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Nutrition Therapy II: 3246:11692

CASE 13: TYPE 2 DIABETES IN AN ELDERLY MAN

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1. What is his IBW, % IBW, and BMI? Estimate caloric requirements to promote an optimal weight.

\[ \text{Wt.}: 220 \text{ lbs.} = 100 \text{ kg} \quad \text{Ht.}: 6'2'' = 74 \text{ in.} = 187.96 \text{ cm} = 1.8796 \text{ m} \]

\[ \text{IBW}: 106 + (6 \times 12) + 2 = 190 \text{ lbs.} \]

\[ \text{%IBW}: \frac{220}{190} \times 100 = 115.79\% \]

\[ \text{BMI}: \frac{100}{(1.8796)^2} = 28.31 \]

**Caloric Requirements:**

\[ \text{TEE} = 1086 - 10.1 \times \text{Age (yr)} + \text{PA} \times (13.7 \times \text{Weight [kg]} + 416 \times \text{Height [m]}) \]

\[ \text{TEE}=1085 - 10.1 \times 73 + 1 \times (13.7 \times 100 \text{kg} + 416 \times 1.88 \text{ m}) = 2,499.78 = 2,500 \text{ kcal} \]

For this patient to lose weight in a healthy manner we will take away 500 kcal daily to try and achieve \( \frac{1}{2} \) to 1 pound of weight loss weekly = 2,000 kcal daily.

2. Suggest an appropriate diet for him. What percent of his diet should come from carbohydrate? How many grams of carbohydrate should he have in a day? How should the carbohydrate be spread out over the day?

An appropriate diet for Mr. Jones is a 2,000 kcal diabetic diet that is still a heart healthy diet. The percent of his diet that should come from carbohydrates is 50% which is 2,000 \( \times \) .50 = 1,000 kcal form CHO; which is 1,000 kcal/4 kcal= **250 gram of CHO.** 250 grams/ 15 gram per serving= **17 servings per 24 hours.** He should consume his serving of CHO: 6 CHO for breakfast, 4 CHO for lunch, 5 CHO for dinner, 2 CHO for HS snack.

3. How does his current intake compare to his needs? Analyze his current intake and show your work. Approximately how many grams of carbohydrate is he currently consuming at each meal and snack? How do you think his low-fat diet has influenced his carbohydrate intake?

The patient is taking in roughly 2,300 kcal daily according to his food recall. This patient is not consuming enough dairy and vegetables which can be one area to build goals. I think the patient’s low-fat diet has influenced him to intake more carbohydrates so that he stays away from lipids. With doing so he has kept his serum cholesterol levels down. Since, this patient does have CVD he needs to stay on a low-fat diet that can work with his diabetic diet.  

<table>
<thead>
<tr>
<th>Meal</th>
<th>Grains</th>
<th>Fruits</th>
<th>Vegetables</th>
<th>Dairy</th>
<th>Protein</th>
<th>Fats/Sugars</th>
<th>CHO Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>2 oz. cereal (¼ c.)</td>
<td>1 c. cranberry juice (2 CHO)</td>
<td>1 slice of lettuce (1 CHO)</td>
<td>1 c. nonfat milk (1 CHO)</td>
<td>3 oz. turkey</td>
<td>8.5 CHO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5CHO)</td>
<td>2 slices rye toast (2CHO)</td>
<td>1 slice of tomato ¼ sliced</td>
<td>2 tbsp. RF mayo</td>
<td>1 tbs. honey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td>2 slices white bread (2 CHO)</td>
<td>1 piece fresh fruit (1 CHO)</td>
<td>1 slice of tomato</td>
<td>2 slices of turkey (1 CHO)</td>
<td>1 tbs. honey</td>
<td>4 CHO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1 CHO)</td>
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</tbody>
</table>
4. How do hemoglobin A1C levels correlate with blood sugar (mean plasma glucose) levels? Calculate his estimated average glucose based on his hemoglobin A1c levels. What factor(s) in his diet might be leading to his inability to further reduce his hemoglobin A1c, and what can you do to help him?

Hemoglobin and other proteins in the bloodstream come in contact with glucose and they slowly attach together in a non-enzymatic and concentration-dependent form. Therefore the measurement reflects the weighted mean plasma glucose levels over earlier weeks. Hemoglobin A1C levels are used as diagnostic criteria for the diagnosis of diabetes mellitus, once the initial value is confirmed by a second Hemoglobin A1C of 6.5% or greater they can confirm the diagnosis.

The patient has a 7.8% Hemoglobin A1C. According to his lab value his average glucose is calculated to 177.2 mg/dL.

