Hypercholesterolemia in childhood: how the response to diet could lead to diagnosis. Lesson from a case-report.

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Introduction

Usually monogenetic primary hypercholesterolemia poorly responds to lipid-lowering diet and pharmacological therapy is recommended also in childhood to limit the progression of cardiovascular damage. Nevertheless, in a rare genetic condition, the normalization of lipid profile on diet is pathognomonic and it has to be considered falsely reassuring.

Case Presentation

First Referral

A Caucasian 7.86 years old boy with an incidental finding of hypercholesterolemia:
- Total cholesterol 524 mg/dl (13.54 mmol/L)
- LDL-cholesterol 412 mg/dl (10.65 mmol/L)
- HDL-cholesterol 52 mg/dl (3.93 mmol/L)
- Triglycerides 55 mg/dl (0.62 mmol/L)
- ApolipoproteinA 104 mg/dl; ApoB100 253 mg/dl

Medical history: parents unrelated. Family history positive for obesity and hypertension. Only his father presented a mild hypercholesterolemia (total cholesterol 242 mg/dl).

Anthropometric parameters: H-SDS -2.02 (Figure 1); z-score BMI -1.40 SDS.

Medical examination: prepubertal. No xanthoma and/or xanthelasma, no arcus corneae and/or splenomegaly.

Follow-up

The relevant improvement in lipid profile within 6 months of cholesterol-lowering diet (Figures 2 and 3):

Because of the impressive and rapid response to diet, sitosterolemia was suspected (Figure 4).

Blood plant sterol levels were: Betasitosterol 228, Campesterol 77.9 and desmosterol 2.13 mg/L (gas-liquid chromatography).

Investigations

- Genetic analysis: no mutations on ARH and LDL-R genes
- Apolipoprotein E genotype: E3/E3
- Thyroid, liver and renal function: normal
- Echocardiography: no abnormalities

Initial Therapy

He was started on diet according to Therapeutic Lifestyle Changes (from NCEP ATP III):
- total fat 25-30% of daily kcal/EER
- saturated fat <7% daily kcal/EER
- cholesterol <200 mg/day

Sitosterolemia is a rare (80-100 cases/world) autosomal recessive disorder characterized by intestinal hyperabsorption and decreased biliary excretion of dietary plant sterol, due to mutations in adenosine-triphosphate( ATP)-binding-cassette(ABC) transporter family (ABCG8 and ABCG5) (Figure 4).

Conclusions

Sitosterolemia may apparently share clinical and biochemical features with homozgyous familial hypercholesterolemia. Nevertheless, it is impressively responsive to cholesterol-lowering diet. In our report, we demonstrate a rapid reduction of severe hypercholesterolemia in response to dietary restriction in a young patient leading to the diagnosis of this rare disease. Early identification and treatment may prevent premature atherosclerosis.