Solbion® presents

DISEASE Diary

Topic:

Prediabetes

SK+F

Case Presentation

Parents of a 12-year-old female patient are worried about her getting diabetes. They have noticed that her weight gain has increased over the last couple of years. Both parents have type 2 diabetes and they want to protect her from developing it too.

The patient has a past medical history of allergic rhinitis and obesity. She is not taking any regularly prescribed medications but does take loratadine as needed. There is no family history of autoimmunity.

On physical exam, she has a body mass index 85% above the ideal for her age and gender, blood pressure of 108/78 mmHg, respiratory rate of 16 breaths per minute, and a pulse of 94 beats per minute. She is not in acute distress and has no signs of insulin resistance other than truncal obesity. The rest of her exam is normal including her thyroid exam.

Today, her hemoglobin A1c (HbA1c) is 6.1% and her random glucose is 108 mg/dL.

Question 1. What type of diabetes does she most likely have based on the presentation so far?

1. Type 1 diabetes
2. Type 2 diabetes
3. Prediabetes
4. Monogenic diabetes/maturity-onset diabetes of youth
5. Secondary diabetes
6. Cannot be sure at this time

Question 2. What laboratory tests are needed to determine her diabetes type? Choose all options that apply.

1. Oral glucose tolerance test
2. C-peptide and glucose test
3. Glutamic acid decarboxylase (GAD) and islet cell autoantibodies
4. Lipid panel

Answer:
Question 1 - 3

Answer:
Question 2 - 1 & 4

Case discussion

The patient had prediabetes and ordered a fasting comprehensive profile, repeat HbA1c, lipid profile, and complete blood count. She had elevated transaminases (aspartate aminotransferase 56 U/L, alanine aminotransferase 49 U/L) and her triglycerides were high at 212 mg/dL and high-density lipoprotein was low at 32 mg/dL. She did not have iron deficiency, anemia, or hemoglobinopathy (summarized in the table).

Laboratory test	Result	Normal range/Interpretation
Total cholesterol, mg/dL	212	<200
High-density lipoprotein, mg/dL	34	>40
Low-density lipoprotein, mg/dL	119	<130
Triglycerides, mg/dL	300	<150
Aspartate aminotransferase, U/L	56	<40
Alanine aminotransferase, U/L	49	<40

At this point, the patient appeared to have prediabetes and metabolic syndrome. Her HbA1c was elevated in the prediabetes range and she had physical and laboratory signs that pointed to being on the type 2 diabetes spectrum. The patient's parents were aware of this and were trying to intervene. The family signed up for a healthy lifestyle program and it was very successful. Both parents were losing weight and their HbA1cs improved. The goal for the child was to grow into her weight. This was initially very successful and was a result of significantly increasing her dietary intake of fruits and vegetables, in addition to 1 hour of physical activity per day.

However, 9 months later, the patient started losing weight despite no increase in the intensity of her lifestyle changes. This progressed enough that she developed polyuria, polydipsia, and polyphagia (the "polys"), and experienced further weight loss. A test at home revealed that the patient's glucose had risen to 524 mg/dL and she was in mild diabetic ketoacidosis (DKA). The patient was admitted to the hospital and treated for DKA. After being stabilized, laboratory testing revealed that her C-peptide was low and autoantibodies associated with type 1 diabetes (GAD-65 and islet cell antibodies) were both positive.

She has now been diagnosed with type 1 diabetes, already having the diagnosis of prediabetes and metabolic syndrome. She has the genetics and phenotype of metabolic syndrome, but she has superimposed autoimmune type 1 diabetes. When a person has both insulin resistance and the genetics of insulin resistance, this is termed "double diabetes." This is a very difficult treatment challenge.

Treatment

Insulin is a necessity since she has type 1 diabetes. However, a person with double diabetes many need more insulin to obtain glucose control. While there is limited evidence supporting the use of insulin sensitizers in these patients, typically metformin or pioglitazone is used for the patients with double diabetes.