His diet has a higher amount of CHO than he needs and these CHO he is eating are high on the glycemic index which can be causing his glucose to rise quicker and drop rapid which might be leading to his inability to further reduce his hemoglobin. He should be consuming 250 g CHO daily which is 17 servings. According to his food recall he is consuming a large amount of his CHO for breakfast and slowly less and less. This can be causing him to glucose levels to spike and drop. Some ways to help him would be to consume 6 CHO for breakfast which could be similar to his breakfast now. His lunch should have 4 CHO but they should be higher on the glycemic index and include more vegetables. For dinner he needs to consume 5 CHO and include more vegetables. Another way could be to eat fruit instead of drink juice. With eating the fruit he will be getting more fiber and other micronutrients.  

5. Explain the pathophysiology of type 2 diabetes. What risk factors does this client have for developing this condition?

<table>
<thead>
<tr>
<th></th>
<th>avocado</th>
<th>bacon</th>
<th>(1 CHO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinner</td>
<td>⅓ c. white rice (1 CHO)</td>
<td>⅓ c. cooked green beans</td>
<td>6 oz. fish</td>
</tr>
<tr>
<td></td>
<td>1 oz. Roll (1 CHO)</td>
<td>½ c. Green Salad</td>
<td>2 tbs. olive oil &amp; 1 tbs. vinegar</td>
</tr>
<tr>
<td>Snacks</td>
<td>2 fig newton’s (1 CHO)</td>
<td>⅓ c. apple cider (1 CHO)</td>
<td>6 oz. nonfat vanilla yogurt (1 CHO)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8 oz.</td>
<td>3 ½ c.</td>
<td>1 ⅔ c.</td>
</tr>
</tbody>
</table>
Type 2 DM is a progressive disease and there might not be classic symptoms right away, which means this disease can go untreated for months. Type 2 DM is a combination of insulin resistance and beta cell failure.

This patient’s has quite a few risk factors for developing type 2 DM. The patient has a BMI greater than 25, he is physically inactive, he is of an ethnic group, family history of type 2DM, he has hypertension and a history of coronary disease, and is hemoglobin A1C is greater than 6.8%. After looking at all of the evidence I would agree with the diagnosis that this patient is full classified as having type 2 DM.\textsuperscript{1, 2, 3}

6. What are the complications of type 2 diabetes? Which complications is he already experiencing? How can the dietitian assist in the management of type 2 diabetes and its associated problems?

There are many complications related to type 2 DM. They are classified as acute and long-term.

Acute:
- hypo/ hyperglycemia
- diabetic ketoacidosis

Long-term:
- complications of hyperglycemia
  - Micro and Macro-vascular complication
    - Retinopathy- Acute damage to the retina
    - Nephropathy- Kidney disease caused by diabetes
    - Neuropathy- Nerve damage caused by chronic high levels of glucose in the blood
    - CVD- coexistence with hypertension & dyslipidemia

This patient is already experiencing hypertension, retinopathy, and neuropathy in his left foot. He also has a high postprandial glucose level this can be seen in his mid-morning finger stick; 223mg/dL.

A dietitian can assist in the management of type 2 DM through nutrition education on CHO counting and using the exchange list. Through educating the patient he will learn the importance of keeping track of what time he ate CHO and how much CHO he ate to keep count. If the patient to stays consistence with this he can improve his glycemic control, which means he can lower his doses of medications that help control his glucose levels.\textsuperscript{1, 2, 3}

7. Make a chart of common classes of oral medications for type 2 diabetes and how they are intended to work. Which ones is this client taking?

<table>
<thead>
<tr>
<th>Oral Medications</th>
<th>How They Work</th>
<th>Side Effects</th>
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<tbody>
<tr>
<td>Biguanides: -Metformin (Glucophage)</td>
<td>Biguanides lower blood glucose levels primarily by suppressing the amount of glucose produced by the liver.</td>
<td>Small weight loss, gastrointestinal side effects that often diminish with time. A rare side effect is lactic acidosis – which usually occurs with excessive alcohol intake – this can be fatal.</td>
</tr>
<tr>
<td>Sulfonylureas: -Chlorpropamide (Diabinese)</td>
<td>Stimulates the beta cells of the pancreas to promote the release of more insulin.</td>
<td>Occasionally, chlorpropamide, and other sulfonylureas, can interact with alcohol to cause vomiting, flushing, or sickness.</td>
</tr>
<tr>
<td>Meglitinides</td>
<td>stimulate the beta cells to</td>
<td>Weight gain, potential</td>
</tr>
</tbody>
</table>
| **Thiazolidinediones**  
<table>
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<tbody>
<tr>
<td><strong>-Rosiglitazone (Avandia) and pioglitazone (ACTOS)</strong></td>
<td>These drugs help insulin work by decreasing insulin resistance in the muscles, tissues and fat. Also, they reduce glucose production in the liver.</td>
<td>Weight gain and edema. TZDs increase the risk for heart failure in some individuals</td>
</tr>
</tbody>
</table>

