Diabetes Defined: Pathophysiology

LEARNING OBJECTIVES

1. Recognize the prevalence of diabetes mellitus;
2. Identify the differences between type 1 and type 2 diabetes;
3. Review the symptoms and risk factors for both type 1 and type 2 diabetes; and
4. Identify the role of genetics and family history in diabetes susceptibility.

Post-Test/Rationale:

1. Which of the following statistics related to diabetes prevalence is NOT accurate?

A. Type 2 diabetes is the most common etiology of diabetes and accounts for 90% to 95% of all cases of diabetes worldwide
B. The incidence of type 1 diabetes is decreasing around the world***
C. It is estimated that 86 million Americans, or 33% of people in the United States, have prediabetes
D. An estimated 27% of Americans over the age of 60 years have diabetes

Correct answer: B

Rationale (Objective #2): The incidence of type 1 diabetes is increasing by 3.2% each year. Reasons for this rise are unclear. The other statistics (choices A, C, and D) are true.

2. Which of the following statements pertaining to the clinical presentation of type 1 diabetes is TRUE?

A. Most children diagnosed with type 1 diabetes will present with diabetic ketoacidosis as an initial symptom
B. At the time of type 1 diabetes diagnosis, 80% to 90% of beta cells have already been destroyed***
C. All children will present with weight loss as a symptom at diagnosis
D. Type 1 diabetes is only diagnosed in children younger than 18 years of age

Correct answer: B

Rationale (Objective #1): Symptoms of type 1 diabetes typically do not occur until most (80% to 90%) of the pancreas’s beta cells are destroyed and early diagnosis is difficult. Choice A is incorrect because only 25% to 30% of children present with diabetic ketoacidosis at the time of diagnosis. Choice C is incorrect because the clinical presentation of type 1 diabetes varies tremendously among patients and, while
many patients present with weight loss, not all will. Choice D is incorrect because type 1 diabetes can be diagnosed at any age.

3. Mechanisms thought to contribute to the development of type 1 diabetes include all of the following, EXCEPT:
A. Immune-mediated pancreatic beta cell destruction
B. Progressive decline in insulin secretion
C. Insulin resistance***
D. Environmental factors
Correct answer: C

Rationale (Objective #1): Insulin resistance is a typical mechanism in type 2 diabetes, but it is not present in early type 1 diabetes. Answer choices A, C, and D are all characteristics of type 1 diabetes.

4. Which of the following patients has the greatest risk for developing type 1 diabetes?
A. A child that has autoantibodies in his blood that correlate to destruction of pancreatic beta cells***
B. An obese child of Native American descent
C. A 35-year-old man whose uncle has type 1 diabetes
D. A 65-year-old woman with hypertension
Correct answer: A

Rationale (Objective #4): People who have autoantibodies against pancreatic cells are at greater risk for developing type 1 diabetes than those who do not have the antibodies. Choices B and D denote risk factors for type 2 diabetes. Family history contributes to the risk of type 1 diabetes, but choice C characterizes a risk that is not related to immediate family, so the risk of diabetes would not be significantly increased for the 35-year-old man.

5. A slightly overweight 42-year-old male presents to the pharmacy after a health screening event with complaints of excessive thirst and lack of energy. His fasting blood sugar level was 129 mg/dl. He asks about taking vitamins to improve his energy level. Your best solution for this patient is to:
A. Point him to the vitamin aisle
B. Tell him it is probably the heat that made him feel this way
C. Refer him for a consultation with the pharmacist***
D. Tell him he has diabetes

Rationale (Objective #4): People who have autoantibodies against pancreatic cells are at greater risk for developing type 1 diabetes than those who do not have the antibodies. Choices B and D denote risk factors for type 2 diabetes. Family history contributes to the risk of type 1 diabetes, but choice C characterizes a risk that is not related to immediate family, so the risk of diabetes would not be significantly increased for the 35-year-old man.
6. Which of the following statements is correct regarding type 2 diabetes?

A. Type 2 diabetes does not tend to be linked to genetic risk factors
B. Type 2 diabetes is only diagnosed in adults
C. Patients diagnosed with type 2 diabetes are usually underweight
D. Type 2 diabetes rates are increasing among children in the United States***

Correct answer: D

Rationale (Objective #1): Type 2 diabetes rates are increasing for children in the United States, especially those of non-white Hispanic descent. Choices A, B, and C are false: type 2 diabetes can be diagnosed in children or adults and patients with the disease tend to be overweight; there are genetic components that affect the development of type 2 diabetes.

7. Which of the following risk factors is most closely correlated with the development of type 2 diabetes?

A. Central obesity***
B. Having Caucasian ancestry
C. Living farther away from the equator
D. Being exposed to an enterovirus

Correct answer: A

Rationale (Objective #3): Central obesity is a consistent risk factor for diabetes and is associated with insulin resistance, lack of activity, and other inflammatory mechanisms. Choices B, C, and D are all possible risk factors for type 1 diabetes.

8. Classic symptoms of type 2 diabetes include all of the following, EXCEPT:

A. Slower infection/wound healing process
B. Blurry vision or vision changes
C. Ketonuria***
D. Fatigue
Correct answer: C

*Rationale* (Objective # 1): The presence of ketonuria is a possibility for people with type 1 diabetes, but this symptom is usually not found in people with type 2 diabetes. Choices A, B, and D are all considered common symptoms of type 2 diabetes.

9. A child is diagnosed with type 1 diabetes at her primary care office. Her mother also has type 1 diabetes. Which of the following statements is accurate regarding this disease?

A. Eating too much sugar and other poor dietary habits likely caused the disease

B. The child is likely experiencing decreased thirst, decreased urination, and weight gain

C. Since the patient is a child, the honeymoon phase may last up to 10 years

D. The child was at increased risk for type 1 diabetes because her mother has the disease***

Correct answer: D

*Rationale* (Objective # 4): Although type 1 diabetes is not strongly tied to genetics, this child is at increased risk for type 1 diabetes because her mother has the disease. Choice A is an incorrect statement that is often believed by people with little knowledge of the disease. Choice B is incorrect because common symptoms of type 1 diabetes include increased thirst, increased urination, and weight loss. Choice C is incorrect because the duration of the honeymoon phase is variable but usually not longer than 1 year.

10. Which of the following is NOT accurate regarding the pathogenesis of type 2 diabetes?

A. Insulin resistance and a progressive decline in beta cell function are major mechanisms of the disease

B. Central obesity and Hispanic ethnicity increase the risk of the disease

C. Family history does not contribute to risk for diabetes***

D. Decreased beta cell function, increased insulin resistance, and increased hepatic glucose output occur early in the course of the disease

Correct answer: C

*Rationale* (Objective # 4): C is the correct answer because type 2 diabetes does appear to be strongly tied to genetics. Choices A, B, and D are all accurate statements pertaining to type 2 diabetes.