Case 6 – Hypertension and Cardiovascular Disease

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Instructions: This is not a group case study; it is an individual assignment! Complete the following questions using the background information of Case 6 (pages 63-69). Use this as a template and type in your answers.

Remember RD’s are experts in researching evidence-based practice for their patients so you can use other credible sources. ***Be sure to reference your answers and provide a Work Cited page at the end.***

I. Understanding the Disease and Pathophysiology

1. **Dr. Thornton indicated in his admitting note that he will “rule out metabolic syndrome.” What is metabolic syndrome?**

   Metabolic syndrome is a group of risk factors that occur together and increase the risk for coronary heart disease, stroke and type II diabetes. These factors are usually the result of obesity and a sedentary lifestyle. Risk factors include hypertension, abdominal obesity, high triglyceride levels and low HDL levels.

2. **What factors found in the medical and social history are pertinent for determining Mrs. Anderson’s CHD risk category?**

   **Medical history**
   - HTN (stage 2) 1 year ago, high blood pressure (160/100)
   - Mother died from MI due to uncontrolled HTN
   - High Cholesterol (270mg/dL)
   - Low HDL (30mg/dL)

   **Social history**
   - Walking program
   - Smoker
   - Housewife (doesn’t leave the house often)
   - Drinks alcohol

II. Understanding the Nutrition Therapy

3. **What are the most recent recommendations for nutrition therapy in hypertension? Explain the history of and rationale for the DASH diet.**

   The DASH (Dietary Approaches to Stop Hypertension) diet is a recent recommendation for nutrition therapy in hypertension, eat unsaturated fats, avoid saturated fats, get whole grains, fruits and vegetables, skim milk, low sodium meats and avoid alcohol.

   The first DASH study was done in 1993 and none of the diet plans that were studied were vegetarian diets. The DASH diets did incorporate similar foods that vegetarians eat such as fruits, vegetables, nuts and beans. The food groups that were incorporated into the DASH diet help to promote lower levels of cholesterol (LDL in particular), which results in lower blood pressure.

4. **What are the Therapeutic Lifestyle Changes? Outline the components of the nutrition therapy interventions.**

   Therapeutic lifestyle changes include diet, exercise and weight loss in an effort to lower LDL cholesterol and prevent the development of atherosclerosis. The main components are low saturated fat diet (<7% total kcal), low trans fat (<1% total kcal), increasing fiber (10-25g/day), limit sodium intake (<2500mg)/day) regular exercise, losing 5-10 # and quit smoking if applicable.
5. **What is the rationale for the use of plant stanols/sterols and list some products that you may recommend?**

Plant stanols/sterols prevent the absorption of dietary cholesterol into the bloodstream. This is due to plant sterol components that are similar to cholesterol. This reduces the total amount of cholesterol the body absorbs, which helps to reduce blood pressure.

Enriched margarines/butters, breads, cereals, yogurts are some products where plant stanols/sterols can be found.

### III. Nutrition Assessment

#### A. Evaluation of Weight/Body Composition

6. **Calculate Mrs. Anderson’s body mass index (BMI). What are the health implications of this number?**

\[
\frac{160}{2.2} = 72.72
\]

\[
(66 \times 0.0254)^2 = 2.81
\]

\[
\frac{72.72}{2.81} = 25.88 \text{ (considered overweight)}
\]

Mrs. Anderson is considered to be overweight, but it’s not significantly high. It does suggest that she’s headed in the wrong direction health-wise and could eventually lead to obesity and the development of cardiovascular disease.

#### B. Calculation of Nutrient Requirements

7. **Calculate Mrs. Anderson’s resting and total energy needs. Identify the formula/calculation method you used and explain your rationale for using it. (HINT: which formula is the most accurate?)**

**Mifflin St. Jeor Equation**

\[
10 \times 72.72 + 6.25 \times 167.64 - 5 \times 54 - 161 = 1343.95 \times 1.4 = 1881.53 \text{ (TEE)}
\]

AF = 1.4

IF = N/A

I calculated Mrs. Anderson’s resting and total energy needs using the Mifflin St. Jeor equation. After calculating the REE (1343.95kcal), I multiplied it by an activity factor 1.4 since she walks 4-5 times a week for 30 minutes so her TEE came out to 1881.53kcal.