| **Alpha-glucosidase inhibitors**  
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<tbody>
<tr>
<td><strong>-Acarbose (Precose) and meglitol (Glyset)</strong></td>
<td>These drugs help the body to lower blood glucose levels by inhibiting enzymes in the small intestine to digest starches, such as bread, potatoes, and pasta. They also slow the breakdown of some sugars, such as table sugar. This delays carbohydrate absorption and lowers postprandial blood glucose.</td>
<td>Flatulence, diarrhea, cramping, abdominal pain, weight gain.</td>
</tr>
</tbody>
</table>

| **DPP-4 inhibitors**  
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<tbody>
<tr>
<td><strong>-Januvia</strong></td>
<td>Help improve A1C without causing hypoglycemia. They work by preventing the breakdown of a naturally occurring compound in the body, GLP-1. GLP-1 reduces blood glucose levels in the body, but is broken down very quickly so it does not work well when injected as a drug itself.</td>
<td>Weight gain and tend to have a neutral or positive effect on cholesterol levels.</td>
</tr>
</tbody>
</table>

The patient is taking ACTOS plus met. This oral medication is classified as a Thiazolidinedione, which helps insulin work better in the muscle and fat. TZD’s; help with T2DM by reducing glucose production in the liver. He is also taking Januvia which is a DPP-4 Inhibitor. Januvia prevents the breakdown of naturally occurring compound GLP-1.  

**8. Identify an appropriate nutrition diagnosis and write a PES statement based on the available nutritional assessment data.**

P: Inconsistent CHO intake  
E: Nutrition knowledge scarce  
S: Diet Recall; lab values

Inconsistent CHO intake related to inconsistent timing of meals is evidenced by wide fluctuation in blood glucose levels.  

**9. What are your goals for this client? How will you help him to achieve those goals, and what outcome measure(s) will you monitor to see that your intervention is working?**
My goals for this client is to reduce his CHO intake to 17 servings a day that include more vegetables and whole grains that are evenly distributed throughout the day to have better glycemic control. Also I would like to have the patient get his hemoglobin A1C to 7% or less. Since the patient has motivation to make changes which is noted from his 30 pound weight loss after starting his lower fat diet; we can then implement increasing physical activity. Increasing his physical active which will help with; glycemic control, improve blood lipids and pressure, and improve coping and stress.

To help him achieve these goals I will have a follow up 6 weeks later where I will have him bring a food journal that he has been keeping track of the time and CHO intake and I will also like to have his hemoglobin A1C tested to see if it has decreased from 7.8%. Also I would take his weight. After collecting the data from his food journal and lab values I would go over everything with him making suggestions on where he should focus more CHO intake or physical active or if he should talk to his doctor about increasing or decreasing his medications.  

10. Write a note that documents your interaction with the patient using the SOAP or ADIME format.

**Assessment:** Patient was diagnosed with type 2 DM one year ago. Patient has history of coronary heart disease s/p angioplasty 5 yr. prior, hypertension, retinopathy, and left foot neuropathy. Patient physician referred him to registered dietitian due to persistently elevated hemoglobin A1c.

73 y.o., Male Dx: Type 2 DM
Ht. 6’2” Wt.: 220 lbs. IDW: 190 lbs.
TEE: 2,000 CHO: 250 g/d
Hgb A1C: 7.8%

**Diagnosis:** Patient has been diagnosed one year ago with type 2 DM; has hgb A1C 7.8%, glucose (mid-morning finger stick) 223mg/dL, blood pressure: 130/80 mm Hg.

Inconsistence CHO intake according to food recall concludes patient does not have adequate education on diet management for type 2 DM.

**Intervention:**

1. Nutrition counseling and education for both him and his wife. Since the wife does the cooking and shopping she needs to be educated as well to help manage his type 2 DM. Education for both of them will be on CHO counting and how to use the exchange list. Also counsel on the important of vegetables and fruit. Also talk about the different types of CHO such as simple and complex. Ex: Fruits and vegetables are CHO and they are full of vitamins, minerals and fiber which are good for you.

2. Explain the importance of evenly distributing CHO intake throughout the day and why CHO counting will help him stay in better glycemic control. Have him start a food journal of time and CHO intake to help him evenly distribute throughout the day.

3. Explain why increasing physical active will help with glycemic control, improve lipid and blood pressure, help with neuropathy in his left foot and help coping and stress.

4. Patients should also increase his dairy intake since he is not in taking enough.

**Monitoring & Evaluation:**

1. Requesting a follow up visit in 6 weeks
2. check his Hgb A1C levels, other follow up lab values, and weight; these measurement will help to see if the goals set in place are being met
3. Have patient bring food journal to see CHO intake and times of intake, and answer any questions or concerns towards diet change
4. If patient is meeting all goals and is complaint with CHO counting and exchange list have a few more follow up visit to ensure motivation and success.
References: