Diet and Medication Strategies to Reduce Diarrhea in Short Bowel Syndrome (SBS)

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Disclosures

• Employee of OptumRx
Objectives

Consumers and their caregivers will learn the key diet and medication strategies to help reduce diarrhea to:

• improve intestinal absorption;
• minimize dependency on PN and IV fluid;
• improve quality of life.
What is SBS?

Specific type of intestinal failure that occurs because of loss of a significant portion of the small bowel’s absorptive area

Initially defined as having less than 200 cm (6.5 feet) of jejunum-ileum in continuity after bowel resection

Currently defined as the failure of the intestine to adequately meet the nutrient and fluid requirements of the individual

SBS is most common type of chronic intestinal failure (CIF)

Can occur in adults and children
Clinical consequences of SBS

Diarrhea leading to major fluid and nutrient losses; incomplete digestion and absorption of food

Dehydration, electrolyte abnormalities, vitamin and mineral deficiencies, and progressive weight loss/malnutrition

The need for nutrition support to prevent dehydration, stabilize electrolytes, avoid weight loss or restore weight, and/or to provide vitamins and minerals
Causes of Diarrhea in SBS

• Loss of intestinal absorptive area which leads to:
  – Rapid transit in the bowel
  – Hypersecretion of stomach acids
  – Bile acid deficiency/Steatorrhea
  – Bacterial overgrowth
Other Causes of Diarrhea

- Active underlying bowel disease
- Medications
- Infection
Key Interventions to Control Diarrhea

• Diet modifications
• Standard Medications
## SBS Diet Prescriptions

<table>
<thead>
<tr>
<th></th>
<th>Colon</th>
<th>No Colon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>50–60% of total calories (limit simple sugars)</td>
<td>40–50% of total calories (restrict simple sugars)</td>
</tr>
<tr>
<td>Protein</td>
<td>20–30% of total calories</td>
<td>20–30% of total calories</td>
</tr>
<tr>
<td>Fat</td>
<td>20–30% of total calories (primarily essential fats)</td>
<td>30–40% of total calories (primarily essential fats)</td>
</tr>
<tr>
<td>Fluid</td>
<td>Isotonic fluids or hypo-osmolar fluids</td>
<td>Isotonic, high-sodium oral rehydration solution</td>
</tr>
<tr>
<td>Soluble Fiber</td>
<td>5–10 grams per day (if stool output is &gt; 3L/day)</td>
<td>5–10 grams per day (if stool output is &gt; 3L/day)</td>
</tr>
<tr>
<td>Oxalates</td>
<td>Limit intake</td>
<td>No restriction</td>
</tr>
<tr>
<td>Meals</td>
<td>5–6 meals per day</td>
<td>4–6 meals per day</td>
</tr>
</tbody>
</table>

Byrne, T. et al; Beyond the Prescription: Optimizing the Diet of Patients with SBS; NCP 15:306-311, 2000.
Osmolarity

Osmolarity is the number of osmoles (the number of particles) per liter of solution (i.e., the concentration).

The more particles there are, the higher the osmolarity or concentration.
## Types of Fluids

<table>
<thead>
<tr>
<th>Hyper-Osmolar</th>
<th>Hypo-Osmolar</th>
<th>Iso-Osmolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Contain many particles of glucose and little to no sodium</td>
<td>• Contain few to no particles of glucose and sodium (not concentrated)</td>
<td>• Contain sodium, potassium, and glucose in same concentration as blood and extracellular fluid</td>
</tr>
<tr>
<td>• Cause fluid to be pulled into the intestinal tract to dilute the concentration of the drink, causing watery diarrhea</td>
<td>• Are not always absorbed entirely, known as free fluids</td>
<td>• Will not cause fluid to shift into the GI tract</td>
</tr>
<tr>
<td>• Juice, soda, smoothies</td>
<td>• Water, decaffeinated, and sugar-free beverages</td>
<td>• Oral rehydration solution (CeraLyte®, Pedialyte®, Gatorade®)</td>
</tr>
</tbody>
</table>

Fluid Comparison

The normal osmolarity of blood plasma is 275–295 mOsm/L.

<table>
<thead>
<tr>
<th>Hyper-osmolar Fluids</th>
<th>Hypo-osmolar Fluids</th>
<th>Iso-osmolar Fluids</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beverage</strong></td>
<td><strong>Osmolarity</strong></td>
<td><strong>Beverage</strong></td>
</tr>
<tr>
<td>Prune juice</td>
<td>1265</td>
<td>Diet soda</td>
</tr>
<tr>
<td>Grape juice</td>
<td>863</td>
<td>Water</td>
</tr>
<tr>
<td>Apple juice</td>
<td>680</td>
<td>Tea</td>
</tr>
<tr>
<td>Orange juice</td>
<td>614</td>
<td>Tea</td>
</tr>
<tr>
<td>Regular soda</td>
<td>550–700</td>
<td>Tea</td>
</tr>
<tr>
<td>Popsicle</td>
<td>720</td>
<td>Tea</td>
</tr>
<tr>
<td>Jell-O®</td>
<td>730</td>
<td>Tea</td>
</tr>
</tbody>
</table>

