Case 31: Lymphoma Treated with Chemotherapy

1. What type of cancer is lymphoma?
Lymphoma is the name for a group of blood cancers that develop in the lymphatic system.

4. Generally, patients with cancer are treated with surgery, radiation therapy, chemotherapy, biological therapy, bone marrow transplant, or a combination of therapies. Ms. Mitchell’s medical plan indicates that she will have both chemotherapy and radiation therapy. Describe how each of these therapy modalities work to treat malignant cells.

• Surgery is used in the process of the diagnosis of lymphoma, which requires a tissue sample. Surgery is used to attain a biopsy of the lymph node(s) and for treatment.
• Radiation therapy involves radiation and high-energy x-rays to destroy cancer cells. There are two types of radiation: external and internal. External a machine to aim high-energy rays at the cancer from outside of the body and internal uses radioactive substance sealed in needles or catheters placed into or near the cancer.
• Chemotherapy includes medications that interrupt different stages of cell cycle replication. Chemotherapeutic agents are most lethal to cells that are undergoing continual proliferation, which is logical since cells of many common tumor types are actively dividing.
• Biological therapies utilizes the body's immune system to fight cancer or to lessen the side effects that may be caused by some cancer treatments.
• Bone marrow transplant are a way of giving very high dose chemotherapy, sometimes with radiotherapy, to try to cure some types of cancer. The bone marrow is the spongy substance inside your bones which makes your blood cells. High doses of chemotherapy kill off your bone marrow, which means you cannot make any blood cells. So doctors can take out some of your bone marrow to put back into your body after chemotherapy in order to make blood cells again. You may also have bone marrow donated by another person if their bone marrow matches yours.

5. Radiation and chemotherapy may also affect healthy tissues.
   a. What other cells in the body may be affected by either or both of these treatments?

Healthy tissues in the body that are at risk to the effects of radiation and chemotherapy include those that are frequently dividing, such as the cells of the bone marrow (red blood cells, white blood cells, and platelets), the epithelial lining of the gastrointestinal tract, and the cells of the hair follicles.

   b. What symptoms may the patient experience as a result of the destruction of these cells?
The most common side effects are due to toxicity to these cells and include neutropenia, thrombocytopenia, anemia, diarrhea, mucositism and alopecia. Some chemotherapeutic agents are also known to cause cardiotoxicity, neurotoxicity, and nephrotoxicity. The most common symptom caused by chemotherapy is nausea and vomiting.

9. Calculate this patient’s body mass index and the percent usual body weight. How would their interpretation differ? Which is the most appropriate to use in determining nutritional risk for this patient?

BMI: 19.4 kg/m$^2$
Current weight: 120 lbs (UBW: 130)
Height: 5’6”
Percent UBW: 92.3%

BMI is calculated using the patient’s current weight and height to assess the weight classification. UBW is used to compare the patient’s current body weight to UBW to assess the nutritional risk and health complications. UBW variations strongly linked to nutritional risk and health complications. UBW is the most appropriate to use in determining the nutritional risk for the patient.

12. Calculate the patient’s protein requirement.
Protein needs are 54.5g – 81.75g

13. Calculate energy requirements for Denise.
Energy needs are 1635 kcal – 1907.5 kcal

14. How would you assess the dietary information gathered for usual nutritional intake?

<table>
<thead>
<tr>
<th>Food</th>
<th>Protein</th>
<th>Kcal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slice dry toast</td>
<td>4.5g</td>
<td>153</td>
</tr>
<tr>
<td>Plain hot tea</td>
<td>0g</td>
<td>5</td>
</tr>
<tr>
<td>½ cup ice cream</td>
<td>3.5g</td>
<td>191</td>
</tr>
<tr>
<td>¼ cup fruit cocktail</td>
<td>0g</td>
<td>30</td>
</tr>
<tr>
<td>1 oz chicken</td>
<td>8g</td>
<td>43</td>
</tr>
<tr>
<td>2 T mashed potatoes</td>
<td>.6g</td>
<td>32</td>
</tr>
<tr>
<td>½ cup jello</td>
<td>1g</td>
<td>10</td>
</tr>
<tr>
<td>Plain hot tea</td>
<td>0g</td>
<td>5</td>
</tr>
</tbody>
</table>

17.6g Protein 469 kcal

The patients 24-hour recall shows she is not consuming enough calories. Her total Energy Expenditure is about 1900 kcal and only consumed estimated 24% of what is recommended. She needs higher protein intake of about 81.75 grams.

18. What common side effects of her illness may affect her dietary intake and
subsequently her nutritional status?
Chemotherapy side effects will affect her dietary intake extremely. The most common side effects of chemotherapy are nausea and vomiting which will affect her nutritional intake. In addition, diarrhea, mouth sores and fatigue are common from low red blood cell counts.

19. What physical symptom(s) is this patient experiencing that might affect her dietary intake?
The patient is experiencing decreased appetite and her throat is slightly dry mucous membranes. Her present nutritional state may get worse if a treatment is not planned. Dry mucous membrane may cause continuing cough that may affect the throat and difficulties with swallowing.

20. From the information gathered within the intake domain, list possible nutrition problems using the diagnostic term.
• Inadequate protein-energy intake
• Inadequate fat intake
• Inadequate protein intake
• Inadequate carbohydrate intake.

21. Which labs can be used to assess protein status?
Visceral protein is assessed by serum proteins, albumin transferring, prealbumin, retinol binding protein, and fibronectin.

a. Which labs will reflect acute changes in protein status versus chronic changes? Why?
Acute changes in protein status are reflected by prealbumin, transferrin, retinol binding protein, and fibronectin levels. These serum proteins have a shorter half-life than albumin and are more responsive to acute changes. Albumin has a half-life of 17-21 days and is often a good indicator of chronic changes.

b. Which are available for this patient? Considering her diagnosis, which labs would not be appropriate to use to evaluate protein status?
Total protein and albumin levels are available, indicating low protein levels. Fibronectin levels would not be appropriate.

c. Determine the nutritional risk associated with this patient’s laboratory value. Would you request any additional nutrition assessment labs?
• MCV is low- may indicate iron deficiency
• RETIC is high- chronic disease
• HGB is low- the chronic disease state
• HCT is low- may be due to dehydration
• WBC is high- disease fighting
• MCHC is low- possible anemia
• Ferritin is high- possible iron deficiency
Additional lab values for prealbumin and transferrin levels would be appropriate to differentiate short-term protein status. C-Reactive Protein levels should also be looked at to show levels of inflammation when more intensive nutrition therapy is beneficial.

25. Select two high-priority nutrition problems and complete the PES statement.
1. Inadequate oral food intake related to decreased appetite and fatigue as evidence by 24-hour recall, recent weight loss of 10 pounds, and overall appearance.
2. Involuntary weigh loss related to inadequate energy intake as evidence by recent weight loss of 20 pounds, and 24-hour recall.

26. For each of the PES statements that you have written, establish an ideal goal (based on the signs and symptoms) and an appropriate intervention (based on etiology).

1. Goal: Increase food intake through nutrition therapy to improve nutritional status. Intervention: Modify food intake to four small feeding of 300 calories; increase nutrient density; provide evidence-based information regarding nutritional needs during treatment for lymphoma and proper food choices.
2. Goal: Prevent additional weight loss and ensure adequate energy intake. Intervention: Ensure high calorie, high protein supplement