Case Study 3: Y.L.

Scenario

Y.L. makes an appointment to come to the clinic where you are employed. She has been complaining of chronic fatigue, increased thirst, constantly being hungry, and frequent urination. She denies any pain, burning, or low back pain on urination. She tells you she has a vaginal yeast infection that she has treated numerous times with OTC (over-the-counter) medication. She admits to starting smoking since going back to work full time as a clerk in a loan company. She also complains of having difficulty reading numbers and reports making frequent mistakes. She says by the time she gets home and makes supper for her family, then puts her child to bed, she is too tired to exercise. She reports feet hurt; they often "burn or feel like there are pins in them." She reports that after her delivery, she went back to her traditional eating pattern which you know is high in carbohydrates.

In reviewing Y.L.'s chart, you notice she has not been seen since the delivery of her child 6 years ago. She has gained a considerable amount of weight; her current weight is 173 lb. Today her BP is 152/97 mm Hg and her plasma glucose is 291 mg/dL. The PCP (primary care provider) orders the following labs: UA, HbA1c (hemoglobin A1c), fasting CMP, CBC, fasting lipid profile, and a baseline 24-hour urine collection to assess Creatinine clearance. The lab values are as follows: fasting glucose 184 mg/dL, A1c 10.4, UA +glucose, -ketones, cholesterol 256 mg/dL, triglycerides 346 mg/dL, LDL (low-density lipids) 155 mg/dL, HDL (high-density lipids) 32 mg/dL, ratio 8.0. Y.L. is diagnosed with type 2 diabetes.

After meeting with Y.L. and discussing management therapies, the PCP decides to start MDI (multiple dose injection) insulin therapy and have the patient count carbohydrates. Y.L. is scheduled for education classes and is to work with the diabetes team to get her blood sugar under control.

1. **Identify the three methods used to diagnose DM.**
    a. A fasting BG is one of the methods used to consider diagnosing a patient with DM. The individual cannot have any caloric intake for a least 8 hours before. If their results is higher than 126 it can be thought that the person has diabetes. Additionally, if each time they do this test their results are increasing, it is time to start moving to the next step, which would be ordering and HbA1C to confidently diagnose them with DM.
    b. Obtaining a HbA1C is the gold standard test to diagnose DM. The test takes an average BG over the last 2-3 months and gives a percentage of total blood. Anything below 6% is in normal, anywhere from 6-6.5% is considered pre diabetic, and anything above 6.5% is considered DM.
    c. Obtaining an OGTT is another method to diagnosing DM. This test is used for patients who are pregnant and have the chance of getting gestational diabetes. Before taking this test, the individual needs to have had no caloric intake for 8-12 hours. The test includes drinking a sugary substance (75g CHO), obtaining their BG an hour after, and another BG after two hours. If the last BG is over 200 that is considered diabetic.

2. **Identify three functions of insulin.**
    a. Insulin is released from the beta cells of the pancreas to lower glucose levels
    b. Helps with CHO and lipid metabolism
    c. Protein utilization

3. Insulin's main action is to lower blood sugar levels. Several hormones produced in the body inhibit the effects of insulin. Identify three.

- Glucagon
- Cortisol
- Epinephrine

4. Y.L. was stated on lispro (Humalog) and glargine (Lantus) insulin with carbohydrate counting. What is the most important point to make when teaching the patient about glargine?

- This medication is good for those who's sugar levels fluctuate often because it is a long acting insulin meaning there is so peak and will stay in the body for a long time. Therefore, I would inform the patient to take it at the same time everyday, usually at bedtime.

5. Because Y.L. has been on regular insulin in the past, you want to make sure she understands the difference between regular and lispro. What is the most significant difference between these two insulins?

- Regular insulin is a slower acting insulin like Humulin or Novolin, while Lispro is a rapid acting insulin. Due to the fact that Lispro is a rapid acting insulin, that means it offers faster subcutaneous absorption and an earlier and greater peak. Therefore, it is crucial to administer Lispro with a meal or to at least eat within 15 minutes. Lastly, regular insulin can be given after eating so it can help control their BG of not getting so high.

6. What is the peak time and duration for lispro insulin?

- Peak: 30-90 min
- Duration: 3-5 hours

7. Y.L. wants to know why she can't take NPH and regular insulin. She is more familiar with them and has taken them in the past. Explain why the provider chose lispro and glargine insulin over NPH and regular insulin?

The provider possibly chose a rapid acting and a long acting to prevent hypoglycemia. When the long acting insulin is in its onset stage, the short acting will have mostly left the body, therefore they won't meet at same time and create a hypoglycemic episode. Furthermore, if the patient were to take NPH and regular insulin, they would cross at a bad time where the insulin blood level would be decreasing with the regular insulin, while the NPH would be at its peak. Overall, the lispro and glargine would be easier to admisnter and monitor at home.