#### C. Intake Domain

8. **Using a computer dietary analysis program or food composition table, compare Mrs. Anderson’s “usual” dietary intake to her prescribed diet (DASH/TLC diet).**

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>PATIENT INTAKE</th>
<th>Prescribed diet</th>
<th>DISEASE IMPLICATIONS based on diet comparison</th>
<th>Your diet recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>kcal</td>
<td>3410.24</td>
<td>1781</td>
<td>Weight gain can lead to obesity, resulting in possible hypertension, cardiovascular disease, etc.</td>
<td>Decrease calorie intake to lower the risk of developing hypertension, cardiovascular disease, etc.</td>
</tr>
<tr>
<td>% kcal Pro</td>
<td>11.2%</td>
<td>15%</td>
<td>Anemia can develop from inadequate intake and excessive protein intake can cause calcium loss</td>
<td>Eat lean meats and legumes</td>
</tr>
<tr>
<td>% kcal CHO</td>
<td>48.6%</td>
<td>55%</td>
<td>Excessive intake of refined CHO can cause high triglycerides</td>
<td>Consume whole grains and wheat products</td>
</tr>
<tr>
<td>% kcal Fat</td>
<td>37.5%</td>
<td>25-30%</td>
<td>SFA can cause high cholesterol levels and increase CVD, but MUFA and PUFA can cause the reverse effects</td>
<td>Consume nuts, oils and other foods that contain MUFA and PUFA</td>
</tr>
<tr>
<td>%SFA</td>
<td>30.8%</td>
<td>&lt;7%</td>
<td>Can lead to high cholesterol and LDL levels which can result in developing CVD</td>
<td>Consume less processed foods and increase stanol/sterol intake</td>
</tr>
<tr>
<td>%MUFA</td>
<td>2.8%</td>
<td>≥8%</td>
<td>MUFA can reverse the risk for atherosclerosis and CVD</td>
<td>Consume plant oils, avocados and nuts</td>
</tr>
<tr>
<td>%PUFA</td>
<td>3.7%</td>
<td>≥2%</td>
<td>PUFA can also reverse the risk for atherosclerosis and CVD</td>
<td>Consume fish, oils and nuts</td>
</tr>
</tbody>
</table>
9. From the information gathered within the intake domain, list possible nutrition problems using the diagnostic term.
Excessive Energy Intake, Excessive Oral Intake, Excessive Fat Intake, Less than Optimal Intake of Types of Fats (Mono & Poly unsaturated fats), Inadequate Protein Intake, Inadequate Carbohydrate Intake, Inadequate Mineral Intake (Ca), Excessive Mineral Intake (Na), Inadequate Vitamin Intake (K).

D. Clinical Domain

10. Dr. Thornton ordered the following labs: fasting glucose, cholesterol, triglycerides, and creatinine. He also ordered an EKG. In the following table, outline the indication for these tests (tests provide information related to a disease or condition).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal Value</th>
<th>Patient's Value</th>
<th>Reason for Abnormality</th>
<th>Your diet recommendations based on results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>70-110</td>
<td>92</td>
<td>Normal</td>
<td>Keep glucose consumption the same to avoid spikes and deficits</td>
</tr>
<tr>
<td>BUN</td>
<td>8-18</td>
<td>20</td>
<td>Above Normal</td>
<td>Consume less protein dense foods</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.6-1.2</td>
<td>0.9</td>
<td>Normal</td>
<td>Stay well hydrated</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>120-199</td>
<td>270</td>
<td>Very High</td>
<td>Limit cholesterol intake, and increase fiber intake</td>
</tr>
<tr>
<td>HDL-cholesterol</td>
<td>&gt;55</td>
<td>30</td>
<td>Very Low</td>
<td>Decrease intake of simple sugars, but increase intake of PUFA</td>
</tr>
<tr>
<td>LDL-cholesterol</td>
<td>&lt;130</td>
<td>210</td>
<td>Very High</td>
<td>Limit intake of transfats and high cholesterol foods</td>
</tr>
<tr>
<td>Apo A</td>
<td>101-199</td>
<td>75</td>
<td>Very Low</td>
<td>Increase intake of PUFA</td>
</tr>
<tr>
<td>Apo B</td>
<td>60-126</td>
<td>140</td>
<td>High</td>
<td>Limit intake of high cholesterol foods</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>35-135</td>
<td>150</td>
<td>High</td>
<td>Limit intake of refined CHOs</td>
</tr>
</tbody>
</table>
11. Indicate the pharmacological differences among the antihypertensive agents listed below.

<table>
<thead>
<tr>
<th>Medications</th>
<th>Mechanism of Action</th>
<th>Potential food-drug interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>Flush excess water and Na</td>
<td>Can cause loss of K, Ca, Mg from body</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>Reduces nerve impulses to heart and blood vessels</td>
<td>Can lower blood pressure too much if taken without food</td>
</tr>
<tr>
<td>Calcium-channel blockers</td>
<td>Inhibits Ca absorption into muscles of heart causing them to relax</td>
<td>Grapefruit alters the way calcium-channel blockers are digested</td>
</tr>
<tr>
<td>ACE inhibitors</td>
<td>Relaxes blood vessels by inhibiting Angiotensin II production</td>
<td>Can increase the K levels in the body</td>
</tr>
<tr>
<td>Angiotensin II receptor blockers</td>
<td>Allows blood vessels to dilate</td>
<td>Salt substitutes contain K and can raise K too high, anti-inflammatories can lower the effect of Angiotensin II receptor blockers</td>
</tr>
<tr>
<td>Alpha-adrenergic blockers</td>
<td>Relaxes heart beat and muscles, which reduces blood pressure</td>
<td>Clonidine can counteract Alpha-adrenergic blockers and other antihypertensive medications can have an added effect if taken with Alpha-adrenergic blockers</td>
</tr>
</tbody>
</table>

12. What are the most common nutritional implications of taking hydrochlorothiazide?

Hydrochlorothiazide is known for depleting potassium, sodium and chloride levels in the body which effects electrolyte balance.

13. Mrs. Anderson's physician has decided to prescribe an HMGCoA reductase inhibitor (Zocor). What changes can be expected in her lipid profile as a result of taking this medication?

Mrs. Anderson should see a drop in her cholesterol levels (particularly LDL). Since HMGCoA reductase inhibitor slows the synthesis of cholesterol her lipid profile should show improvement. Her LDL and triglyceride levels should decrease.

14. From the information gathered within the clinical domain, list possible nutrition problems using the diagnostic term.

Overweight, Food-Medication Interaction, Predicted Food-Medication Interaction

E. Behavioral–Environmental Domain

15. What are some possible barriers to compliance? Within this domain, list possible nutrition problems.

If Mrs. Anderson is unwilling to improve her knowledge on controlling her cholesterol levels, relying on the antihypertensive medications, or unwilling to change her eating habits, all can become barriers.

Food-and nutrition-related Knowledge Deficit, Not Ready for diet/lifestyle change, Limited adherence to Nutrition-related Recommendations and Undesirable food choices can lead to malnurishment or excessive intake.

IV. Nutrition Diagnosis

16. Select two KEY nutrition problems and complete the PES statement for each.

Overweight related to excessive energy intake as evidenced by BMI of 25.88 and 3400kcal daily intake

Excessive fat intake related to food- and nutrition- related knowledge deficit concerning appropriate amount of dietary fat as evidenced by 37.5% of kcals from dietary fat and 150 triglyceride level.

V. Nutrition Intervention

17. When you ask Mrs. Anderson how much weight she would like to lose, she tells you she would like to weigh 125, which is what she weighed most of her adult life. Is this reasonable? What would you suggest as a goal for weight loss for Mrs. Anderson?
100# + 60" + 5# per inch over 5'

According to the Hamwi equation her ideal body weight is close to her desired weight

\[ 100 + 5(6) = 130\# \]

Her BMI, if she weighed 125# would be 20.2, so her desire to weight 125# is reasonable

18. How quickly should Mrs. Anderson lose this weight?
   Mrs. Anderson should try to reach her goal weight within 6 months. In order to accomplish this she should lose about 1-2 # per week.

19. Write Nutrition Prescription for patient. Include Diet type, kcal level, % kcal from CHO, PRO, FAT, Saturated fat, cholesterol, Na.
   Recommend the DASH diet (1781kcal, 67g Pro, 245g CHO, 55g Fat, <4.4g Sat. Fat, <200mg Cholesterol, 1500-2300mg)

20. 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 the etiology). Use IDNT manual to label Intervention domains and subclasses; and give details of exactly what you are going to do.

   PES #1
     o Goal: BMI <25, 1781kcal daily intake
     o Intervention: Instruct/train the patient about the DASH diet and its components to increase their knowledge

   PES #2
     o Goal: <30% of kcal dietary fat intake and <135 triglycerides
     o Intervention: Instruct/train the patient about applying the education of the DASH diet to practical use

VI. Nutrition Monitoring and Evaluation

21. Evaluate Mrs. Anderson’s labs at 3 months and then at 6 months. Have the biochemical goals been met with the current regimen?
   Most lab values have met their goals, but a few like cholesterol and LDL are still a little high, but they are lower from the 3 month to the 6 month lab work. There are also exceptions like BUN which increased from the 3 to 6 month lab work where the level went higher than the normal range.

22. Write a concise ADIME note by pulling the key components from you answers. Consider the admission data only (not the 3 and 6 month data). Hand in a double spaced typed version only.