Lpl Gene Mutation and Polymorphism of Apoc2 and Apoc5 Genes in a Patient with Diabetes Mellitus Type 1

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Introduction: The rise of TG in patients with ketoacidosis is connected with the impairment or deficiency of apolipoprotein C2 (ApoC2), A5 (ApoA5) or lipoprotein lipase activity (LPL) – the enzyme strictly dependent on insulin. Insulin intensify expression of LPL.

Case Report: The authors present a case report of 2.5 years old boy in whom diabetes manifestation was connected with severe metabolic disorders: ketoacidosis and extreme hyperlipidaemia.

The child without any significant medical history, admitted due to the present features of dehydration and ketoacidosis connected with a newly diagnosed diabetes mellitus. The laboratory results were as follows: glucose 850 mg/dl, pH 7.27, Na 100.5 mmol/l, K 4.0 mmol/l, TG 13496 mg/dl, Ch 734 mg/dl. A milky serum caused the reliable results difficult to achieve. The child was referred to an intensive care unit after i. v. fluid administration. Insulin therapy and parenteral nourishment caused normalization of glucose levels and gradual normalization of metabolic status. On admission to endocrine unit: body weight 11 kg, normal gas analysis,HbA1C 11.6 %, Ch 337 mg/dl, TG 766 mg/dl, HDL 24 mg/dl. On abdominal ultrasound examination: the liver enlargement and its echogenicity increase – the picture of steatosis. Currently the only therapy for this patient is insulin. All control results are right.

Tab. 1 Serum levels of total cholesterol (TC) and triglyceride (TGA) in a patient during the therapy

	25.04.	25.04	26.04	26.04	26.04	27.04	28.04	13.05	01.09
TC	734	-	615	-	274	194	337	375	180
TGA	13493	7019	-	4025	1172	690	766	495	90

Genetic results: Molecular screening of gene mutation ApoB100 and LDRL gene has been negative.

Genetic analysis confirmed heterozygous mutation in exon 6 *LPL* gene and polymorphism of *APOC2* and *APOC5* genes.

The same mutation in *LPL* gene was found in the patient's mother.

Tab. 2 Other genetic screening especially in LPL and APOC2 and APOA5 gene were positive.

	genotyp	mutation	polymorphism variant 1	polymorphism variant 2
LPL	Mutation in exon 6	c.1018+34A>G heterozygote		
APOC2	Polymorphism in exon 1 and 2	-	rs2288912, C>G	rs2288911, T>G
APOA5	Polymorphism in exon 1 and 2	-	Rs662799, C>T*	RS3135506, C>G*

*) a polymorphism variant which can affect high serum levels of triglyceride

Summary: LPL gene mutation in our patient can diagnose hyperlipoproteine type I A.

Prevalence homozygote is 1: 1.000.000. Prevalence heterozygote is 1:500 and it's some kind of progressive disorder, which starts in childhood. Typical symptoms are: lipemia of retina, recurrent and severe acute pancreatitis, hepathosplenomegaly

CONCLUSIONS:

1. So escalated lipid disturbances in a young child with diabetes mellitus were not reported in medical literature so far. LPL deficiency or its lower activity, and deficit of apolipoproteine A5 (apoA5) essential to LPL activation constitute the main genetic reasons of a primary increase of triglycerides level.
2. Mutation of LPL gene is the reason of extreme severe hypertriglicerydemia in heterozygote with ketoacidosis
3. Insulinotherapy improves lipid disorders