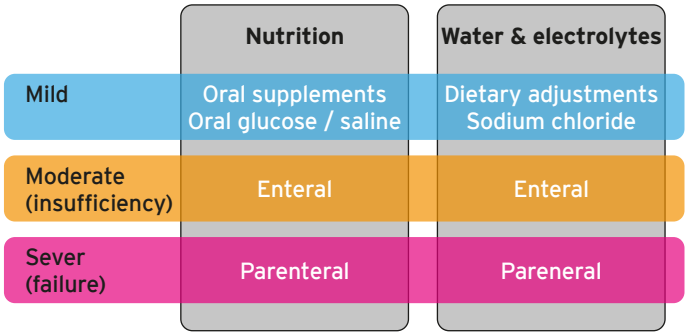
'Reduced intestinal absorption so that macronutrient and/or water and electrolyte supplements are needed to maintain health and/or growth' (Nightingale, 2001)

'The reduction of gut function below the minimum necessary for the absorption of macronutrients and/or water and electrolytes, such that intravenous supplementation is required to maintain health and /or growth' (Pironi et al., 2014).

From the beginning, the severity of intestinal failure and the proposed need for nutritional support must be established.

A number of classifications have been described based on support required or remaining length of the bowel.

Severity of Intestinal Failure



It has been shown that the small bowel lengths listed below are inadequate to be managed by oral treatments alone. Such patients need intravenous support in the form of nutrition/fluid. Or any patient whose output/nutrition status continues to cause concern.

- ≤ 100cm Jejunum ending in Jejunostomy
- ≤ 50-60cm Jejunum anastomosed to colon

Note: these lengths always refer to healthy bowel.

The steps below outline how to establish goals of treatment and aims of nutritional support

1) Obtain weight and weight history, calculate BMI and establish target weight and goal of treatment
2) Use other anthropometric measurement to establish baseline e.g. Grip Strength or Mid-Arm Muscle Circumference (MAMC)
3) Calculate kcalorie and protein requirements based on current recommendations
4) If patient has elevated C Reactive Protein (CRP), or ongoing evidence of infection - exercise prudence with additional kcalories for weight gain. **Note:** Important not to overfeed with Parenteral Nutrition (PN)
5) Initiation of PN – use Glucose Oxidation Rate (GOR) as a guide:

$$\frac{\text{4-7mg x kg (Body Weight) x 60min x 24hr}}{1000} = \text{glucose mg/kg/min/day}$$

6) Important to remember can exceed GOR if normal blood glucose, liver function is reasonable and patient metabolically stable
7) Calculate fluid losses taking into consideration stoma, fistulae, drains and gastric losses
8) Measure a baseline micronutrient screen for Vitamins A, C, D, E, B12, Folate, Iron Studies, Copper, Zinc, Selenium and Manganese. Then repeat the screen every 2-4 weeks
9) Determine baseline HbA1c also prior to discharge

Dietary intake

Maximise diet intake without exacerbating stoma output. This has many benefits to the patient both psychologically and clinically. Maintaining oral intake can help to prevent severe cholestasis and liver function test disturbance in the short bowel.
If a patient has an end Jejunostomy

- Manipulate the diet to decrease transit time
- Low fibre, low resistant starch to decrease output
- Malabsorption is common 60-70% energy, 70% protein, 50-60% fat and 60-70% carbohydrates absorbed
- Hyperphagia requires: 6-8 meals per day
- Complex carbohydrates > simple sugars to avoid osmotic effect
- High salt foods should be encouraged
- High energy 30-60kcal/kg/day
- High protein 0.2-0.25gN2/kg/day
- Low residue
- Consider higher fat

Fluid Balance

One of the most important aspects of management of patients with a short bowel is control of oral fluid intake

Due to the leaky nature of the upper small bowel and the hypotonic nature of normal drinks patients will normally lose more fluid from their stomas than they consume

Limit hypotonic fluids to 500 to 1000ml depending on anatomy

500ml-1000ml of oral rehydration solution (see Table 1) to minimise fluid losses

Separation of food and fluids can reduce gut transit time

TABLE 1: Example of Oral rehydration therapy preparations commonly used

Oral Rehydration Therapy (ORT)

	Double Strength Dioralyte (10 x sachets/litre)	St. Mark's Mix E - mix
Volume (ml)	1000	1000
Sodium	120	90
Chloride	120	60
Potassium	40	-
Bicarbonate	0	30
Glucose	180	101
Citrate	20	0

Review fluid losses and correct with additional intravenous fluids and electrolytes to match stoma and gastric losses.