* (mOsm/L)

Iso-osmolar Drinks

Iso-osmolar drinks are the beverage of choice for SBS consumers.
Examples of ORS

Commercial Products
• Cera-Lyte® 90
• DripDrop®
• Pedialyte®
• Rehydralyte®
• WHO Packet (Jianas Brothers)
• WHO Reduced-Osmolarity Packet (TriOral®)

Home-made recipes
• Gatorade G2®:
  – 4 cups of Gatorade G2®
  – ½ teaspoon table salt

• Fruit juice based:
  – ¾ cup fruit juice
  – 3 ¼ water
  – ¾ teaspoon table salt
Key Diet Recommendations

The SBS diet:

• Emphasizes complex carbohydrates and restricts simple sugars in food and fluids. Account for all sugar!

• Contains a source of complex carbohydrate, protein, and fat (especially essential fat) at each meal and snack

• Distributes food and fluid throughout the day

• Restricts fluids to 4 oz. per meal, and fluids are either hypo-osmolar or isotonic
Alternatives to Sugar

Non-nutritive sweeteners are intense, very low-calorie sweeteners that do not have an adverse effect on stool output since they do not contribute to osmolality in the GI tract. These sweeteners can be used as an alternative in order to reduce simple sugars in the diet.

<table>
<thead>
<tr>
<th>Sweetener</th>
<th>Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame K</td>
<td>Sunett®, Sweet &amp; Safe, Sweet One®</td>
</tr>
<tr>
<td>Aspartame</td>
<td>Nutrasweet®, Sugar Twin®, Equal®</td>
</tr>
<tr>
<td>Saccharin</td>
<td>Sweet’N Low® and Sweet Twin</td>
</tr>
<tr>
<td>Sucralose</td>
<td>Splenda®</td>
</tr>
<tr>
<td>Stevia-based</td>
<td>Truvia®, Pure Via®</td>
</tr>
</tbody>
</table>
Alternatives to Sugar

Sugar Alcohols are also used as low-calorie sweeteners. Unlike the non-nutritive sweeteners, they are designed to be malabsorbed, causing uncomfortable side effects like abdominal gas, bloating and diarrhea.

- Sugar alcohols can be found in the ingredient list on food labels as sorbitol mannitol, xylitol.
- A product labeled “sugar-free” must contain a separate line for sugar alcohols under the carbohydrate section on the food label.

Medication Management

Anti-diarrheals

Function:
• Used to increase intestinal transit time (slow down the GI tract) thereby increasing absorption of nutrients

Types:
• Loperamide (Imodium®)
• Diphenoxylate (Lomotil®)
• Codeine
• Tincture of Opium (DTO)

Dose:
• Varies depending on bowel anatomy and the volume/frequency of output and may exceed package dosing

Best Practices:
• Should be taken 30 minutes prior to meals for maximal effect
• Avoid liquid medications which are typically high in sorbitol
Medication Management

Anti-secretories

Function:
- Used to decrease stomach acid secretion, which is increased after bowel resection

Types:
- H2 Blockers: Famotidine (Pepcid®), Ranitidine (Zantac®)
- Proton Pump Inhibitors: Omeprazole (Prilosec®), Esmeprazole (Nexium®), Pantoprazole (Protonix®)

Dose:
- Daily or 2x/day; oral/IV

Best Practices:
- Typically necessary after significant small bowel resection for up to 6 months
- Long-term use is dependent on the individual patient symptoms and underlying disease process
# Medication Management

## Additional Medications to Consider

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Function</th>
<th>Administration</th>
<th>When given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octreotide (Sandostatin®)</td>
<td>Anti-secretory</td>
<td>Subcutaneous injections or IV</td>
<td>Output &gt;800 ml /24 hrs when NPO</td>
</tr>
<tr>
<td>Cholestyramine</td>
<td>Bile Salt Binder</td>
<td>Oral</td>
<td>Rectal burning with early morning stool</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Treat bacterial overgrowth</td>
<td>Oral</td>
<td>Chronic gas and bloating</td>
</tr>
<tr>
<td>Pancreatic Enzymes</td>
<td>Needed for digestion</td>
<td>Oral</td>
<td>Decreased enzyme secretion or availability</td>
</tr>
</tbody>
</table>
Next Steps

• Write down what you’re eating and drinking for 3 days.
• Note the number of times you have a bowel movement or empty your ostomy.
• Review the medications that have been prescribed to control your diarrhea to ensure you are taking them as prescribed.
• Review with your team.
Consider....

• Adjusting your oral fluid choice
• Making one significant diet change
• Committing to a medication regimen