

## Diabetes Mellitus: Review Questions

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### QUESTIONS

Choose the single best answer for each question.

- At his yearly physical examination, a previously healthy 55-year-old man has a fasting plasma glucose level of 130 mg/dL. Which of the following steps is most appropriate to confirm a diagnosis of diabetes mellitus?**
  - Determine the patient's hemoglobin A<sub>1c</sub> proportion
  - Determine the patient's postprandial plasma glucose level
  - Perform an oral glucose tolerance test
  - Repeat the fasting plasma glucose test at another time
  - Perform no further tests
- A man with known diabetes mellitus has a cholesterol level of 230 mg/dL, low-density lipoprotein level of 130 mg/dL, and triglyceride level of 200 mg/dL. His fasting plasma glucose level is 130 mg/dL, and his hemoglobin A<sub>1c</sub> proportion is 7.5%; he is taking glyburide 5 mg once daily. Which of the following is the next best step in treating this patient?**
  - Add metformin to his regimen
  - Increase his dose of glyburide
  - Recommend diet and exercise only
  - Start administering an antilipidemic agent
  - Switch his treatment to insulin therapy
- Which of the following is the most sensitive test for diagnosing diabetic nephropathy?**
  - Creatinine clearance measurement
  - Glucose tolerance measurement
  - Serum creatinine measurement
  - Ultrasonography of the kidneys
  - Urine albumin measurement
- Which of the following is the counterregulatory hormone first secreted in the acute response to hypoglycemia in a patient with a recent diagnosis of diabetes mellitus?**
  - A catecholamine
  - Cortisol
  - Glucagon
  - Growth hormone
  - Somatostatin
- Which of the following best describes the mechanism of action of pioglitazone and rosiglitazone in treating diabetes mellitus?**
  - Decreased production of glucose by the liver
  - Increased absorption of glucose by the intestine
  - Increased secretion of insulin by the pancreas
  - Increased sensitivity of peripheral tissues to insulin
- On physical examination, a 60-year-old African American woman with a 5-year history of diabetes mellitus has a blood pressure of 160/95 mm Hg. Renal function is mildly impaired, with a creatinine level of 1.2 mg/dL. Which of the following is the best treatment for this patient?**
  - Amlodipine administration
  - Atenolol administration
  - Captopril administration
  - Furosemide administration
  - Low-salt and low-protein diet

*(turn page for answers)*

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**EXPLANATION OF ANSWERS**

1. **(D) Repeat the fasting plasma glucose test at another time.** According to the new American Diabetes Association criteria for the diagnosis of diabetes mellitus, a patient is considered to have the disease when (1) the fasting plasma glucose level is at least 126 mg/dL on 2 separate occasions; (2) a random plasma glucose level is above 200 mg/dL (regardless of the elapsed time since the patient's last meal), and the patient has symptoms of diabetes mellitus (eg, polyuria, polydipsia); or (3) the 2-hour plasma glucose level during an oral glucose tolerance test is greater than or equal to 200 mg/dL.
2. **(D) Start administering an antilipidemic agent.** The patient seems to have good control of his diabetes mellitus; although an optimal plasma glucose level and hemoglobin A<sub>1c</sub> proportion are desirable, changing his current therapy at this point would not have an optimal effect on the lipid panel. According to the new guidelines of the National Cholesterol Education Program regarding adenosine triphosphate III, diabetes mellitus is regarded as a coronary heart disease risk equivalent, and the goals for lipid levels in patients with the disease should be a low-density lipoprotein level less than 100 mg/dL, a cholesterol level less than 200 mg/dL, and a triglyceride level less than 150 mg/dL.
3. **(E) Urine albumin measurement.** The most sensitive test for detecting diabetic nephropathy is a urine albumin test, which would reveal the presence of microalbuminuria. This finding appears much earlier than any change in creatinine level or any anatomic changes in the kidneys. The creatinine clearance can vary depending on the stage of diabetes mellitus, increasing in the first few years following diagnosis and decreasing progressively some years later. Although diseases other than diabetes mellitus can cause changes in the creatinine level or the anatomy of the kidneys, microalbuminuria is the most characteristic finding of diabetic nephropathy.
4. **(C) Glucagon.** Glucagon is the first counterregulatory hormone to be secreted in response to hypoglycemia, both in disease-free individuals and in those with a new diagnosis of diabetes mellitus. Catecholamines follow a few minutes after glucagon secretion, whereas growth hormone and cortisol will take hours to be secreted. In patients with chronic diabetes mellitus, the problem of hypoglycemia unawareness with absent glucagon response exists, causing the patients to be heavily dependent on catecholamines to help them recover from hypoglycemia. In patients with more severe chronic diabetes, catecholamines also fail to respond, which explains why those patients need more time to recover from hypoglycemia and can present with more severe symptoms. Somatostatin is not considered to be a counterregulatory hormone in response to hypoglycemia.
5. **(D) Increased sensitivity of peripheral tissues to insulin.** Pioglitazone and rosiglitazone are the newest insulin sensitizer medications approved by the US Food and Drug Administration. They are thiazolidinediones, a class of medications that reduce insulin resistance and increase insulin sensitivity in the peripheral tissues (eg, liver, muscle). Of the other classes of drugs used to treat diabetes mellitus, sulfonylureas are the pancreas secretagogues, biguanides (eg, metformin) diminish the hepatic gluconeogenesis, and the  $\alpha$ -glucosidase inhibitors (eg, acarbose) interfere with the intestinal absorption of carbohydrates.
6. **(C) Captopril administration.** Angiotensin-converting enzyme (ACE) inhibitors, such as captopril, are considered the treatment of choice for hypertension in patients with diabetes mellitus. Although this patient's high creatinine level is a cause for concern, it should not be considered a contraindication of captopril treatment. ACE inhibitors are the only category of medications proven, in several studies, to be protective for the kidneys of patients with diabetes. If renal function worsens and the ACE inhibitor needs to be discontinued, control of high blood pressure is most important, and any other category of medications can then be used. In the United Kingdom Prospective Diabetes Study, even  $\beta$ -blockers were considered to be an acceptable treatment for hypertension.

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