Medical Nutrition Therapy for Short Bowel Syndrome

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Patient Background Information
Patient is a 63-year-old obese female (BMI 42.6 kg/m²) diagnosed with stage IIIIC ovarian cancer in the right ovary. On diagnosis, cancer cells have spread to the omentum, small and large bowel. The following procedures were conducted at an outside hospital in January, 2014:

- Tumor debulking surgery
- Right salpingo-oophorectomy (removal of the right fallopian tube)
- Right hemicolectomy (removal of the right side of the colon)
- Omentectomy (removal of part or all of the abdominal lining)
- Resection of small bowel to the remaining colon
- Colostomy

Review of the operative report suggests that there is approximately 91 cm of remaining small bowel.

Addition History of Present Illness
- Presumably short gut syndrome
- Received 3 cycles of chemotherapy: Taxotere and Carboplatin; presumable chemotherapy-related toxicity
- History of C-difficile colitis (May, 2014), treated with antibiotics
- Complained of loose and increased ostomy output, cramping, abdominal pain, and fatigue
- Currently on TPN since hospitalization at the University of Washington Medical Center in May 2014, for fluid and electrolyte replacement
- Abdominal pain, and fatigue

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Short Bowel Syndrome (SBS)
Patients with SBS typically experience severe diarrhea, steatorrhea, nutrient deficiencies, electrolyte disturbances, dehydration, malnutrition, and weight loss [1]. Resection of the ileum would result in decreased water absorption and delivery of excess fluid to the colon; the right hemicolectomy and colostomy may further reduce water absorption in the colon [1]. Absence of ileum puts patients at risk for:

- Vitamin B12 deficiency
- Calcium, magnesium, zinc and iron deficiencies
- Bile acid malabsorption
- Fat-soluble vitamins (vitamins A, D, and E) malabsorption [1].

Oxalate restriction is also recommended [1].

Enteral Nutrition (EN) support is preferable to Parenteral Nutrition (PN) for increasing absorption of macronutrients in patients with short bowel syndrome [2]. In addition, EN is less expensive and has lower overall risks than PN [2].

Medical Nutrition Therapy for Short Bowel Syndrome

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Recommendation for Patients with Colon Present</th>
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</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>50-60% of total energy; complex carbohydrates, including soluble fiber</td>
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<tr>
<td>Proteins</td>
<td>20-30% of total energy</td>
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<tr>
<td>Fats</td>
<td>20-30% of total energy</td>
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<tr>
<td>Fluids</td>
<td>Minimize fluids with meals, sipping of fluids between meals</td>
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<tr>
<td>Vitamins</td>
<td>Daily multiple vitamin with minerals; possibly B12; possibly vitamins A, D, E supplements</td>
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<tr>
<td>Minerals</td>
<td>500 mg calcium with meals; possibly iron, magnesium, and zinc supplements; reduced oxalate</td>
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<tr>
<td>Meals</td>
<td>3 small meals plus 2-3 snacks</td>
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Assessment

Labs: hypokalemia, low vitamin D

Nutrition Requirements:
- Energy Need: 1550-1860 kcal (30-35 kcal/kg x Adjusted Body Weight)
- Protein Need: 62-81 g (1.0-1.3 g/kg x Adjusted Body Weight)
- Fluid Need: 2475 mL (BSA x 1500)

3-Day Intake Record:

<table>
<thead>
<tr>
<th>Patient’s intake</th>
<th>Date</th>
<th>Calorie (kcal)</th>
<th>Protein (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/4/2014</td>
<td>1270</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>7/5/2014</td>
<td>159</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>7/6/2014</td>
<td>1420</td>
<td>47</td>
<td></td>
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<tr>
<td>Typical Diet</td>
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<tr>
<td>Breakfast: one egg omelet with ⅔ cup ham and ⅔ string cheese</td>
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<tr>
<td>Lunch: ⅔ ham sandwich (1 slice ham and 1 slice cheese), ⅔ banana</td>
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<td></td>
<td></td>
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<tr>
<td>Dinner: 1 cup pasta with meat sauce</td>
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</tbody>
</table>
Snack: chocolate

Patient was also receiving 3313 kcal of energy and 110 grams of protein per day through home TPN infusion.

Diagnosis

Altered GI function related to history of hemicolectomy, resection of small bowel, omentectomy, colostomy, and chemotherapy-related toxicity as evidenced by loose and frequent ostomy output (~2 full bags of ostomy output per day).

Intervention

1. Consume 3 small meals plus 2-3 snacks per day.
2. Take probiotics – VSL#3 is a probiotic containing 125 billion CFU counts, including four strains of lactobacillus, three strains of bifidobacterium, and one strain of streptococcus thermophilus.
   - Double-blind and placebo-controlled study in patients undergoing pelvis radiation [4] found:
     - Development of radiation enteritis: 32% in the intervention group, 52% in the control group
     - Bowel movement frequency: control group had 3 times more bowel movement per day as did the intervention group
   - Increase soluble-fiber intake through food sources and supplements.
     - Food sources: applesauce, banana, oatmeal, carrots, sweet potatoes, onion, squash, etc.
   - Supplement example: Heathers’ Tummy Fiber
4. Increase fruit and vegetable intake for potassium and phytonutrients. Recommend more soluble-fiber, such as from root vegetables, rather than insoluble-fiber. Experiment with fruits to test tolerance.
5. Increase protein intake by mouth to meet protein need.
6. Vitamin D supplementation: 4000 IU per day.
7. Track intake at least 3 times per week.

Monitoring and Evaluation

- Monitor serum vitamin B12, calcium, iron, magnesium, zinc, and fat-soluble vitamins routinely
- Monitor weight status and oral food intake

Summary

Patient continues to be on TPN support. However, the above recommendations are intended to help patient increase oral food intake and decrease reliance on TPN, while managing the symptoms of malabsorption from SBS. Patient’s need for TPN should be re-assessed based on the overall risks of TPN.

References