Medications

It is imperative to advise patients on timings of antidiarrheals, rational and dosage of medications. For example Loperamide 2-16mg four times daily, 30mins before meals and feed. Codeine Phosphate 30-60mg four times daily.

If patient has loss of Terminal Ileum or Inflammatory Bowel Disease ensure the patient is prescribed Intramuscular Vitamin B12 injections one every three months on discharge from hospital. If serum levels are <300 nanograms/L, we normally use the loading dose of Hydroxycobalamin 1 mg Intra Muscular (IM) three times per week for two weeks followed by 1mg injections every 2-3 months (British National Formularly, 2020).

Oral multivitamin/multi-mineral replacement, for example Forceval may have a place where bespoke compounding resources are limited.

It is important to provide the patient with clear and individualised written information and diet plan ahead of discharge.

Formulation of Parenteral Nutrition

Calculate requirements for kcalorie, protein, fluid, Sodium, Potassium, Magnesium, Phosphate and Calcium.

Establish kcalorie and protein gap from oral intake, bearing in mind estimated percentage absorption.

Calculate non-protein kcalories and use a dual source of glucose and lipid, e.g. 50:50 in the Parenteral Nutrition (PN) bag.

Use Standard commercially available bag initially as an inpatient to establish stability, correcting fluid and electrolytes with intravenous fluids. Ideally using a 3rd generation lipid preparation containing appropriate n3/n6 blend of lipid.

Initially run PN over 20-24 hours before lengthening break in PN as patient stabilises. Take care to monitor hydration, blood pressure and blood sugars during break.

Counsel patient on hypoglycaemia treatment and appropriate snacks during break off PN.

Cyclical PN (i.e. providing a break daily) and/or a night off PN can help to prevent Intestinal Failure Associated Liver Disease (IFALD) and improves quality of life for the patient.

Where facilities available, bespoke PN bags can be formulated to include additional fluid thus minimising handling of Hickman or PICC line.

Ensure appropriate vitamin, mineral and trace elements are added to the PN bag. Additional amounts can be given with some bespoke formulations.

Monitoring

As an inpatient the following should be monitored as a minimum:

- Strict fluid balance - daily
- Urinary sodium - weekly
- Nutritional Status – weight, MAMC, Triceps Skin Fold (TSF), Grip Strength

Always check with a specialist centre for advice on patient nutritional parameter monitoring.

On discharge, we recommend that the patient keeps a daily record of their fluid balance. We educate and provide patients with jugs, food and fluid diaries.

Patients are advised to measure oral intake, PN/fluids, diet, urine, stoma or bowel movements, fistulae or drains and vomit on a daily basis.

We normally recommend that these daily records are kept until clinical review be that face to face or virtually.

Patients are encouraged to weigh themselves once or twice per week only at home.

Biochemistry to include Urea and Electrolytes, Liver function tests, bone profile, Magnesium, CRP, cholesterol and triglycerides and full blood picture. Initially 2 weeks post discharge then 4 weeks then 2-3 monthly when stable (BAPEN 2016, NICE 2006, ESPEN 2020).

Measure HbA1c prior to discharge and 6monthly thereafter.

Micronutrient screen to be repeated 3-6monthly depending on patient's clinical need. (BAPEN 2016, NICE 2006, ESPEN 2020).

The burden of Home Parenteral Nutrition (HPN) whilst challenging especially during these COVID-19 times can be a life-changing yet hugely beneficial therapy. Where patients are supported by appropriately trained dietitians or Nutrition Support Teams they can lead a very good quality of life on HPN.

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Date of Preparation: 28th July 2020 Job Code: PN/Gen.010.20