Case Study Responses

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Note: Readers are encouraged to visit www.InsulinJournal.com to review the details of a Case Study published in the January 2008 issue of *Insulin*.

This was the case of a 50-year-old white man with type 2 diabetes mellitus who was being treated with Humulin® 70/30 (Eli Lilly and Company, Indianapolis, Indiana) 10 units BID and metformin (Glucophage®; Bristol-Myers Squibb Company, Princeton, New Jersey) 500 mg TID. The patient decided to seek another endocrinologist's opinion and was referred by his primary care physician.

Question 1. **What is the cause of the discrepancy between the patient's self-monitored blood glucose readings and his glycosylated hemoglobin (A1C) level?**
Answer: **d. Improper meter use.**

The patient's blood was tested using his own blood glucose meter and our point-of-care blood glucose meter. Results were 235 and 105 mg/dL, respectively. Examination of his canister of blood glucose strips revealed that the strips had expired >2 years ago. Although several technological advances in blood glucose meters have decreased operator error, studies have reported that 16% of people who perform self-monitoring of blood glucose have used the meter incorrectly.[1]

The National Steering Committee for Quality Assurance in Capillary Blood Glucose Monitoring[2] proposed guidelines suggesting reassessment of patients 30 days and 6 months after being trained in blood glucose monitoring. Previous users of blood glucose monitors are to be reassessed annually.[3]

The patient did not have a blood transfusion in the past 3 months.

A few studies suggest that A1C levels may not reflect true glycemic control in patients with HIV.[4] In February 2007, the National Institutes of Health began recruiting patients with HIV and diabetes to determine whether A1C truly reflects plasma glucose levels.

Hemoglobin variant was not investigated, and hemoglobin electrophoresis was not ordered.

Question 2. **For this patient with an A1C of 5.3%, who tests infrequently, when is the optimal time for him to test his glucose level?**
Answer: **c. 2-Hour postmeal.**

As the A1C level decreases toward the normal range, postprandial blood sugars contribute to 70% of the A1C. Two-hour postmeal testing helps the individual to understand the impact of food on blood glucose and to assess the level of postmeal hypoglycemia.

Question 3. **What change in medication would you most likely make at this visit?**
Answer: **d. (b and c). Discontinue insulin and increase metformin from 500 mg TID to 1000 mg BID.**

Humulin 70/30 BID was making the patient "eat up to his insulin." After discontinuing the premixed insulin, the patient no longer felt hungry during mid-morning or at bedtime. He no longer required his 2 snacks, which allowed weight loss. Metformin was changed to a simpler dosing (BID instead of TID). Also, one must not forget to reinforce nonpharmacologic therapy (ie, lifestyle modifications), focusing on a healthy diet and physical activity.

Question 4. **What can be done to ensure that your patients are getting accurate readings from their glucose meters?**

First, make sure your patient's blood glucose meter is calibrated correctly. With each new batch of strips (except for those meters that require no coding), a code must be entered into the meter or a chip must be inserted. Be sure to check the expiration date on the strip package. Before using the strips for blood glucose testing, be sure your patient is applying control solution according to the manufacturer's directions. The solution usually is good for only 3 months after

opening. Remind the patient that the strips are to be stored in their original container and kept at room temperature. Before testing, hands must be washed with soap and water and dried completely. Observe your patient's technique to make sure they are using the meter correctly. If in doubt, send a venous blood specimen to the laboratory and compare that result with the patient's meter reading.

REFERENCES

1. Baum JM, Monhaut NM, Parker DR, Price CP. Improving the quality of self-monitoring blood glucose measurement: A study in reducing calibration errors. *Diabetes Technol Ther*. 2006;8:347–357.
2. The National Steering Committee for Quality Assurance in Capillary Blood Glucose Monitoring. Proposed strategies for reducing user error in capillary blood glucose monitoring. *Diabetes Care*. 1993;16:493–498.
3. Bergenstal R, Pearson J, Cembrowski GS, et al. Identifying variables associated with inaccurate self-monitoring of blood glucose: Proposed guidelines to improve accuracy. *Diabetes Educ*. 2000;26:981–989.
4. Diop ME, Bastard JP, Meunier N, et al. Inappropriately low glycated hemoglobin values and hemolysis in HIV-infected patients. *AIDS Res Hum Retroviruses*. 2006;22:1242–1247.

Readers are invited to consider a new Case Study (see page 111) and submit responses to www.InsulinJournal.com before the deadline.