POSTOPERATIVE NUTRITIONAL IMPLICATIONS OF THE WHIPPLE PROCEDURE

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Whipple Procedure

Before surgery:
- Stomach
- Bile duct
- Gall bladder removed
- Pancreas tumor
- Duodenum
- Small intestine

After surgery:
- Bile duct attached to small intestine
- Remaining pancreas attached to small intestine
- Stomach attached to small intestine
Nutrition and the Whipple Procedure

• Enteral vs parenteral nutrition
• Early initiation of enteral feeds
• Synbiotics
• Where to put the tube?
• Oral intake and Diet education
Medical Considerations of a Whipple Procedure

- **Malabsorption/maldigestion**
  - Related to pancreatic enzyme production
  - Decreased surface area of the small intestine

- **Risk of weight loss and loss of lean body mass**
  - Inadequate digestion and absorption of calories and protein

- **Micronutrient deficiencies**
  - Fe, Ca, folate, fat soluble vitamins
Short bowel syndrome

The short bowel syndrome resulting in dehydration and malabsorption occurs as a result of massive intestinal resection, especially of the ileum with or without the colon. Resection of up to 100 cm of ileum causes diarrhea, because there are progressively greater degrees of bile salt malabsorption. Malabsorbed bile salts enter the colon where they cause water secretion by activating cyclic adenosine monophosphate. When the resection exceeds 100 cm, there is progressively more fatty acid loss in the colon, which also adds to water secretion and diarrhea. There is also malabsorption of vitamin B₁₂. In addition, there is loss of energy in the form of increased fat loss. However, as the length of the resection increases, there is malabsorption of all macronutrients, namely, fat, carbohydrate and protein. The malabsorbed carbohydrate entering the colon is fermented to produce flatulence and diarrhea. In addition, there is malabsorption of vitamins and trace elements such as zinc.
Patient Data

- EW - 77 year old male
- Married, lives with wife and step-daughter
  - No current alcohol, tobacco, or drug use
- Retired industrial truck operator
- Medicare insurance
Medical/Surgical Data

- **PMH:**
  - Chronic renal insufficiency
  - Hypertension
  - Anemia
  - Prostate cancer
  - Hyperlipidemia
  - Diverticulosis
  - GERD
  - Glaucoma
  - Chronic venous insufficiency
  - Morbid obesity
Medical/Surgical Data

- **PSH:**
  - Venous surgery to legs
  - Radiation for prostate cancer
  - Duodenal ampullary mass resection (12/8/11)
Nutritional History

• High in fat and calories
• Meals that are not nutritionally balanced
• EW’s wife cooks most of the meals
  ▫ Also eat out often
• No trouble with dairy products
• Admits he probably doesn’t get enough fruits or vegetables in his diet
Nutritional History

- Normal Day:

  - **Breakfast** – two packets of instant oatmeal made with whole milk, coffee, orange juice

  - **Lunch** – deli sandwich (roast beef, turkey) on wheat bread with lettuce and tomato

  - **Dinner** – fried chicken, collard greens, scalloped potatoes

  - **Snacks** – infrequently but often enjoys ice cream or pie, occasionally an apple
Cultural Attitudes Affecting Intake
First Admission

- February 14, 2012 - pylorus sparing Whipple Procedure
  - Recent diagnosis of malignancy in the ampulla of Vater causing silent bleeding
Lab Values

- WBC, RDW – high
- RBC, Hbg, Hct, MCH – low
- Ca – low
- Alb – low
Medications

- Lasix - diuretic
- Heparin – anticoagulant
- Hydrochlorothiazide - K sparing diuretic
-Prevacid – decreases stomach acid
- Reglan – stimulates intestinal transit
Anthropometrics

• Initial Assessment 2/16/12:

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight</th>
<th>IBW</th>
<th>%IBW</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>167.6cm</td>
<td>110kg</td>
<td>64.5kg</td>
<td>171%</td>
<td>39.2</td>
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</table>
Estimated Nutrient Needs

Initial Assessment 2/16/12:

<table>
<thead>
<tr>
<th>Using Facility Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KCALS</strong></td>
</tr>
<tr>
<td><strong>PRO</strong></td>
</tr>
<tr>
<td><strong>Fluid</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Using Nutrition Care Manual – Oncology General Guidance</th>
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<td><strong>KCALS</strong></td>
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<td><strong>PRO</strong></td>
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<tr>
<td><strong>Fluid</strong></td>
</tr>
</tbody>
</table>
Nutrition Care Process - First Admission Initial Assessment

• **Diagnosis**
  ▫ Inadequate enteral nutrition infusion (NI-2.3) related to current tube feed rate of Jevity 1.2 @ 10mL/hr X 24 hours via dobhoff as evidenced by current tube feed provides <25% of the patient’s estimated calorie and protein needs.

