Tapering Home Parenteral Nutrition to Never When Possible

Douglas L. Seidner, M.D.
Center for Human Nutrition
Vanderbilt University Medical Ctr
Disclosures

• Hamni Pharma: Med Advisory Board (MAB)
• Option Care - MAB
• Takeda (Shire) Pharma: MAB, Research support
• TheraChron: MAB
• Zealand Pharma: Research support
Learning Objective

• Discuss who needs parenteral support
• Understand the main types of short bowel syndrome (SBS)
• Consider factors that affect nutrient absorption with SBS
• Know what to monitor when tapering parenteral support
Definition And Classification Of Intestinal Failure

• Definition

– **Intestinal failure (IF)** - the reduction of gut function below the minimum necessary for the absorption of macronutrients and/or water and electrolytes, such that **IV supplementation is required** to maintain health and/or growth.

– The reduction of gut absorptive function that **doesn't require any IV supplementation** to maintain health and/or growth, can be considered as **“intestinal insufficiency”** (II).

Overview of Intestinal Failure

**Functional classification** based on onset, metabolic status, expected outcome

- **Type I**
  - Acute, short-term, self-limited

- **Type II**
  - Subacute, complex, weeks-months

- **Type III**
  - Chronic, stable, months to years

**Pathophysiologic classification**:
- SBS – Fistula – Motility disorder – Intestinal obstruction – Mucosal disease

**SBS Anatomic classification**:
- Type I - jejunostomy
- Type II – jejunocolic anast.
- Type III- jejunooileal anast.

**Clinical classification / parenteral support**:
- 16 subgroups based on daily volume and energy requirements modified to 8 subgroups*

Clinical Classification of PS

On the basis of the requirements for energy and the volume of the IVS, CIF was firstly categorized into 16 subtypes. An international multicenter survey carried out by the CIF Action Day database allowed to simplify it in 8 categories [6]:

<table>
<thead>
<tr>
<th>Type of the IVS</th>
<th>Volume of the IVS (mL/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤1000</td>
</tr>
<tr>
<td>Fluids and electrolytes (FE)</td>
<td>FE 1</td>
</tr>
<tr>
<td>Parenteral nutrition (PN)</td>
<td>PN 1</td>
</tr>
</tbody>
</table>

FE = Fluids and Electrolytes alone.
PN = Parenteral Nutrition Admixture containing also macronutrients.

*Calculated as daily mean of the total volume infused per week = volume per day of infusion x number of infusions per week/7.

Normal Adult GI Anatomy and SBS

SB length: 365-600 cm
Duodenum: ~ 30 cm
Jejunum: ~ 150 to 200 cm
Ileum: ~ 200 to 300 cm
Colon: ~ 150 cm

Short Bowel Syndrome
<200 cm of jejunum-ileum

1 foot = 30 cm
SBS Anatomic Classification

Type and Length of SB needed to taper off PS

Type I
> 100 cm SB

Type II
> 65 cm SB

Type III
> 30 cm SB
Weaning Parenteral Support

Jeppessen PB. Expert Opinion on Orphan Drugs 2013;1:515
No two people are alike
Factors that Favor Nutrient Absorption in SBS

- Remaining bowel length (SBS anatomy class)
- Segment resection (ileum>jejunum)
- Absence of mucosal disease (IBD, radiation)
- Upper GI function (stomach, liver, pancreas)
- Intestinal adaptation (2-3 years)
- Hyperphagia (eating 2-4 times requirements)
- Ability to modify diet and response to meds
**Individualized care because of heterogeneity of disease**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Finding</th>
<th>Reduce?</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydration</td>
<td>Enteral I/O balance &gt; 1L (*Q &amp; Q measures of bowel func)</td>
<td>If favorable Yes</td>
<td>Low margin for error</td>
</tr>
<tr>
<td></td>
<td>Urine &gt; 0.5mL/kg/hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stable BUN/Cr</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urine SG or Na &gt; 20mEq/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micronutrients</td>
<td>Stable/Normal BMP(Ca) Mg Phos</td>
<td>If favorable Yes</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Stable/Normal vitamins and TE</td>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td>Macronutrients</td>
<td>Target weight Δ &lt; 1.5 kg since last PS adjustment</td>
<td>If favorable Yes</td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Calorie goals met &gt; 80% target (Hyperphagia 200%-400% BMR)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Qualitative, Quantitative

Seidner DL, JPEN 2013;37:201
DiBaise JK, J Clin Gastroenterol 2006;40:S94
Contraindications and Barriers to Tapering Off Parenteral Support

- Severe Malnutrition
- Severe short bowel syndrome
- Enterocutaneous fistulas
- Bowel obstruction
- Socioeconomic and psychosocial constraints
Tapering Home Parenteral Nutrition to Never When Possible

• Parenteral support is requirement for intestinal failure (IF)

• Tapering PS may be possible when there are factors that favor nutrient absorption

• Tapering may not be possible if malabsorption is extreme, resources are limited, or compliance with treatment is too difficult
Thank You From the Capitol of the Volunteer State