Combining Complex Pathophysiologic Concepts: Diabetes Mellitus

KEY TERMS

dawn phenomenon  
diabetes mellitus  
dernocrine pancreas  
exocrine pancreas  
hyperglycemia  
hyperketonemia  
hypoglycemia  
insulin  
intermittent claudication  
islets of Langerhans  
ketoacidosis  
Kussmaul respirations  
nephropathy  
neuropathy  
nocturia  
polydipsia  
polyphagia  
polyuria  
retinopathy  
Somogyi effect

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Chapter Review

1. An anabolic hormone required for the uptake of glucose by the many cells is called:
   a. Insulin
   b. Estrogen
   c. Alpha hormone
   d. Beta hormone

2. Todd is a diabetic. He often experiences hyperglycemia. This means:
   a. A decrease in blood glucose
   b. An increase in insulin production
   c. Reabsorption of glucose
   d. Significant elevation in blood glucose

3. Mary has diabetes. She has an absolute or significant deficit of insulin from the destruction of beta cells in the pancreas. Mary has:
   a. Hypoglycemia
   b. Type 3 diabetes
   c. Type 1 diabetes
   d. Type 2 diabetes

4. The three manifestations that are associated with diabetes include all of the following except:
   a. Polyglycemia
   b. Polydipsia
   c. Polyuria
   d. Polyphagia

5. The main goal of treatment for diabetes is to:
   a. Increase episodes of hypoglycemia
   b. Stabilize the blood sugar
   c. Stabilize the immune system
   d. Monitor for infection
6. Thomas, your friend, has been diagnosed with diabetes. He tells you that he has reduced tissue sensitivity to insulin. Thomas most likely has:
   a. Hypoglycemia
   b. Type 3 diabetes
   c. Type 1 diabetes
   d. Type 2 diabetes

7. In type 2 diabetes, the clinical manifestations are:
   a. Acute and nonspecific
   b. Insidious and nonspecific
   c. Acute in nature
   d. Insidious and specific

8. Initial treatment of type 2 diabetes in a patient with a blood sugar of 120 mg/dL will most likely include all of the following except:
   a. Immediate insulin therapy
   b. Diet modification
   c. Exercise
   d. Oral glycemic agents

9. Glucose intolerance that occurs during pregnancy is called:
   a. Glucose resistance
   b. Type 2 diabetes
   c. Type 1 diabetes
   d. Gestational diabetes

10. Mandy has hypoglycemia. You would expect to see all of the following clinical manifestations except:
    a. Hot, dry skin
    b. Pallor
    c. Cool, clammy skin
    d. Weakness

11. The above clinical manifestations that Mandy is experiencing are most likely a result of:
    a. The stress response
    b. Parasympathetic nervous system activation
    c. Sympathetic nervous system activation
    d. Neuronal deprivation of glucose
12. In a patient with type 1 diabetes, severe hyperglycemia (over 400 mg/dL) with deficient insulin can lead to:
   a. Increased production of insulin
   b. Clammy skin
   c. Diabetic ketoacidosis
   d. Weakness

13. During diabetic ketoacidosis, the individual will experience Kussmaul respirations. This occurs because:
   a. The alveoli have collapsed
   b. The body is trying to rid itself of excess acids
   c. There is a decrease in O₂ diffusion
   d. They are short of breath

14. The chronic complications that occur with diabetes are primarily related to:
   a. Episodes of hypoglycemia related to treatment
   b. The stress response
   c. The Somogyi effect
   d. Degenerative changes in the tissues caused by hyperglycemia

15. Karen develops the complication of neuropathy. Neuropathy is:
   a. Nerve degeneration resulting in delayed nerve conduction and impaired sensory function
   b. Shrinking of the nerve cells
   c. Malfunction of the dendrites
   d. Excessive stimulation of the nerve cells

**Case Study 18.1**

Tony is a 60-year-old obese male who has had type 2 diabetes for 15 years. Prior to his diagnosis, he led a sedentary lifestyle and did not eat a balanced diet. He has an uncle and a cousin with diabetes. His current treatment plan includes oral hypoglycemic medication, diet modification, and an exercise program. Tony has noticed that he is having increased vision problems and has to see his optometrist more frequently. Tony also noticed that the sore on his foot took a very long time to heal. His fasting blood sugar levels have been running 175 to 225 mg/dL over the past month.
1. Describe the alteration occurring within Tony’s body. What body processes are affected?

2. What is the most likely cause of Tony’s diabetes? How did it develop? What risk factors did Tony have?

3. What types of chronic complications occur with diabetes? What complications is Tony experiencing?

4. What clinical manifestations would you expect to see with type 2 diabetes? Relate these to Question 1.

5. Are the long-term complications of types 1, 2, and gestational diabetes the same? Why or why not?
Mechanisms of hyperglycemia and hyperketonemia. CNS, central nervous system.

- Insulin deficiency (and glucagon excess)
  - Decreased glucose uptake
    - Amino acids
      - Weight loss
      - Hunger
      - Polyphagia
  - Glycogen
    - Gluconeogenesis
      - Ketones
        - Fatty acids
        - Weight loss
        - Hunger
        - Polyphagia
    - Glycerol
  - Weight loss
  - Hunger
  - Polyphagia
  - Osmotic diuresis
  - CNS depression
    - Kussmaul respirations
    - Dehydration (polydipsia)
  - Kidney
  - Brain

Mechanisms of hyperglycemia and hyperketonemia. CNS, central nervous system.

Concept Map Exercise

Drawing on what you have learned and studied in Chapter 18, fill in the missing terms in the concept map below.