SHORT BOWEL SYNDROME: NUTRITIONAL ASSESMENT IN PATIENTS RECEIVING HOME PARENTERAL NUTRITION COMPARED TO PATIENTS ON ORAL NUTRITIONAL THERAPY

Beermann T, Køhler M, Vinter-Jensen L, Jacobsen BA, Rasmussen HH
Centre for Nutrition and Bowel Diseases, Aalborg University Hospital, Aalborg, Denmark

Rationale

Patients with short bowel syndrome (SBS) are often in high risk of malnutrition and targeted nutritional therapy is mandatory. Some patients will be dependent of home parenteral nutrition (HPN), while others can maintain nutritional status by oral nutritional therapy (ONT). A thorough nutritional assessment is thus mandatory to make a targeted nutrition plan.

The aims of this study were to compare body composition, muscle strength and metabolism in patients receiving HPN vs. ONT, and furthermore to investigate correlations between muscle mass and muscle strength for patients with SBS.

Methods

A cross-sectional investigation of ambulatory patients with SBS stratified according to treatment with HPN or ONT (no patients on tube feeding).

The following data were recorded:

- Age and gender
- Use of HPN or ONT
- Anthropometric measurements:
  - Hand grip strength (Hydraulic hand dynamometer NC70142 from North Coast)
  - Weight (Seca 701 electronic scale)
  - Standing height (Seca 222 stadiometer).
- Bioelectrical Impedance Analysis (BioScan 920-II from Maltron)

  Indirect calorimetry (Jaeger Oxycon Pro from Carefusion)

Statistics: Differences were tested using t-test, paired samples t-test and correlation (Pearson). Significance level: P <0.05.

Discussion

In this cross-sectional study we found that patients with SBS on HPN had a poorer nutritional status compared to patients on ONT. The two groups might be different regarding the period they have had the SBS diagnosis and this could have an impact on the results. Newly diagnosed SBS patients will in almost every case start with HPN and may very recently have experienced a period of disease and weight loss, and thereby can be expected to have lower BMI, muscle mass and muscle function. It can also be speculated if the HPN therapy has not been sufficient regarding calories and proteins. A widely used method for estimating energy is by calculating BMR by Harris-Benedict equation, but it seems to underestimate BMR for patients receiving HPN (Køhler M, 2011). Even though all patients were fasting before the nutritional assessment were performed, we didn't register, when the patients had the last portion of HPN, which might be as near as two hours before measurement. This might influence the results of bioelectrical impedance (FM and FFM) and lead to a higher basal metabolic rate (BMR).

However, these results emphasises the importance that patients with SBS must undergo a thorough nutritional assessment, to target and optimize the nutritional treatment.

Results

Overall 44 patients (19 males and 25 females) were included. Age was 62.6±12.8 years (mean±SD) (Table 1). Of these 21 (48%) received HPN. There were no differences between the two groups regarding age, gender or length of remaining bowel.

We found that patients on ONT had a higher body mass index (BMI) (p=0.03) and hand grip strength (HGS) (p=0.01). There was a tendency that patients on ONT had higher Fat Mass (FM), Fat Free Mass Index (FFMI) and weight (Table 2).

Overall, correlations were found between BMI and FFMI (r=0.84, p< 0.01), HGS and FFMI (r=0.56, p<0.01).

Table 1. Demographics and nutritional assessment in 44 patients with short bowel syndrome on oral nutrition therapy (ONT) compared to patients on home parenteral nutrition therapy (HPN).

	Total	ONT	HPN	P-value
Number	44	23	21	
Age (years)[1]	62.6±12.8	60.4±13.1	65.1±12.3	0.23
Female	25	13 (52%)	12 (48%)	-
Male	19	10 (53%)	9 (47%)	-
Weight (kg)	57.0±13.9	60.7±11.2	52.9±15.6	0.06
Height (m)	1.66±0.1	1.67±0.1	1.65±0.1	0.48
BMI[2] (kg/m^2)	20.4±3.9	21.6±3.4	19.1±4.1	0.03
HGS[3] (kg)	25.6±12.2	29.9±12.7	20.9±9.9	0.01
FFM[4] (kg)	42.9±9.5	44.8±8.9	40.7±9.8	0.15
FFMI[5] (kg/m^2)	15.3±2.0	15.9±1.6	14.7±2.3	0.06
FM[6] (kg)	14.1±6.8	15.9±6.5	12.2±6.8	0.08
BMR-m[7] (kcal)	1220±241	1191±167	1252±304	0.41
BMR-hb[8] (kcal)	1256±216	1309±182	1198±240	0.09

[1] Mean±SD, [2]BMI = Body Mass Index, [3]HGS = Hand Grip Strength, [4]FFM = Fat Free Mass, [5]FFMI = Fat Free Mass Index, [6]FM = Fat Mass, [7]BMR-m = Basal Metabolic Rate measured by indirect calorimetry, [8]BMR-hb = Basal Metabolic Rate estimated by the Harris-Benedict equation

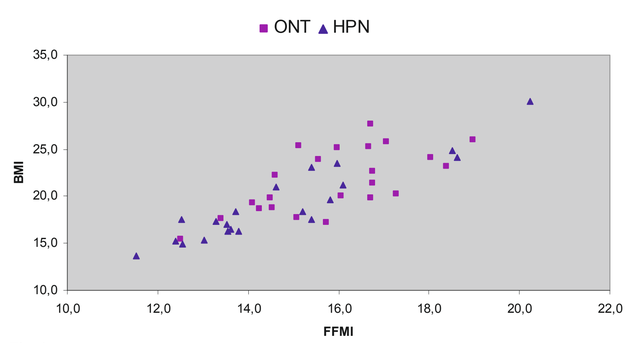

Fig.1.
BMI correlated to Fat Free Mass Index (FFMI). For all patients r=0.84, p<0.01

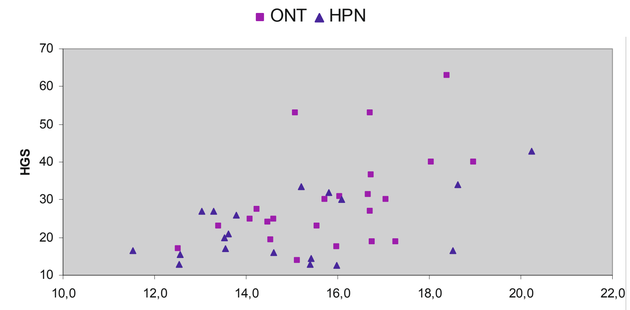

Fig. 2.
HGS correlated to Fat Free Mass Index (FFMI). For all patients r=0.56, p<0.01

Conclusion

Patients with short bowel syndrome on home parenteral nutrition (HPN) were characterized with a lower BMI, Fat Mass (FM), Fat Free Mass Index (FFMI) and lower muscle function (HGS) compared to patients on oral nutritional therapy (ONT). Overall, a good agreement was found between muscle strength and muscle mass.

References:
(1) Køhler M, Beermann T, Vinter-Jensen L, Jacobsen BA, Rasmussen HH. Basic metabolic rate in patients with short bowel syndrome: measured versus estimated. Abstract. Poster presentation ESPEN 2011.