• **Intervention**
  ▫ Change the enteral formula/solution (ND-2.1.1) to a goal rate of Jevity 1.2 @ 60mL/hr X 24 hours via dobhoff to provide 1728kcals, 80g protein, and 1166mL of water.
  ▫ Provide 95mL flushes Q4 hours (ND-2.1.4).

• **Monitoring**
  ▫ Follow up with patient tolerance to the enteral formula/solution (FH-1.3.2.1) looking for any high residual volumes (>400mL), diarrhea, or altered lab values.
Nutrition Care Process - First Admission Follow-Up Assessment

- Diet slowly advanced from clear liquids to mechanical soft chopped PO as well as Jevity 1.2 @ 20mL/hr X 24 hours via dobbhoff
  - oral intake was <25% observed

- Recommendations/Interventions:
  - Ensure plus BID
  - Continue tube feed increasing to a goal rate of 60mL/hr X 24 hours as tolerated
  - Encourage/monitor PO intake
    - If PO intake >50%, consider discontinuing tube feed
Second Admission

- **February 29, 2012** – readmitted for dehydration
  - Presented with: decreased appetite and activity, SOB, and nausea with few bowel movements
  - Drainage from the incision
  - Possible diagnoses: fluid overload, intra-abdominal abscess, anastamotic leak, or delayed recovery
Lab Values

- WBC, RDW, platelets – high
- RBC, Hbg, Hct, MCV, MCH, MCHC – low
- Na – low
- Alb/prealbumin – low
Medications

- Os-Cal – calcium supplement
- Ciprofloxacin – antibiotic
- Hydrochlorothiazide - K sparing diuretic
- Megace - appetite stimulant
- Protonix – proton pump inhibitor
- Warfarin – anticoagulant
Anthropometrics

• Readmission Assessment 3/2/12:

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight</th>
<th>IBW</th>
<th>%IBW</th>
<th>BMI</th>
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</thead>
<tbody>
<tr>
<td>165cm</td>
<td>101.3kg</td>
<td>61.7kg</td>
<td>165%</td>
<td>37.2</td>
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## Estimated Nutrient Needs

**Readmission Assessment 3/2/12:**

<table>
<thead>
<tr>
<th>Using Facility Standards</th>
<th>KCALS</th>
<th>15-20kcals/kg</th>
<th>1520-2026kcals/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO</td>
<td>1-1.25g/kg (IBW)</td>
<td>62-77g/day</td>
<td></td>
</tr>
<tr>
<td>Fluid</td>
<td>15-20ml/kg</td>
<td>1520-2026ml/day</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Using Nutrition Care Manual – Oncology General Guidance</th>
<th>KCALS</th>
<th>25 kcal/kg to 30 kcal/kg body weight for nonambulatory or sedentary adults</th>
<th>2750 – 3300 kcals/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO</td>
<td>1.0 g/kg to 1.2 g/kg body weight, nonstressed patient with cancer</td>
<td>110-132g/day</td>
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</tr>
<tr>
<td>Fluid</td>
<td>No specific recommendations</td>
<td>n/a</td>
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Nutrition Care Process -
Second Admission Initial Assessment

• **Diagnosis**
  ▫ Unintended weight loss (NC-3.2) related to decreased appetite due to nausea and diarrhea prior to admission as evidenced by an 8% weight loss in less than one month (severe weight loss).
  ▫ Food and nutrition related knowledge deficit (NB-1.1) related to the need for a low fat diet in relation to the Whipple Procedure as evidenced by the statement “I don’t need to change what I eat just how much.”

• **Intervention**
  ▫ Advance diet from full liquid diet to cardiac when medically feasible as per patient tolerance ((ND-1.2).
  ▫ Low fat, low sodium diet education given; the patient was interested and receptive, but unmotivated (E-1.5).
  ▫ Ensure plus BID with lunch and dinner (ND-3.1.1).

• **Monitoring**
  ▫ Follow up to assess tolerance of diet advancement (FH-1.2.2.1), seeing if any nausea, vomiting, or diarrhea are present and monitor intake of Ensure plus. Also follow up to address any questions or concerns the patient has regarding the diet education (FH-4.1.1).
Nutrition Care Process - Second Admission Follow-Up Assessments

• 3/4/12: MD consult for TPN recommendations
  ▫ Never started on TPN

• 3/7/12: Full liquid diet with Ensure plus TID
  ▫ Symptoms of maldigestion/malabsorption – diarrhea, possible steatorrhea

• Recommendations/Interventions:
  ▫ Advance diet to cardiac GI soft when able as it is low in fat and may be better tolerated
  ▫ Discussed a brief review of low fat, low sodium diet education
Nutritional Therapy & Implication of Findings for the Whipple

- Focus on providing sufficient calories, protein and fluid
- Correcting any micronutrient imbalances
- Tailored to each individual patient and adjusted according to patient tolerance and preferences
References

• Cerner Corporation. (2009). CernerWorks [Computer program].
• Mahan, L., & Stump, S. (n.d.). *Krause’s Food and Nutrition Therapy* (12th ed.).
Questions?