Heterozygous mutation in G6PC2 (glucose 6 phosphatase catalytic subunit 2) gene in a female patient with atypical diabetes characteristics; does this mutation explain clinic features or is just a polymorphism

Elif Özsu
Memorial Health Group, Department of Pediatric Endocrinology

Introduction

Some of the mutations that cause monogenic diabetes increase the susceptibility to Type 2 DM. Glycokinase is one of these. The activity of the GCK gene is regulated by G6PC2 (glucose 6 phosphatase catalytic subunit 2) in beta cells and by the GCK regulator protein in the liver. Variations in the GCK and G6PC2 genes may cause type 2 DM susceptibility by disrupting the relationship between them. A 10-year-old girl with a diabetes mellitus was presented for showing a rare mutation / variation in G6PC2 by genetic analysis.

Case

- She was first diagnosed with obesity at 9 years and 7 months in our clinic. Blood glucose was normal at that time. Her medical history was not remarkable. But there was a strong family history about diabetes.
- At the age of 10 years and 6 months, blood glucose was found 570 mg/dl coincidentally.
- In her physical examination weight was 54 kg (99%p) height was 146,7 cm (99% p) body mass index was 25 (98% p) and pubertal stage was 3.
- In her laboratuar examination; fasting blood glucose was 363 mg/dl, no acidosis and ketone was detected and insulin, c peptide and HbA1C level were 3,76 mu/ml, 1 ng/ml, 10% respectively. Fasting lipid, thyroid hormon and thyroid autoantybody levels were in normal range.
- Anti GAD was found 3 iu/ml(0-1)
- Patient were considered Type 1 diabetes, was began subcutaneous insulin therapy and on follow metformin was added because the patient had insulin resistance findings.
- Our patient had good blood glisemic control despite low dose of insulin requirement.
- At the end of 3 years because of insuline reserve, monogenic diabetes genes were studied for 23.
- A heterozygous potential pathological mutation in G6PC2 was detected.
- Although this mutation has been reported to be pathological, there is not enough data to explain clinical findings in our patient.

Discussion

G6PC2 gene is known as regulating fasting blood glucose and its mutation is prone to type 2 diabetes. Although our patient was treated as Type 1 diabetes, some patients can show the characteristics of all types of diabetes. So diabetes classification can be made more clearly with advanced genetic tests.